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Tools of Financial Analysis

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Abstract

To evaluate the financial condition and performance of a company the financial analyst needs certain yardsticks. The yardstick frequently used is a ratio, or index relating two pieces of financial data to each other.

When comparing changes in the business's ratios from period to period, you can pinpoint improvements in performance or developing problem areas. By comparing the ratios to those in other businesses, you can see possibilities for improvement in key areas.

This paper focus on the main financial ratio calculated for the activity's entities referring to average levels registered for Romanian' entities in comparison with average level registered in Europe and generally, in the world**.**

Introduction

The primary goal of financial management is to maximize the stock price's entities but accounting data do influences stock prices and to understand why a company is performing, first of all is necessary to evaluate the information reported by financial statements.

In order to assess how business is doing, one needs more than single numbers extracted from the financial statements. Each number has to be viewed in the context of the whole picture. For example, the income statement may show a net profit of 10,000 Euros. But is this good? If this profit is earned on sales of 50,000 Euros, it may be very good; but if sales of 200,000 Euros are required to produce the net profit of 10,000 Euros, things don't look so great anymore. A 200,000 Euros sales figure may seem impressive, but not if it takes $2,000,000 in assets to produce those sales.

The true meaning of figures from the financial statements emerges only when they are compared to other figures. Such comparisons are the essence of why **business and financial ratios** have been developed.

The analysis of financial ratios involves two types of comparison.

First, the analyst can compare ***a present ratio with*** **past and expected future ratios for the same company.** The current ratio for the present year-end could be compared with the current ratio for the preceding year-end. When financial ratios are arrayed on a spreadsheet over a period of years, the analyst can study the composition of change and determine whether there has been an improvement or deterioration in the financial condition and performance over time. Financial ratios also can be computed for projected, or pro forma statements and compared with present and past ratios. In the comparisons over time, it is best to compare not only financial ratios, but also the raw figures.

The second method of comparison involves comparing ***the ratios of one firm with those of similar or with industry averages*** at the same point in time. Such comparison gives insight into the relative financial condition and performance of the firm. Sometimes a company will not fit neatly into an industry category. In such situations, one should try to develop a set, albeit usually small, of peer firms for comparison purposes.

A number of sources, including many trade or business associations and organizations, provide data for comparison purposes. Industry average is published by many companies, trade associations, and governmental agencies. For example, a variety of ratios can be found in the publications of Dun & Bradstreet's, Moody's Manual of Investments and Standard & Poor's Corporation Record.

The analysis must be in relation to the type of business in which the firm is engaged and to the firm itself.

For our purposes, financial ratios can be grouped into five types: **liquidity, debt, profitability, coverage and market value ratios.** No one ratio gives us sufficient information by which to judge the financial condition and performance of the firm. Only when we analyze a group of ratios are we able to make reasonable judgments. We must be sure to take into account any seasonal character of a business.

Liquidity Ratios

Liquidity ratios are used to judge a firm's ability to meet short-term obligations.

From them, much insight can be obtained into the present cash solvency of a company and its ability to remain solvent in the event of adversities. Essentially, we wish to compare short-term obligations with the short-term resources available to meet these obligations.

Current ratio

The ratio most commonly used to appraise the debt exposure represented on the balance sheet is the current ratio. This relationship of current assets to current liabilities is an attempt to show the safety of current debt holders' claims in case of default.

Current ratio = Current assets /Current liabilities

Presumably, the larger this ratio, the better the position of the debt holders. From the lenders' point of view, a higher ratio would certainly appear to provide a cushion against drastic losses of value in case of business failure. A large excess of current assets over current liabilities seems to help protect claims, should inventories have to be liquidated at a forced sale and should accounts receivable involve sizable collection problems.

Seen from another angle, however, an excessively high current ratio might signal slack management practices. It could indicate idle cash balances, inventory levels that have become excessive when compared to current needs and poor credit management that results in overextended accounts receivable. At the same time, the business might not be making full use of its current borrowing power.

The Rumanians current accounting rules recommends an acceptable level, around **2** (The Romanian accounting rules harmonization at EU norms, 2008).

The possible causes of a *low current ratio* are:

- Current liabilities too high
- Using short-term funds to fund long-term assets

If the firm feel it business's current ratio is too low, it may be able to raise it by:

- Paying some debts.
- Increasing your current assets from loans or other borrowings with a maturity of more than one year.
- Converting non-current assets into current assets.
- Increasing your current assets from new equity contributions.
- Putting profits back into the business

Quick ratio (acid test ratio)

This ratio is an indicator of a company's short-term liquidity. The quick ratio measures a company's ability to meet its short-term obligations with its most liquid assets, calculated as follow:

The quick ratio = Current assets- Inventories /Current liabilities

The higher the quick ratio, the better the position of the company. Also known as the "acid-test ratio".

This ratio is the same as the current ratio, except that it excludes inventories- presumably the least liquid portion of current assets – from the numerator. The ratio concentrates on cash, marketable securities and receivables in relation to current obligations and thus provide a more penetrating measure of liquidity than does the current ratio. The key concept here is to test collectibles of current liabilities in the case of a real crisis, on the assumption that inventories would have no value at all.

Companies with ratios less than 1 cannot pay their current liabilities and should be looked at with extreme caution. Furthermore, if the acid-test ratio is much lower than the working capital ratio, it means current assets are highly dependent on inventory.

Retail stores are examples of this type of business.

The possible causes of a *low quick ratio* are:

- Current liabilities too high
- Using short-term funds to fund long-term assets
- Stock too high

Solutions could be:

- Move some short-term liabilities to long-term
- Sale' leaseback of some fixed assets
- Reduce stock

Liquidity of receivables

When there are suspected imbalances or problems in various components of the current assets, the financial analyst will want to examine these components separately in assessing liquidity. Receivables, for example, may be far from current. To regard all receivables as liquid when in fact a sizable portion may be past due, overstates the liquidity of the firm being analyzed. Receivables are liquid assets only insofar as they can be collected in a reasonable amount of time. For our analysis receivables, we have two basic ratios:

❖ The first of which is **the average collection period**:

The average collection period = (**Receivables/Annual credit sales)* Days in year(365)**

❖ The second ratio is **the receivable turnover ratio**:

The receivable turnover ratio = **Annual credit sales/ Receivables**

These two ratios are reciprocals of each other. The number of days in the year, 365, divided by the average collection period, 62 days, gives the receivable turnover ratio, 5.89.

The number of days in the year divided by the turnover ratio gives the average collection period. Thus, either of these two ratios can be employed.

Liquidity of Inventories

We may compute the inventory turnover ratio as an indicator of the liquidity of inventory as follow:

The liquidity of inventory = Cost of goods sold/Average inventory

The average inventory figure used in the denominator typically is an average of beginning and ending inventories for the period.

Generally, the higher the inventory turnover, the more efficient the inventory management of the firm. Sometimes a relatively high inventory turnover ratio may be the result of a too low a level of inventory and frequent stock outs. It might also be the result of too many small orders for inventory replacement. Either of these situations may be more costly to the firm than caring a larger investment in inventory and having a lower turnover ratio. When the inventory turnover ratio is relatively low, it indicates slow-moving inventory or obsolescence of some of the stock.

Debt Ratios

Most companies finance a portion of their assets with liabilities and the remaining portion with equity. A company that finances a relatively large portion of its assets with liabilities is at a greater risk. This is because the liabilities must be repaid and often require regular interest payments. The risk is that a company may not be able to meet required payments. One way to assess the risk associated with a company's use of liabilities is to compute and analyze debt ratio.

Debt proportion analysis is in essence static, and does not take into account the operating dynamics and economic values of the business. The analysis is totally derived from the balance sheet, which in itself is a static snapshot of the financial condition of the business at a single point in time.

Nonetheless, the relative ease with which these ratios are calculated probably accounts for their popularity. Such ratios are useful as indicators of trends, when they are applied over a series of time periods. However, they still don't get at the heart of an analysis of creditworthiness, which involves a company's ability to pay both interest and principal on schedule as contractually agreed upon, what is, to service its debt over time.

In this category, we have three ratios as follows:

Debt-to-equity ratio

The **debt-to-equity ratio** which is computed by simply dividing the total debt of the firm (including current liabilities) by its shareholders' equity as follow:

Debt-to-equity ratio = Total debt/ Shareholder's equity

When intangible assets are significant, they frequently are deducted from shareholders' equity.

- A ratio greater than one means assets are mainly financed with debt, less than one means equity provides a majority of the financing.
- If the ratio is high (financed more with debt) then the company is in a risky position - especially if interest rates are on the rise.

The ratio of debt to equity varies according to the nature of the business and the volatility of cash flow. An electric utility, with very stable cash flows, usually will have a higher debt ratio than will a machine tool company, whose cash flows are far less stable.

A comparison of the debt ratio for a given company with those of similar firms gives us a general indication of the creditworthiness and financial risk of the firm.

Long-term capitalization ratio

In addition to the ratio of total debt to equity, we may want to compute the following ratio, which deals with only the **long-term capitalization** of the firm:

The long-term capitalization = Long-term debt/Total capitalization where,

- Total capitalization represents all long-term debt, preferred stock, and shareholders' equity.

This measure tells us the relative importance of long-term debt in capital structure.

The debt- to- total assets ratio

This ratio expresses what proportion of total farm assets is owed to creditors and it is obtained by compares total farm liabilities to the value of total farm assets, after formula below:

The Debt/Asset Ratio = The debt/Total assets

The ratio is one measure of the risk exposure of the farm business; thus, is important in evaluating the financial trend of the business.

The goal of many farm business operators is to approach a debt free operation. A continual lowering of this ratio is a trend in that direction. The higher the ratio, the greater the risk exposure of the farm business.

So, it is favorably appreciated a descendent evolution of this indicator and the interval of the financial safety is $[0\%, 30\%]$.

In USA, the industry average of this ratio is 40 % (Brigham E. F, 1999).

High Debt to total assets ratio:

- High debt to total assets ratio means more of the firm's assets are financed by debt relative to owners' funds.
- A high ratio requires the commitment of more funds to pay interest and repay principal amount. The failure to meet these requirements may force a company to bankruptcy.
- A company with a very high debt ratio may also find it difficult to attract additional financing.
- Positive aspects of high debt ratio are that existing shareholders can maintain control because using debt avoids the sale of new shares.

Low Debt to assets ratio:

- Generally, lower is better
- Low debt ratio means that the firm is using more of owner's capital and retained earnings to finance its assets.
- It means less risk to creditors.
- Company can borrow additional funds with relative ease.

Coverage Ratios

Borrowing money is one of the most effective things a company can do to build its business. But, of course, borrowing comes with a cost: the interest that is payable month after month, year after year. These interest payments directly affect the company's profitability. For this reason, a company's ability to meet its interest obligations, an aspect of its solvency, is arguably one of the most important factors in the return to shareholders.

There are two types of coverage ratio:

- Time Interests Earned (TIE) ratio
- The Fixed Charge Coverage ratio

Time interests earned (TIE) ratio

Interest coverage is a financial ratio that provides a quick picture of a company's ability to pay the interest charges on its debt. The 'coverage' aspect of the ratio indicates how many times the interest could be paid from available earnings, thereby providing a sense of the safety margin a company has for paying its interest for any period. A company that sustains earnings well above its interest requirements is in an excellent position to weather possible financial storms. By contrast, a company that barely manages to cover its interest costs may easily fall into bankruptcy if its earnings suffer for even a single month.

The Time Interests Earned (TIE) ratio = EBIT/ Interest charges

Because interest coverage is a highly variable measure, not only between companies within an industry but between different industries, it is worthwhile to establish some guidelines for setting acceptable levels of interest coverage in particular industries. Obviously, an interest-coverage ratio below 1 is an immediate indication that the company, regardless of its industry, is not generating sufficient cash to cover its interest payments. That said, an

interest-coverage ratio of 1.5 is generally considered the bare minimum level of comfort for any company in any industry.

Beyond these absolute minimums, determining acceptable interest coverage for an industry depends on its nature - or more specifically, the stability or consistency of its earnings.

The Fixed Charge Coverage ratio

This ratio is similar to the times-interest-earned-ratio but it's more inclusive because it's recognizes that many firms lease assets and also must make sinking fund payment.

Leasing is widespread in certain industries, making this ratio preferable to the time-interests-earned-ratio for many purposes.

Fixed charge include interest, annual long-term lease obligations and sinking fund payments, and the fixed charge coverage ratio is defined as follow:

The Fixed Charge Coverage ratio = (EBIT + Lease payments)/(Interest charges+Lease payment+Sinking fund payment (1-Tax rate))

Profitability Ratios

We turn now at the viewpoint of the owners of a business. These are the investors to whom management is responsible and accountable. So far, we have not mentioned owners directly, even though it should be quite clear that the management of a business must be fully cognizant of, and responsive to, the owners' viewpoint and expectations in the timing, execution, and appraisal of the results of operations. This is the basis for shareholder value creation, as we've said before. Similarly, management must be alert to the lenders' viewpoint and criteria.

The key interest of the owners of a business, the shareholders in the case of a corporation, is profitability. In this context, profitability means the returns achieved, through the efforts of management, on the funds invested by the owners. The owners are also interested in the disposition of earnings which belong to them, that is, how much is reinvested in the business versus how much is paid out to them as dividends, or, in some cases, through repurchase of outstanding shares. Finally, they are concerned about the effect of business results achieved-and future expectations about results-and the market value of their investment, especially in the case of publicly traded stocks.

Profitability ratios are of two types:

- those showing profitability in relation to sales
- those showing profitability in relation to investment.

Together these ratios indicate the firm's efficiency of operation.

Profitability in Relation to Sales

There are three key profit-margin ratios: gross profit margins, operating profit margins and net profit margins.

Gross profit margin

This ratio tells us the profit of the firm relative to sales after we deduct the cost of producing the goods sold. Your gross profit ratio tells you how much of each sales dollar you can expect to use to cover your operating expenses and profit. In other words, it measures the difference between what it costs to produce a product and what you're selling it for.

The formula for this ratio is:

Gross profit margin = Sales less cost of goods sold/ Sales

There are two key ways to improve your gross profit margin:

- First, it will be increase the prices.
- Second, it will be decrease the costs to produce your goods.

Of course, both are easier said than done. An increase in prices can cause sales to drop. If sales drop too far, you may not generate enough gross profit dollars to cover operating expenses. Price increases require a careful reading of inflation rates, competitive factors and basic supply and demand for the product you are producing.

The second method of increasing gross profit margin is to lower the variable costs to produce your product. This can be accomplished by decreasing material costs or making the product more efficiently. Volume discounts are a good way to reduce material costs. The more material you buy from a supplier, the more likely they are to offer you discounts. Another way to reduce material costs is to find a less costly supplier. However, you might sacrifice quality if the goods purchased are not made as well.

Whether you are starting a manufacturing, wholesaling, retailing or service business, you should always be on the lookout for ways to deliver your product or service more efficiently. However, you also must balance efficiency and quality issues to ensure that they do not get out of balance.

Companies with high gross margins will have a lot of money left over to spend on other business operations, such as research and development or marketing. So be on the lookout for downward trends in the gross margin rate over time. This is a telltale sign of future problems facing the bottom line. When labor and material costs increase rapidly, they are likely to lower gross profit margins - unless, of course, the company can pass these costs onto customers in the form of higher prices.

It's important to remember that gross profit margins can vary drastically from business to business and from industry to industry. For instance, the airline industry has a gross margin of about 5%, while the software industry has a gross margin of about 90%

Operating Profit Margin

By comparing earnings before interest and taxes (EBIT) to sales, operating profit margins show how successful a company's management has been in generating income from the operation of the business:

Operating Profit Margin = EBIT/Sales

This ratio is a rough measure of the operating leverage a company can achieve in the conduct of the operational part of its business. It indicates how much EBIT is generated per dollar of sales. High operating profits can mean the company has effective control of costs, or that sales are increasing faster than operating costs.

Operating profit also gives investors an opportunity to do profit-margin comparisons between companies that do not issue a separate disclosure of their cost of goods sold figures (which are needed to do gross margin analysis). Operating profit measures how much cash the business throws off, and some consider it a more reliable measure of profitability since it is harder to manipulate with accounting tricks than net earnings. Naturally, because the operating profit-margin accounts for not only costs of materials and labor, but also administration and selling costs, it should be a much smaller figure than the gross margin.

Net profit margin

The net profit margin tells us the relative efficiency of the firm after taking into account all expenses and income taxes, but not extraordinary charges.

The formula for this ratio is:

Net profit margin= Net profit after taxes/ Sales

Margin analysis is a great way to understand the profitability of companies. It tells us how effectively management can wring profits from sales, and how much room a company has to withstand a downturn, fend off competition and make mistakes. But, like all ratios, margin ratios never offer perfect information. They are only as good as the timeliness and accuracy of the financial data that gets fed into them, and analyzing them also depends on a consideration of the company's industry and its position in the business cycle.

Margin ratios highlight companies that are worth further examination. Knowing that a company has a gross margin of 25% or a net profit margin of 5% tells us very little without further information. As with any ratio used on its own, margins tell us a lot, but not the whole story, about a company's prospects.

Profitability in Relation to Investment

With all the ratios that investors toss around, it's easy to get confused. Consider return on equity (ROE) and return on assets (ROA). Because they both measure a kind of return, at first glance, these two metrics seem pretty similar. Both gauge a company's ability to generate earnings from its investments. But they don't exactly represent the same thing. A closer look at these two ratios reveals some key differences. Together, however,

they provide a clearer representation of a company's performance. Here we look at each ratio and what separates them.

- *Return on assets*, which is of major importance for judging management performance, and
- *Return on equity*, which serves as the key measure from the owners' viewpoint.

Return on Assets

This number tells you how effective your business has been at putting its assets to work. The ROA is a test of capital utilization - how much profit (before interest and income tax) a business earned on the total capital used to make that profit. The basic formula for return on assets (ROA) is:

ROA= Net profit/Assets

This is an important ratio for companies deciding whether or not to initiate a new project. The basis of this ratio is that if a company is going to start a project they expect to earn a return on it, ROA is the return they would receive. Simply put, if ROA is above the rate that the company borrows at then the project should be accepted, if not then it is rejected.

To get the most insight out of Return on assets we should look at the number in two different ways:

- Look at the trend in return on assets over time. A falling return on assets could indicate that the company's customers find new products much less valuable than an existing product line or much less valuable than competitor's offerings and aren't willing to pay as much for them. Older products with lower margins could be making up a bigger and bigger part of sales. An older factory simply can't produce the company's products very efficiently anymore. Management can simply be clueless about how to control expenses. A falling return on assets inevitably leads to a declining stock price as investors realize that management is earning less and less profit on the things the business owns.
- Compare a company's return on assets with the ratio at other companies in its industry. Companies with a high return on assets relative to their peers own a very powerful weapon. They are getting more profit out of each dollar of machinery or inventory, for example. That means they have more money to devote to marketing or research and such companies certainly have an easier time attracting investment capital for new factories and new products. Companies with a low return on assets are probably losing ground to competitors. A steadily falling return on assets may be a sign that this company is headed onto history's trash heap.

Return on equity or the ROE

Essentially, ROE reveals how much profit a company generates with the money shareholders have invested in it and it is calculated as follow:

ROE= Net income/ Shareholders' equity

The ROE is useful for comparing the profitability of a company to that of other firms in the same industry.

This index may vary substantially from company to company or from period to period because of the financial structure differences.

The ROE of an enterprise with a rapid growth will constantly decrease even if sales and net gains look very good. This is happening because of the initial sub capitalization of the enterprise.

Obtaining big profit with a company initially low on equity may give the ROE a staggering evolution. A decreasing evolution of the ratio must not be seen as negative - the condition is not to fall below a certain minimum limit that is admitted in the industry. An average ratio on industry for this indicator is 9,2% (Halpern P., 1998)

Also, return on equity ratio, can have a different importance from a shareholder to another, specking about the different interest of a majortar shareholder comparison with minortar shareholder.

Therefore, the majortar shareholder does a long term placement for which he doesn't need an immediately remuneration, so he won't be interested in obtain of dividend, right away. He will want to realize an acceptable level of return on equity ratio, based on the reinvest the profit and also generating a raise of entity value.

Contrarily, the minortar shareholder will be interested in a short-term ratability consist in the value of dividends received for their investment. This level of ratability is evaluated with another group of ratios we will focus later, in this paper. So, the minortar shareholder won't have a special interest for this ratio.

The Difference between ROA and ROE is All about Liabilities. The big factor that separates ROE and ROA is financial leverage, or debt. The balance sheet's fundamental equation shows how this is true: assets = liabilities + shareholders' equity. This equation tells us that if a company carried no debt, its shareholders' equity and its total assets would be the same. It follows then that their ROE and ROA would also be the same.

Market-Value Ratios

There are relating the current market price of share of stock to an indicator of the return that might accrue to the investor. This ratios focus on the current market price of stock because that is the amount the buyer would invest. Four market ratios can be used by the analysts and investors as follow:

1. Earning per share Power (EPS)

It shows how much of the company's profits, after tax, each shareholder owns.

EPS = Net income/Number of Shares Outstanding

This ratio evaluates profitability strictly from the common stockholders' point of view. This key ratio is used in share valuations.

2. Price to Earnings ratio (P/E)

This ratio measures the relationship between the current market price of the stock and its earnings per share.

P/E = Market Value Per Share/Earnings Per Share

The P/E ratio is used as an indicator of the future performance of the stocks. Analysts use the P/E ratio to predict how the stock price may react to a change in the level of the company's earnings.

In general, a high P/E suggests that investors are expecting higher earnings growth in the future compared to companies with a lower P/E. An average industry rate, for these indicators is 7 (Halpern P., 1998).

3. Market-to-book Ratio (MTBR)

Simply put, the market value of a firm divided by capital invested.

MTBR = Market Value per Share/Book Equity Value

Market to Book Ratio seeks to show the value of a company, by comparing the book value and market value. Book value is calculated from the companies historical cost, or accounting value, and market value is calculated from its market capitalization. An average industry rate, for this indicators is 0,9 (Halpern P., 1998).

4. Dividend Yield Ratio (DYR)

The indicator measures the earnings of shareholders resulting from investment in enterprise stocks.

Dividend Yield Ratio = Dividend per share/Market Price per Share

Like the P/E ratio, this ratio is a volatile measure because the price of stock may change materially over short period of time, and each change in market price or dividend payment changes the ratios.

For comparison, in the table below, we present the average performance ratios registered for Romania, Europe and world average economy:

Table 1: The main average performance ratios: Comparison between Romania, Europe and world average.

Ratios	Romania	Europe	World average
I. Liquidity ratios			
Current Ratio	1,72	1,89	1,79
Quiq Ratio	1,12	1,34	1,17
Debtors' turnover ratio	77,28	90,48	97,71
Inventory Turnover ratio (days)	102,83	96,8	178,1
Total assets Turnover (days)	514,08	323	434,5
II. Debts ratios			
Total debts to total assets	28,51 %	35,59 %	33,24 %
Long Term Debt to Total capital	16,87 %	24,43 %	20,39 %
Equity to total capital	78.16	71.91	76.12
Long term debt to total capitalization	17.75 %	25.35 %	21.12 %
III Profitability ratios			
Gross Profit Margin	30.57 %	23.84 %	24.00 %
Operating profit margin	12.43 %	8.03%	10.67 %
Cost good sold/Sales	59.61 %	70.15 %	68.6 %
Return on Equity	18,11 %	11,96 %	13,81 %
Return on assets	8,86 %	5,38 %	21,73 %
IV Coverage			
Fixed charge coverage ratio	25.41	331.5	1014.3

Sourse : Parker Philip M. (2006)

For Romania, referring to liquidity ratio, we can observe there is a good liquidity at the global economy level. The solvability ratios are bigger than even the average world level, especially by reason of a good level registered for gross or net profit There is one except, namely Return on assets, that has small level compare with average world ratio but higher than average Europe ratio. The explanation consists in a higher level of assets compare with the profit that generates it. We can also observe a very small turnover ratio for total assets, with a big level above even the average ratio. The problem is caused by the big level of fix assets and their very small turnover.

As for the solvability ratios, there is a very small debt ratios cause of mistrust for financial organization and also of the small level of their development.

In conclusion, there are no "magic" ratios which somehow encapsulate all that is important to understand about the position of particular company (Walton P, Haller A., Raffournier B, p.494) for minimum **two reasons:**

First, the ratios can only be interpreted on a **comparative, basis**. Financial analysis often use four type of standards against which ratio are compared (Short G. Daniel, 1993, Boston, p. 760):

✓ **Comparison of the ratios for the current year with the historical ratios for the same company.** Particular attention is given to the trend of each ratio over time.

✓ **Comparison of the ratios for the current year with ratios of other companies for the same year.** These comparisons include the use of ratios from other similar companies and from industry average.
✓ **Experience of the analyst who has a subjective feel for the right relationship in a given situation.** These subjective judgments of an experienced and competent observer can be more reliable than purely mechanical comparison.
✓ **Comparison of the ratios for the current year with goals and objectives expressed as ratios.** Many companies prepare comprehensive profit plans (the budgets) that incorporate realistic plans for the future. These plan usually incorporated goals for significant ratios, such as profit margin, return on investment, earning per share.

❖ **Second**, the ratios doesn't represent the final point of analyze and doesn't reflect strengths and weaknesses point of a business, only through themselves. A unilateral analyze of an individual ratio could generate wrong conclusions about the activity evaluation. It's impose that financial ratios of a specific business **to be best interpreted as a group**, rather than making judgments on individual ratios. The interpretation of one ratio may be altered by other ratios of the same business.

Also, supplementary, a compute analyze of ratio with **another dates about the entity's management or another entity's economic conditions,** it would be reflect, certainly, the fair value about the entity's activity.

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How Does FDI and Economic Growth Affect Each Other? The OECD Case

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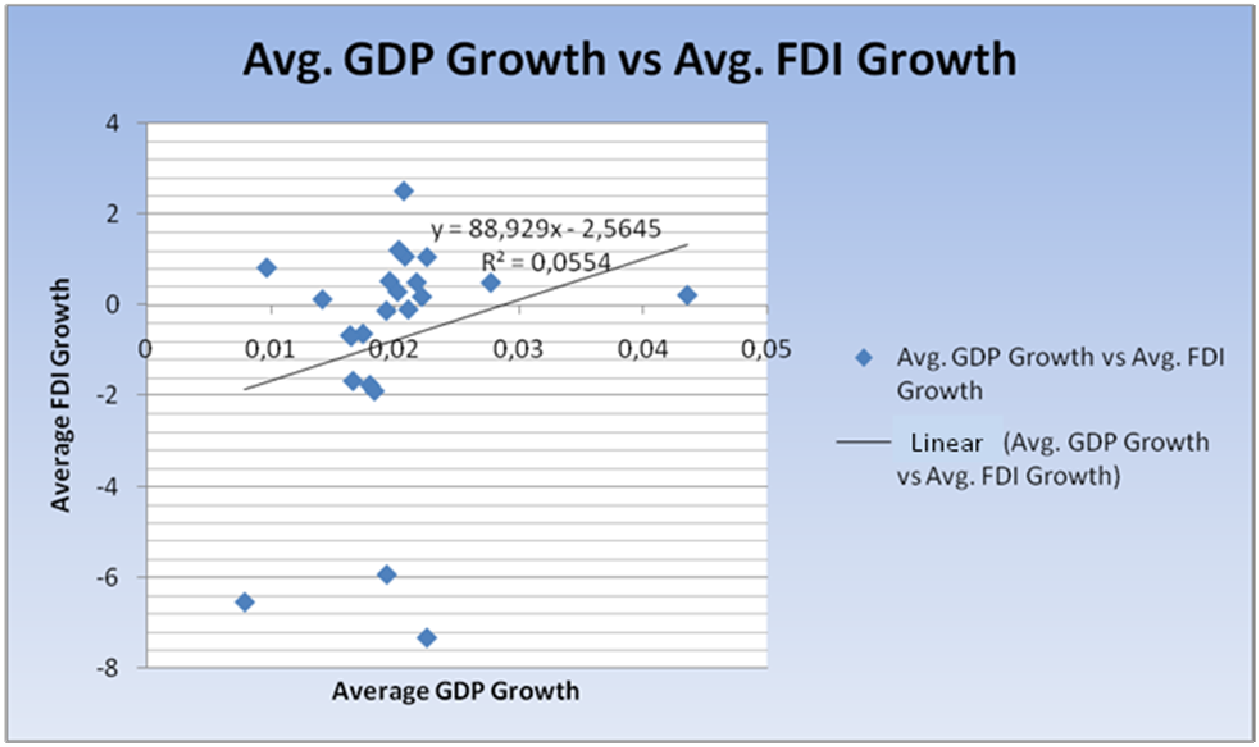
Abstract

This paper tests the endogenous relationship between FDI and economic growth using a panel dataset for 23 OECD countries for the period 1975-2004. Following the literature, we treat economic growth and FDI as endogenous variables, and estimate a two-equation simultaneous equation system with the generalized methods of moments (GMM) for the OECD case. We find that FDI and growth are important determinants of for each other. We also find that export growth rate is statistically significant determinant of FDI and economic growth. Our results indicate that there is an endogenous relationship between FDI and economic growth.

Introduction

What kind of relationship does exist between FDI and GDP growth? This is one of the interesting questions in modern times as capital movement is almost completely free to move between countries. World Bank statistics show that FDI worldwide grew 23.4 percent per annum on average between 1970-2006 and reached 1.4 trillion dollars in 2006. The huge growth of capital movement liberalization next to free trade movement indicates that there is some positive relationship between FDI and economic growth. The following graph indicates this positive relationship in one dimension: FDI growth versus GDP growth.

Figure 1: Average GDP Growth versus Average FDI Growth in OECD



The figure scatter plots average growth rate of GDP against average growth rate of FDI of OECD countries in the period 1975-2004. The figure exhibits that there is a positive relationship between average GDP growth and average FDI growth, though the latter has large variations across countries.

On possible question that one may ask on the relation between FDI and economic growth is how FDI affects economic growth? There is contradicting evidence on this issue, though most of them support the idea that FDI has a positive impact on economic growth. On the theoretical grounds, FDI may affect growth positively because FDI, which moves in general from capital-rich countries to capital-scarce economies, lower rental rate of capital and increase production via enhancing labor productivity and introducing new technology embedded in the capital. On the other hand, FDI may affect growth negatively, as it may deteriorate competition and may corrupt the development path of the country in its own interests. Most empirical works nonetheless seem to have found a positive impact of FDI on economic growth. For example, Papanek (1973), Balasubramanyam *et al.* (1996), Borensztein *et al.* (1998), Balasubramanyam *et al.* (1999), Berthelemy and Demurger

(2000), Obwona (2001), Reisen and Soto(2001), Zhang and Ram(2002), Massoud (2003), Bengoa and Sanchez–Robles (2003), Basu *et al*. (2003), Saha (2005), Li and Liu (2005), Hansen and Rand (2006), Hyun (2006), Johnson (2006), Güner and Yılmaz (2007), Basu and Guariglia (2007) found empirically that FDI enhances economic growth. On the contrary, Fry (1993) and Bornschier *et al*. (1978) found that FDI may deteriorate growth as it may distort the development part of FDI receiving economy. Interestingly, some other studies like Alfaro *et al*. (2002), Carkovic and Levine (2002), Durham (2004), and Herzer *et al*. (2008) found that there is no direct relationship between FDI and economic growth. In Annex A, we provide a more detailed review of the literature and their main findings.

The alternative question that one may ask due to figure 1 is whether economic growth has any impact on determining FDI or not? On theoretical grounds, it also has contradicting explanations. On the one hand, the higher the growth rates in a country, the higher the growth in demand, which implies greater profitability opportunities for inflowing capital. Hence, capital must prefer higher growing countries. On the other hand, lower growing economies may imply more profitability opportunities for capital, given that these economies are capital-scarce and labor abundant (if they are capital abundant and have low growth rates, it does not have any incentive for capital to move in such economies). Empirical research on the issue has mixed results. On the one hand, works by Chowdhury and Mavrotas (2006), Saha (2005) and Choe (2003) found that higher growth rates attract more FDI (=countries having higher growth rates attract more FDI). On the other hand, studies like Hansen and Rand (2006), Hsiao and Hsiao (2004) and Mencinger (2003) argue that high-growing countries do attract much FDI.

This study works out the above-discussed two fundamental questions in a simultaneous equation system for the case of OECD. The simultaneous equation setup allows us to treat FDI and economic growth variables endogenously. Heuristically speaking, our approach is rare in the literature; most empirical studies use either single equation estimation techniques or (Granger-) causality tests to determine the direction of causality. Our simultaneous equation model allows us to estimate the determinants of FDI and economic growth for OECD countries by using panel data. Moreover, following Saha (2005) and Li and Liu (2005), we use Generalized Methods of Moments (GMM) estimation technique in a panel dataset.

The organization of paper is as follows. Section 2 portrays an illustrative framework. We show that FDI determines economic growth and that economic growth is a determinant of FDI. Section 3 first describes the data and its limitations and next discusses the simultaneous equation system. Section 4 presents the findings of the model and its implications. The last section provides some concluding remarks.

An Illustrative Framework[1]

Let us assume an open economy that capital may freely move between borders. Let us further assume that domestic and foreign capital are perfect substitutes for factor of production; hence each pay the same rate of return, r, the world interest rate. Suppose that capital per person k^* that exists in a domestic country at a particular time has two possible ownerships: domestic residents and foreigners. Suppose also that k is capital per person that belongs to domestic residents. Hence, $k^* - k$ represents *total* foreign investments in

[1] This section is based on chapter 3 of Barro and Sala-i-Martin (2005).

the domestic country. For matter of illustration, we assume that $k^* - k > 0$, without loss of generality. In another interpretation, $k^* - k$ represents net claims by foreigners on the domestic economy. We assume that the model is single-good economy. The only function of openness in this model is the free movement of capital. We continue to assume that labor is immobile. The budget constraint for the representative household is

$$\dot{k} = w + (r - n) \cdot k - c \qquad (1)$$

Where k is capital per person owned by domestic residents, w is the real wage rate, r is the world's real rate of interest, n is the population growth rate, c is the consumption, and a dot on top of a variable indicates a time derivative of the variable.

Suppose that utility function of the representative consumer is defined as

$$U(c) = \int_0^{\infty} e^{-\rho t} u(c) L dt \qquad (2)$$

Where $U(c)$ is the overall utility, ρ is the subjective rate of discount, $u(c)$ is the momentary felicity function, L is the labor which grows at rate n. We assume that momentary utility is defined as $u(\mathrm{c}) = \dfrac{\mathrm{c}^{1-\theta} - 1}{1 - \theta}$, where θ is the elasticity of marginal utility.

The representative household's optimization problem implies constructing an optimal control problem, which yields:

$$\frac{\dot{\mathrm{c}}}{\mathrm{c}} = \frac{1}{\theta}(r - \rho) \qquad (3)$$

Suppose that the production technology is represented by

$$\mathrm{Y} = F(K^*, N) \qquad (4)$$

Where Y output, K^* is total physical stock available in the domestic economy, and N is labor stock. The optimization conditions for the representative firm entail equality between the marginal products and the factor prices:

$$f'(k^*) = r \qquad (5a)$$

$$f(k^*) - k^* f'(k^*) = w \qquad (5b)$$

If we substitute for w from equation (5b) into equation (1) and use equation (5a), the change in assets per capita can be determined as

$$\dot{\mathrm{k}} = f(k^*) - r(k^* - k) - nk - c \qquad (6)$$

Note from equation (6) that it would become the standard equation of motion of Ramsey if the economy were closed, $k^* - k = 0$. The difference between equation (6) and the macroeconomic budget constraint of Ramsey model is that the domestic economy is incurring rental cost for the total foreign capital that came in until time t. By definition, it must be true that $k^* - k = \int_0^t FDIdt$, where FDI is the physical capital inflow from abroad at time t. If we take time derivative of this identity, we obtain that $\dot{k}^* - \dot{k} = FDI$. Hence, we may alternatively express equation (6) as follows:

$$\dot{k}^* = f(k^*) - r(k^* - k) - nk - c + FDI \qquad (7)$$

Given that $y = f(k^*)$, the growth rate of output g is $g_y = \frac{\dot{y}}{y} = \frac{f'(k^*)k^*}{f(k^*)}\frac{\dot{k}^*}{k^*}$. Hence, the growth rate of domestic economy is positively supported by FDI, that is,

$$g_y = \frac{f'(k^*)k^*}{f(k^*)}\left[\frac{f(k^*)}{k^*} - r\frac{(k^* - k)}{k^*}r - n\frac{k}{k^*} - \frac{c}{k^*} + \frac{FDI}{k^*}\right] \qquad (8)$$

Hence, $g_y = h(FDI, Z)$, with $h_{FDI}(\cdot) > 0$ and Z represents vector of all variables that determine growth rate.

Since we have not modeled the foreign (lending) economy next to the domestic (borrowing) economy, we may directly exploit the literature on FDI on the determinants of FDI. As we know from our literature survey above, *ex ante* differences between domestic and world interest rates, the size of the economy, the growth rate of economy, export growth rate of economy all contribute to determination of FDI. Hence, we may argue that the following FDI function is capable of capturing FDI behavior:

$$FDI = f(g_y, M) \qquad (8)$$

where M represents vector of variables next to the growth rate of domestic economy that contributes to the determination of FDI.

Data, Method and its limitations

Data

FDI inflows data have been retrieved from World Development Indicators Online Database. Raw FDI data were in current US$. Per capita FDI data were formed by using populations of countries, which were collected from Penn World Table Database. Lastly, FDI per capita growth rates were calculated from these per capita FDI data. A similar procedure was applied for determining export growth rates. Firstly, exports of goods and services data were collected from WDI Online Database. Next, per capita exports values calculated by using population data from Penn World Table and finally growth rates of export per capita were found. Growth rates of per capita GDP values were directly retrieved from WDI Online Database.

Our data set consists of 23 OECD countries and covers time period of 1975–2004. We included Australia, Austria, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Mexico, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, and USA in our data set. We dropped Belgium and Luxembourg from the data set as their FDI data are not trustable. Consequently our sample size consists of 690 observations and also it is a balanced panel data set.

Simultaneous Equation System

The empirical method that is used to predict more than one equation systems is called simultaneous equation system approach. A simultaneous equation system consists of a number of *structural equations* involving several *endogenous variables* whose values are determined within the specified system. Their values also depend on several *exogenous variables* whose values are specified outside the system, and also on lagged values of variables, known as *predetermined variables.* To avoid confusion, exogenous variables are also considered predetermined. Structural equations can be behavioral, technical, identities or equilibrium conditions. If each of the endogenous variables is solved in terms of the exogenous and predetermined variables, we obtain a system of *reduced form equations.* These equations will not contain any endogenous variables but will depend on the stochastic terms of all the equations. A good example to simultaneous equation system is demand and supply equations; price and quantity are jointly determined in this system.

Although the implications of simultaneity for econometric estimation were recognized long time ago, e.g., Working (1926), the first major contribution to the area of estimating simultaneous equation system has been made by Trygve Haavelmo (1943). According to Haavelmo (1943), if one assumes that the economic variables considered satisfy, simultaneously, several stochastic relations; it is usually not a satisfactory method to try to determine each of the equations separately from the data, without regard to the restrictions which the other equations might impose upon the same variables. That this is so is almost self-evident, for in order to prescribe a meaningful method of fitting an equation to the data, it is necessary to define the stochastic properties of all the variables involved. Otherwise, we shall not know the meaning of the statistical results obtained. Furthermore, the stochastic properties ascribed to the variables in one of the equations should, naturally, not contradict those that are implied by the other equations.

If the simultaneity is ignored and ordinary least squares applied, the estimates will be biased and inconsistent. Consequently, forecasts will be biased and inconsistent. In addition, tests of hypotheses will no longer be valid (Ramanathan, 1998).

Our illustrative framework suggests that FDI contributes positively to the growth rate of FDI receiving economy, and that positive growth rate stimulates positively FDI inflows. That means there is bi-directional causality relationship between variables. Hence, we need to consider the determination of FDI and growth rate together as it is not possible to construct one-equation regression models.

Econometric Analysis

In this part of the paper, we present our results out of simultaneous equation systems analysis. In this work, our simultaneous equation system is composed of two equations:

$$g_{FDI,it} = \beta_0 + \beta_1 g_{Y,it} + \beta_2 g_{X,it} + \beta_3 g_{FDI,it}(-1) + u_{it} \quad (9a)$$

$$g_{Y,it} = \alpha_0 + \alpha_1 g_{FDI,it} + \alpha_2 g_{X,it} + \alpha_3 g_{Y,it}(-1) + v_{it} \quad (9b)$$

In (9a), $g_{FDI,it}$ is the growth rate of foreign direct investment of the i'th country at time t, $g_{Y,it}$ is the growth rate of GDP, $g_{X,it}$ is the growth rate of exports and $g_{FDI,it}(-1)$ is one year lagged value of FDI growth rate. In (9b), $g_{Y,it}$ is one year lagged value of GDP growth rate.

Growth rate of exports is the annual percentage change of goods and services exports. GDP growth rate is stated as annual percentage change in GDP. Lastly, FDI growth rate is the growth rate of foreign direct investment inflows to countries.

Before starting to an econometric analysis, unit root tests of related series must be made in order to beware of “artificial regression” problem. Because if there is a unit root problem in any series, which is used in the model, there will be no stationary in this series. Consequently, estimation results will not be economically meaningful.

There are different approaches to unit root tests. Our results with these different approaches are shown in Annex B. Unit root test results prove that our series are stationary series and they do not involve unit root problems. Hence, we can estimate our model by using these series. The following table shows the estimation results of our simultaneous equation system which was estimated by the different econometric methods.

Table 1: Estimation Results of the Simultaneous Equation System

Dependent Variables		*Independent Variables*							
		Constant	gy	gFDI	gx	gFDI(-1)	gFDI(-2)	gy(-1)	gy(-2)
1	gFDI	-137.668* (-1.92)	15.917 (0.75)	-	4.367 (0.55)	-	-	-	-
2		-323.153 (-1.58)	17.202 (0.27)	-	27.849 (0.82)	-	-	-	-
3		-404.177** (-1.99)	88.391 (1.43)	-	16.463 (0.48)	-	-	-	-
4		-244.410*** (-6.21)	18.773*** (2.61)	-	18.944*** (4.14)	-	-	-	-
5		-245.333*** (-5.99)	21.626*** (3.10)	-	19.044*** (4.16)	-0.008 (-1.60)	-	-	-
6		-220.755*** (-5.03)	15.520** (2.00)	-	17.295*** (3.62)	-0.007 (-1.37)	0.008* (1.95)	-	-
1	gY	1.260*** (10.46)	-	5.230 (0.75)	0.121*** (8.97)	-	-	-	-
2		1.226*** (4.62)	-	0.0001 (0.52)	0.142*** (3.59)	-	-	-	-
3		1.239*** (4.69)	-	0.0002 (0.76)	0.142*** (3.59)	-	-	-	-
4		1.167*** (5.90)	-	0.0002* (1.80)	0.155*** (5.02)	-	-	-	-
5		0.523*** (2.86)	-	0.0006*** (3.38)	0.127*** (4.36)	-	-	0.417*** (11.46)	-
6		0.247 (1.23)	-	0.0008*** (4.39)	0.157*** (4.98)	-	-	0.360*** (10.26)	0.114*** (4.06)

t values in parenthesis: *** %1 level, ** %5 level, * %10 level

For matter of clarity, let us suppose that "the first equation" refers to the equation that tries to identify the determinants of FDI and that "the second equation" refers to the equation that tries to identify the determinants of GDP growth. The first model uses Ordinary Least Squares (OLS) estimation method, to identify the first and second equations. t-statistics of $g_{Y,it}$ and $g_{X,it}$ in the first equation are insignificant for 1%, 5%, and 10% levels of significance.

In the second equation, t-statistic of $g_{FDI,it}$ is insignificant at all levels, while $g_{X,it}$ is significant at 1% level. Our test results indicate us that OLS regressions do not produce statistically reliable/significant results.

In the second model, Two Stage Least Squares Method (TSLS) was used to estimate the system. The results indicate that t-statistics of $g_{Y,it}$ and $g_{X,it}$ in the first equation are insignificant. Moreover, t-statistics of $g_{FDI,it}$ in the second equation is insignificant. Again, $g_{X,it}$ is statistically significant for the 1% level of significance.

In the third model, Three Stage Least Squares (3SLS) estimation technique was used in order to estimate the system. $g_{Y,it}$ and $g_{X,it}$ in the first equation, are statistically insignificant. Also, in the second equation, $g_{FDI,it}$ is statistically insignificant, too. However, t-statistics of $g_{X,it}$ is statistically significant for the 1% level of significance.

In the fourth model, which was estimated by GMM technique, although coefficients of all the variables are statistically significant at the 1% level of significance and signs are positive as expected for the first equation, and also $g_{X,it}$ is statistically significant for 1% level of significance in the second equation; t-statistics of $g_{FDI,it}$ is only significant for the level of 10%.

Fifth model is the model which consists of one year lags of $g_{FDI,it}$ and $g_{Y,it}$. It is estimated by GMM method, because model includes one year lagged values of dependent variables and this means that our model behaves as an autoregressive model. As it can be seen from the table, in the first equation only coefficient of one year lagged $g_{FDI,it}$ is insignificant. $g_{Y,it}$ and $g_{X,it}$ are significant for the 1% level of significance. However in the second equation, all the coefficients are statistically significant at the level of 1% and also signs of coefficients are as expected.

Sixth model consists both one-year and two-year lagged values of $g_{FDI,it}$ and $g_{Y,it}$, respectively. According to the estimation results of this model, only $g_{X,it}$ shows significance at the 1% level for the first equation. $g_{Y,it}$ is statistically significant for 5% level and two-year lagged value of $g_{FDI,it}$ is significant at the 10% level. However, in this

equation, one-year lagged value of $g_{FDI,it}$ is statistically insignificant. In the second equation, all the independent variables are statistically significant at the level of 1%.

As a result, from the table above, it can easily be seen that, best model for our system is certainly Model 5.

In model 5, coefficients of the variables show that FDI and economic growth are important determinants of each other. Also, it is obvious from the results that export growth rate is statistically significant determinant of FDI and economic growth. On the other hand, although both FDI and economic growth affect each other in a positive way, the effect of economic growth on FDI is larger than the effect of FDI on economic growth in OECD countries.

Our findings are mainly consistent with the literature, though there are some counter findings. Our finding that FDI inflows affect economic growth positively is also found by Güner and Yılmaz (2007), Hyun (2006), Li and Liu (2005), Saha (2005), Hsiao and Hsiao (2004), Bengoa and Sanchez-Robles (2003), Mencinger (2003), Massoud (2003), Zhang and Ram (2002), Reisen and Soto (2001), Obwona (2001), Berthelemy and Demurger (2000), Balasubramanyam, Salisu and Sapsfort (1999), Borensztein, Gregerio and Lee (1998), Balasubramanyam, Salisu and Sapsford (1996) and Papanek (1973). Contradicting evidence is given by Bornschier, Chase-Dunn and Rubinson (1978) and Durham (2004). The former study argues that FDI has especially negative impact on the growth rate of developing countries. The latter study asserts that current value of FDI does not have any positive impact on the growth rate. Johnson (2006) on the other hand argues that FDI has positive impact on developing countries but not on developed countries. As our study focuses on OECD countries, which are developed by and large, our results contradicts with this result.

Concluding Remarks

It is well known from the wide literature of economic growth that FDI is a major engine of economic growth. However, what is less understood is the two-way relationship between FDI and growth. In other words, there is an endogeneity between FDI and growth, and if this endogeneity is ignored econometric estimations will produce wrong and misleading results.

In this paper, the endogenous relationship between foreign direct investment and economic growth was examined for 23 OECD countries and 1975 – 2004 period of time. For this purpose a simultaneous equation system was established and an econometric estimation procedure was applied. Our empirical results suggest that FDI positively affects economic growth rate and also economic growth rate positively affects FDI inflows. Our results indicate that economic growth stimulates growth rate of FDI inflows more than that the growth rate of FDI stimulates economic growth.

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Annex A

Table 1: Literature Review

Author	Sample Size and Time Period	Econometric Method and Tests	Empirical Evidences
Basu & Guariglia (2007)	119 developing countries 1970 – 1999	Generalized Methods of Moments (GMM)	FDI enhances both educational inequalities and economic growth in developing countries. However, it reduces the share of agriculture sector in GDP.
Güner & Yılmaz (2007)	104 countries 1993 – 2004	Ordinary Least Squares (OLS)	FDI affects economic growth in a positive way and it provides some advantages on capital accumulation.
Johnson (2006)	90 developed and developing countries 1980 – 2002	OLS	FDI inflows accelerate economic growth in developing countries. But it is not valid for developed countries.
Chowdhury &Mavrotas (2006)	3 countries 1969 – 2000	Toda – Yamamoto Causality Test	In Chile, GDP growth is the Granger Cause of FDI but reverse is not true. In Malaysia and Thailand FDI and economic growth are Granger causes of each other.
Hyun (2006)	59 developing countries 1984 – 1995	OLS	FDI has positive effect on economic growth but lagged FDI values have no positive effects on current economic growth.
Hansen & Rand (2006)	31 developing countries 1970 – 2000	Unit Root Tests, Panel Cointegration Test and VAR Analysis	There is a strong causality from FDI through GDP growth.
Li & Liu (2005)	21 developed countries and 63 developing	Unit Root Tests, Durbin – Wu – Hausman Test, OLS	Endogenous relationship between FDI and economic growth has accelerated since the middle of 1980s. Also, relationships between FDI, human capital and technological differences effect economic

	countries 1970 – 1999		growth in developing countries indirectly.
Saha *(2005)*	20 Latin America countries and Caribbean countries 1990 – 2001	3 Stage of Least Squares	FDI and economic growth are important determinants of each other in Latin America and Caribbean. There is an endogenous relationship between FDI and economic growth.
Durham *(2004)*	80 countries 1979 – 1998	Extreme Bound Analysis (Sensitivity Analysis)	There is no direct positive effect of current and lagged values of FDI and portfolio investment on economic growth.
Hsiao & Hsiao *(2004)*	8 countries 1986 – 2004	Granger Causality Test and VAR Analysis, Unit Root Tests GMM method	There is one – way causality from FDI through GDP growth and exports. FDI and exports make positive contribution to economic growth.
Hermes & Lensink *(2003)*	67 less developed countries 1970 – 1995	OLS	Financial development level of a FDI attracting country is an important pre-condition in order to provide positive affect of FDI on economic growth.
Basu, Chakraborty & Reagle *(2003)*	23 developing countries 1978 – 1996	Unit Root Tests and Panel Cointegration Test	There is a steady state relationship between FDI and GDP growth in the long – run.
Bengoa & Sanchez – Robles *(2003)*	18 Latin America countries 1970 – 1999	Hausman Test OLS	Economic freedom is an important determinant of FDI inflows. Also FDI affects economic growth positively.
Mencinger *(2003)*	8 EU countries 1994 – 2001	Granger Causality Test	FDI affects economic growth but economic growth doesn't affect FDI.
Massoud	51 developing	OLS	FDI accelerates economic growth in both time periods (1989 – 1996

(2003)	countries 1989 – 1996 1989 - 2000		and 1989 – 2000)
Choe *(2003)*	80 countries 1971 – 1995	Granger Causality Test	FDI is Granger cause of economic growth and economic growth is Granger cause of FDI. However economic growth affects FDI growth more.
Zhang & Ram *(2002)*	85 countries 1990 – 1997	OLS	There is a positive relationship between FDI and economic growth in 1990s.
Carkovic & Levine *(2002)*	72 developed and developing countries 1960 – 1995	OLS and GMM	FDI alone has no statistically significant affect on economic growth.
Alfaro, Chanda, Kalemli-Ozcan & Sayek *(2002)*	*1. sample*: 20 OECD countries and 51 non-OECD countries 1975 – 1995 *2. sample*: 20 OECD countries and 29 non-OECD countries 1980 – 1995	OLS	FDI alone has an ambiguous affect on economic growth. However, the countries which have developed financial markets can benefit from FDI.
Zhang *(2001)*	11 East Asia and Latin America countries	Granger Causality Test	It's more possible FDI to affect economic growth in export promoting countries than import substituting countries.

	1957 – 1997 (different time periods among these years)		
Duttaray (2001)	66 developing countries 1970 – 1996	Granger Causality Test, Non-Stationarity Test	In less than %50 of selected countries, FDI affects economic growth.
Reisen & Soto (2001)	44 countries 1986 – 1997	GMM	FDI and portfolio investments affect economic growth positively.
Obwona (2001)	Uganda 1975 – 1991	2 Stage Least Squares	FDI has a positive effect on economic growth in Uganda.
Berthelemy & Demurger (2000)	24 Chinese provinces 1985 – 1996	GMM	FDI plays an important role in the economic growth of Chinese provinces.
De Mello (1999)	32 OECD and non-OECD countries 1970 – 1990	Augmented Dickey-Fuller Test, Panel Cointegration Test, OLS	There is an inverse relationship between the difference of technologically leader countries and their followers, and effect of FDI on economic growth.
Nair – Reichert & Weinhold (1999)	24 developing countries 1971 – 1995	MFR model (mixed fixed and random model) Causality Test	Although there is heterogeneity between countries, the affect of FDI on future economic growth rates is more in more open countries.
Balasubramanyam, Salisu & Sapsford (1999)	46 countries 1970 – 1985	OLS	FDI – labor force relations play an important role in the growth process.
Borensztein, Gregorio & Lee	69 developing countries	SUR Method	FDI is an important tool for technology transfer. Also, it makes more contributions to economic growth than domestic investment.

(1998)	1979 – 1989		
Balasubramanyam, Salisu & Sapsfort *(1996)*	46 developing countries 1970 – 1985	OLS	In export promoting countries affect of FDI on economic growth is more than import – substituting countries.
Fry *(1993)*	16 developing countries 1975 – 1991 (different time periods according to different countries)	OLS	In 11 developing countries, FDI affects economic growth negatively. But in Pacific Basin countries FDI affects economic growth positively. The reason of these different evidences is that, in Pacific Basin countries economic distortions are less.
Bornschier, Chase-Dunn & Rubinson *(1978)*	76 less developed countries 1960 – 1975	OLS	FDI has negative impact on economic growth in developing countries. Also, this impact increases as income level increases.
Papanek *(1973)*	*1. Sample:* 34 countries 1950s *2. Sample:* 51 countries 1960s	OLS	Savings and FDI flows affect one third of economic growth; foreign aids have more impact than other determinants on economic growth. There is no obvious relationship between FDI and foreign aids. Also, economic growth is not correlated with export, education, per capita income and country size.

Source: Constructed by authors

Annex B

Table 2: Unit Root Test Results for *FDIg*

Method	Statistics	Probability
Levin, Lin&Chu (Null Hypothesis: Unit Root)	-5.64182	0.0000
Im, Pesaran and Shin W-stat (Null Hypothesis: Unit Root)	-9.05500	0.0000
ADF - Fisher Chi-square (Null Hypothesis: Unit Root)	179.043	0.0000
PP - Fisher Chi-square (Null Hypothesis: Unit Root)	366.293	0.0000
Hadri Z-stat (Null Hypothesis: No Unit Root)	-0.18945	0.5751

Table 3: Unit Root Test Results for *Yg*

Method	Statistics	Probability
Levin, Lin&Chu (Null Hypothesis: Unit Root)	-4.83151	0.0000
Im, Pesaran and Shin W-stat (Null Hypothesis: Unit Root)	-9.57166	0.0000
ADF - Fisher Chi-square (Null Hypothesis: Unit Root)	179.632	0.0000
PP - Fisher Chi-square (Null Hypothesis: Unit Root)	262.024	0.0000
Hadri Z-stat (Null Hypothesis: No Unit Root)	0.43079	0.3333

Table 4: Unit Root Test Results for *Xg*

Method	Statistics	Probability
Levin, Lin&Chu (Null Hypothesis: Unit Root)	-7.34907	0.0000
Im, Pesaran and Shin W-stat (Null Hypothesis: Unit Root)	-11.8374	0.0000
ADF - Fisher Chi-square (Null Hypothesis: Unit Root)	226.190	0.0000
PP - Fisher Chi-square (Null Hypothesis: Unit Root)	349.215	0.0000
Hadri Z-stat (Null Hypothesis: No Unit Root)	-0.18645	0.5740

Regional Development in Şanlıurfa Province, the Center of South Eastern Anatolian Project (GAP): Key Sector Analysis

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Abstract

The challenges facing Şanlıurfa are not unique, they are the same challenges found in rural areas all around the world. Agriculture is still the most important sector in Şanlıurfa, but it is generating fewer and fewer jobs. New approaches used in regional development shift from a focus on individual sectors (such as agriculture policy) to one based on a comprehensive **multisectoral** approach in which agriculture is conceived as one component sector of a comprehensive regional development policy.

Within this framework, there are two major aims of this study. **The first aim** is to identify the **high point sectors (key industries)** by using LQ analysis in Şanlıurfa province and 11 districts. The analysis encompasses all sectors of industry and services thus excluding agriculture. On the other hand the economy of Şanlıurfa, endowed with very rich arable land resources and irrigation facilities, thanks to GAP-(South Eastern Anatolian Project), is mainly based on agriculture. Accordingly **the second aim** of this paper is to analyze the development potentials of **"clusters of agro-industries based on organic agriculture products**" in the region.

The findings of the analysis reveal that the key sectors identified in industry and services (food and textiles industries and retail and wholesale of food stuff) provide inputs from the main agricultural products in the region. On the other hand considering the availability of land and other facilities for organic agricultural products the findings of the study strongly supports development of "clusters of organic - agro industries" in Şanlıurfa Region.

Socio-Economic Profile of Şanlıurfa Province

Among the 26 NUTS 2 regions defined by State Planning Organization in the framework of regional development policies, Şanlıurfa is grouped together with Diyarbakır under the code TRC2. At NUTS 3 level its code is defined as TRC21. Map 1 shows 9 Provinces of the south eastern Anatolia.

Map 1: Şanlı Urfa in South East Anatolia Region

The surface area of Şanlıurfa located in Southeastern Anatolia Region of Turkey is 19.020 km^2 and this constitutes 3% of the total surface area of Turkey (Bulu and Eraslan, 2004). Şanlıurfa is the Center City of GAP project. Şanlıurfa is surrounded by Gaziantep in the west, Adıyaman in the northwest, Diyarbakır in the northeast, Mardin in the east, and Syria in the south. There are 11 districts including the central district. These are Akçakale, Birecik, Bozova, Ceylanpınar, Halfeti, Harran, Hilvan, Suruç, Siverek and Viranşehir.

Demographic Structure

As it may be seen in **Table 1,** total population including the central province and districts is 1,443,42 according to 2000 census. Population growth rate is 30.9 ***(‰)***, far above the average of Turkey (14.9 ***‰***). On the other hand the average size of a household in the province is higher than 4.5, the average of Turkey. It is 6.87. Namely, approximately 7 persons live in a house. When the distribution according to age is considered, the province has a quiet young population. 0-4 age group has the biggest share within population. It is estimated that the population of Şanlıurfa will reach 1.9 million in 2010 through this rapidly growing population.

Table 1: Demographic Indicators - 2000

Codes	***Total Population***	***Urban population growth rate %***	***Population growth rate (‰) 2004***	***Population density***	***Total Fertility Rate (‰)***	***Household avarege-person***
Türkiye-TR	67,803,9	64,9	14.9	86	2,53	4,5
South East Anatolia-TRC	6,608,619	62,69	21.23	86	4,57	6,48
Şanlıurfa,Diyarbakır-TRC2	2,806,130	59,15	24.6	80	4,68	6,76
Şanlıurfa-TRC21	1,443,42	58,34	30.9	75	4,83	6,87
Diyarbakır-TRC22	1,627,08	60	18.4	87	4,51	6,64
Zonguldak-TR811	615,599	40,66	-10,08	186	1,93	4,23
İstanbul-TR100	10,018,73	90,69	30,73	1,885	1,97	3,93

Source: TUİK, DPT, Annual Statistical Reports.

The economy of Şanlıurfa is based on agriculture. As it may be seen in **Table 1 and 2** nearly 42% of the population live in rural area. Urbanization rate decreases down to 30% in the districts except the central district. However, with 58% urbanization rate, the province is below the average of Turkey which is %65.

Table 2: Population Breakdown of the Provinces of Şanlıurfa

Name of District	***Total Population***	***Urban population***	***Share of urban population in total %***
Merkez	534706	385588	72,11
Akçakale	77261	32114	41,57
Birecik	74671	40054	53,64
Bozova	65842	19848	30,14
Ceylanpınar	67817	44258	65,26
Halfeti	34402	2766	8,04
Harran	56258	8784	15,61
Hilvan	38411	16094	41,9
Siverek	224102	126820	56,59
Suruç	82247	44421	54,01
Viranşehir	187705	121382	64,67

Source: TUİK, DPT, Annual Statistical Reports.

Regarding literacy rate it is very low particularly among women (52%) which is far below the average of Turkey (%80). Another striking issue is the extent of net outmigration in Şanliurfa (-39 ***(‰)***. Namely, 39 out of 1000 persons migrate from Şanliurfa. As it may be seen in **Table 3**, the province with the highest net outmigration is Zonguldak- 74 ***(‰)***, and

Antalya ranks first in term of net immigration. One needs to analyze the structure of the labor market of Şanliurfa to understand the reasons of outmigration in Şanlıurfa.

Table 3: Migration Data

Codes	***permanent Settlement population 2000***	***In-migration***	***Out-migration***	***Net Migration***	***Growth of Net Migration***
Türkiye-TR	60,752,995	40,983,56	40,983,56	0	0
South Eastern-TRC	5,687,740	212,425	4,223,15	-209,890	-36.23
Şanlıurfa,Diyarbakır-TRC2	2,419,448	96,864	194,240	-97,376	-39.45
Şanlıurfa-TRC21	1,243,058	38,320	87,632	-49,312	-38.9
Diyarbakır-TRC22	1,176,390	62,996	111,060	-48,064	-40.04
Antalya-TR611	1,451,771	171,982	81,525	90,457	64.31
Zonguldak-TR811	574,182	27,839	71,848	-44,009	-73.82

Source: TUİK, DPT, Annual Statistical Reports.

Economic structure and Labour Market

Economic structure of Şanliurfa is mainly based on the agriculture sector. According to 2000 data, the sectoral breakdown of regions GDP is agriculture (43%), services (40%), industry (11%) and construction (6%). GDP in 2000 is 1 billion 850 Million Dollars, and income per capita is 1.300 Dollars. **(Table 4).** However referring to the labour market data, we see that employment generating capacity of agriculture sector has been declining. As it may be seen in (**Table 6),** in terms of TRC2 -Urfa-Diyarbakir data, employment share of agricultural has declined from 47.4% in 2004 to 26.9% in 2006. On the other hand the share of industry in employment is increasing gradually as it increased from 12.1% in 2004 to 16.2% in 2006.

Table 4: Distribution of GNP by Sector

Codes	***Per capita GNP 1995-$***	***Per capita GNP 2001-$***
Türkiye-TR	2727	2146
Güneydoğu Anadolu-TRC	1498	1186
Şanlıurfa,Diyarbakır-TRC2	1471	1156
Şanlıurfa-TRC21	1238	1300
Diyarbakır-TRC22	1696	1313
Ağrı,Kars, Iğdır,Ardahan-TRA2	877	730
Kocaeli,Sakarya,Düzce,Bolu,Yalova-TR42	4873	4109

Source: TUİK, DPT, Annual Statistical Reports.

Table 5: Employment and Labour Force in TRC2 Region

1000 person	***2004***	***2005***	***2006***	***TRC (2006)***
Population	3.05	3.155	3.199	7347
Civilian Population 15 + ages	1.657	1.731	1.782	4214
Labour Force	649	615	575	1452
Unemployed	70	64	69	204
Employment	579	551	505	1248
Unemployment	10.8	10.4	12	14
Labour Force participation rate %	39.2	35.5	32.3	34

Table 6: Distribution of Employment by Sector

Codes		***2004***			***2005***			***2006***		
		Agriculture	**Industry**	**Service**	**Agriculture**	**Industry**	**Service**	**Agriculture**	**Industry**	**Service**
Türkiye-TR	Person Thousand	7,400	5,017	9,375	6,493	5,456	10,097	6,088	5,674	10,568
	%	34,0	23,0	43,0	29,5	24,7	45,8	27,3	25,4	47,3
Güneydoğu-TRC	Person Thousand	572	249	635	408	292	673	299	294	654
	%	39,3	17,1	43,6	29,7	21,3	49,0	24,0	23,6	
Şanlıurfa-Diyarbakır TRC2	Person Thousand	275	70	234	210	76	264	136	82	287
	%	47,4	12,1	40,1	38,1	13,8	47.9	26.9	16.2	56,8
Ağrı,Kars,Iğdır ,Ardahan TRA2	Person Thousand	209	14	94	201	18	107	172	18	116
	%	65,9	4,4	29,7	61,7	5,5	32,8	56,0	5,9	37,8
İstanbul TR100	Person Thousand	26	1,412	1,880	23	1,527	2,005	19	1,538	2,119
	%	0,8	42,6	56,7	0,6	42,9	56,4	0,5	41,8	57,6

Source: TUİK, DPT, Annual Statistical Reports.
TUİK Genel Sanayi ve İşyerleri Sayımı, Geçici Sonuçlarına Göre İl İşyeri Sayısı ve İstihdam, 2005.

Another striking point is that labour force participation rate has been declining in the recent years. The participation rate which was 39% in 2004 decreased to 32% as of 2006 (**Table 5)** Findings of a recent research carried out by State Planning Institute reveals that the number of people who have no hope in finding a job is highest in Şanlıurfa (105,000 people) among all the provinces of Turkey. On the other hand the highest number of people that leave the region for seasonal works is also very high. Declining employment opportunities in agriculture, inadequate access to education and leisure facilities and declining job opportunities in the public sector employment due to recent climate of fiscal restraint are among the main reasons of high rates of outmigration from Şanlıurfa.

Agriculture

Table 7 shows that Sanliurfa owns rich and plentiful land resources for farming activity. 1.200.572,5 hectares of its 1.858.400-hectare-area constitute the agricultural area of the region. 836.000 hectares of this area is suitable for irrigation. Currently 313.025 hectares of agricultural area can be irrigated. 167.325 hectares of this irrigation is provided by state and 145.700 hectares is provided by the public. Agricultural area of Urfa consists 13% of Turkey's agricultural area and it also constitutes 35% of agricultural area of southeastern region.

Table 7: Total Agriculture Arable Land

Regions	***Land Area – Ha***	***Percentage share %***
TRC- South Eastern Anatolia	3.453.464	13 (in Turkey)
TRC 2 Şanlı Urfa-Diyarbakır	1.995.235	58 (in TRC)
TRC 21-Şanlı Urfa	1.200.572	35 (in TRC)
TRC 22- Diyarbakır	798428	23 (in TRC)

Source: Şanlı Urfa Tarım İl Müdürlüğü, Şanlı Urfa Sanayi ve Ticaret Odası, TUİK

Şanliurfa is one of the major producers of cotton, wheat and barley in Turkey. Other farming products produce are red lentil, pistachio, grape, sesame and various vegetables. After 1995 with the initiation of GAP, there has been a great increase in cotton production; cotton production which was 277.000 tons in 1995 increased to 708,602 tons/year in 2004. **(Table 8)**

Table 8: Agriculture Products Before/After GAP

Before GAP	
Products	***Wheat, Lentil, Pistachio, Sesame, Barley***
After GAP	
Products	***Ton/year***
Wheat	1442884
Barley	762767
Lentil	209314
Sesame	5368
Cotton	867790
Corn	18300
Pistachio	42097
Tomato	81507
Aubergine	53352

Source: Şanlıurfa Tarım İl Müdürlüğü

In Turkey, 30% of total cotton production; 11% of total dry legumes production; 6.4% of total barley production; 4% of total wheat production is provided by Şanliurfa.

Farming of Animals

Sheep and goat farming is at the forefront in terms of husbandry. In spite of the fact that bovine breeding is not at expected levels, it is improving gradually. In 2006, the amount of farmed animals are as follows; sheep and goat 1.584.495 unit/per year,; cattle breeding 144. 848 unit/per year; poultry 1.010.097 unit/per year; bee hive 8.491 unit/per year.

As it may be seen in **Table 9**, almost 2000 tons of meat was produced in the region in 2002.

Table 9: Manufacture of Meat Products (2002)

Products	***Amount***
Meat (Ton)	*8.688*
Leather (Unit)	*168.573*
Milk (Ton)	*166.495*
Honey (Kg)	*90.143*

Source: Şanlıurfa Tarım İl Müdürlüğü

Atatürk Dam and Euphrates River offer valuable potentials in terms of fisheries and fish breeding. Total 38,835-hectare of water surface comprises 1430 hectares of ponds and nearly 37,405 hectares of dam area. The potential of this area in terms of fishery products is of great importance. Implantation works carried out to protect and increase available fishery products potential in lakes, pounds and dams, and to make use of the new resources efficiently have an important impact on the development of fishery in the province. Total

production of fishery products is 405 tons as of 2001 in the region, and 30 tons of this figures was provided by aquaculture. As a result of the studies to be carried out in the region it is expected that the production will reach 3700 tons through hunting and 2000 tons through aquaculture. The available production which is 405 tons/year will reach 5700tons/year.

According to a study entitled **"Regional Development Policies in Turkey"** carried out by **TUSIAD,** Urfa-Diyarbakır Region, **among** the 26 NUTS 2 Regions;

- Ranks first **in field crops** (1.6)
- Ranks last **in fruit and vegetable** (0.3)
- Ranks second **in sheep and goat farming after** TRB2 (Bitlis, Hakkari, Van, Muş) (1.77)
- Also ranks among the top provinces in **meat production** (1.78)

A crucial problem in the region is the salting of land due to over irrigation which is also called high ground water. 1.512 hectares of the total land area has already been suffering from this problem. Drainage works and reconstruction works are underway in order to tackle this issue.

To sum up, inspire of the many problems, agriculture still plays an important role in shaping the rural landscape and the regions economy therefore it remains a wellspring of regional support for development. However, this would make sense if agriculture were conceived more as a part of a regional restructuring process towards multisectoral approaches, than as a traditional sector producing commodities**.**

Industry

While the share of employment in agriculture has been declining, the employment share of industry has been increasing and reached 16.2 % in 2006. The number of the firms employing 2 or more workers in manufacturing sector increased rapidly in recent years and this number is 2.933 as of 2002. With regards the industry sector as a whole (manufacturing, electricity, gas and water and construction) the number of companies and the number of workers are 3138 and 16392 consecutively.

In 1992, contractions works for First Organized Industrial Zone was launched and it was completed in 2000 except waste treatment facilities. 295 industry parcels were allocated to 148 entrepreneurs. As of today, 135 factories are operating, 23 factories are under construction, and 11 factories are in the phase of project. When all of these facilities are completed in 1. Organized Industrial Zone where 4.500 people are employed, in total 8.000 people will be employed.

Since the First Organized Industrial Zone could not meet the demands of high number of entrepreneurs, construction works for the Second Organized Industrial Zone was launched. The total area of 2. Organized Industrial Zone which was included in 1997 investment Programme is 1186 hectares.

Industry and Services Sectors in Şanlıurfa: Key Sector Analysis

Clusters and Key Sector Analysis

The idea that national economic success depends, in part at least, on the development of localised concentrations of industrial specialisation can be traced back more than one hundred years to Alfred Marshall (Marshal, 1949). He argued that Britain's economic growth and leadership during the 19th century was founded on the development of several examples of localised industries. Examples include cotton textiles in Lancashire, the potteries district around Stoke, furniture around High Wycombe, and so on.

A century later, economists have rediscovered Marshall's work on industrial localisation. Their argument is that regional economic agglomeration and specialisation can maximise the potential offered by technological, market and other externalities that underpin increasing returns hence the more geographically localised is an industry within a given nation, the more internationally competitive that particular industry is likely to be (Porter, 1990, 1998; Krugman, 1991, 1993; Antonelli 2003).

Porter's identification of these contemporary local economic agglomerations has been especially influential, and his term 'industrial cluster' has become the standard concept in this field. Porter's concept of 'clusters'(Porter, 1990), originated in his work on international competitiveness argues that the leading exporting firms in a range of different countries are not isolated success stories but belong to successful groups of rivals within related industries. These groups are termed clusters, which refers to industries related by horizontal and vertical links of various kinds.

The definition of Clusters according to M. Porter is as follows:

Clusters are Geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions (for example, universities, standards agencies, and trade associations) in particular fields that compete but also co-operate" (Porter,1998.op. cit. page 197)

Accordingly clusters lead to higher growth in three main ways.

-*First*, they raise productivity by allowing access to specialized inputs and employees, by enhancing access to information, institutions and public goods and by facilitating complementarities.

-*Second*, they increase firms' capacity for innovation by diffusing technological knowledge and innovations more rapidly.

-*Third*, clusters stimulate higher rates of new business formation, as employees become entrepreneurs in spin-off ventures. Over the past few years, the cluster approach has found an audience amongst policy-makers at al levels. The idea is that governments and local authorities can help to provide the business and institutional environment necessary to cluster success. Identifying high point sectors and industries at the regional level is a prerequisite for cluster study.

Over the past few years the cluster approach has found an audience amongst policy-makers at al levels. The idea is that governments and local authorities can help to provide the business and institutional environment necessary to cluster success. In Turkey in the framework of the nations accession to EU, there has been a number of case studies realized which aim at identifying high point industries at NUTS 1 and NUTS 2 levels Some of those studies have been analyzed by Akgüngör, Kumral and Lenger (2003), Kumral and Deger (2003), Akgüngör (2003), Kumral and Değer (2004), TUSIAD and DPT (2005). These studies have had significant contributions to Turkey's regional development issues both at theoretical and political levels. However the scope of the majority of such studies is limited to the manufacturing sectors.

High Point Industries (Key Sectors) Analysis in Şanlıurfa

The scope of our study covers the entire industry and services sectors in the Province of Şanlıurfa. It aims at investigating each and every regional sector to determine whether and to what extent they may form high points in the province. Hence the findings of this study is expected to contribute to the previously realized studies

Method

In this study by making use of 4 digit NACE 1.1 codes, employment data belonging to the years of 2002. The specialization and concentration levels for Şanlıurfa Province in the industry sector and services sector have been calculated by using Location Quotient Index.

The fundamental quantitative measure of firm activity we use in Şanlıurfa province is that of employment. We will use a relative measure of employment density known as the location quotient (LQ) as the main technique to determine the degree of localization of a given sector. We used a methodology similar to DTI's application on UK to identify high point industries and clusters (DTI, 2001; 14).

The questions of scale and significance are central to the analysis hence our study attempts to identify the high point sectors in terms of comparative scale; the size of the sector in relation to the relevant sector nationally. Hence all the LQ values of each sector within the industry and services sectors will be calculated. LQ is defined as follows:

$$LQ = (Eij/Ej)/(Ein/En) \text{ or } LQ = (Eij/Ein)/(Ej/En)$$

Eij employment in industry in region *j,*

Ej is total employment in region *j,*

Ein is national employment in industry *i,* and En is total national employment relative to the region's share of a given industry's national employment.

Firstly, LQ values have been calculated that high point industries of individual region.

The LQ values will measures the share of a given industry's employment in Şanlıurfa relative to the region's share of total national employment.

An LQ greater than1.5 indicates that there is an above average proportion of employment in a given industry in a given region. Conversely for an LQ of less than 1.5. Those sectors with an LQ value greater than 1.5 will be identified as key sectors (high point sectors) in Şanlıurfa.

Sectors Besides the Agriculture Sector include Industry sector and Services Sector. Sub sectors are as follows:

Industry Sectors: Manufacturing Industry (D); Electricity, Gas and Water (E); and Construction (F)

Service Sectors : Wholesale and Retail trade (G) ; Hotels and restaurants (H), Transportation, Storage and Communication (I), Activities of Financial Intermediary Institutions (J), activities of Real estate, Renting and Business (K), Education (M), Healthy Affairs and Social Services (N), Other Social and Private Activities (I)

The sector level data that used is from two sources: Firstly from the "Manufacturing Industry Surveys" and 1992 and 2002 "General Census Of Industry And Business Establishments" provided by the State Statistics Institute of Turkey. The second data source will be Chambers of Industry and Trade of Şanlıurfa. The data is based on four digits Nomenclature of Economic Activities (NACE).

Empirical Results

- High Point Sectors In Industry

As seen in Table 10, 19 High Point Industries have been identified in Şanlı Urfa Region's Manufacturing Industry. The main high point sectors identified are basically in food products and in the textile sector.

Food Industry, the high point sector with the highest LQ value is Manufacture of Diary Products (code. 1551; LQ = 21.26). Other high point sectors with high LQ values are Manufacture of Bakery Products (1581) and Manufacture of Vegetable and animal oil and fats (1541).

Textile Industry, Only one high point sector, preparation and spinning of cotton type fibers (1711) has been identified**.** As indicated above Urfa is the major cotton producer in Turkey. 1711 sector constitutes the first stage in textile production and most of the companies among the 57 sited in the table are mainly cotton fibers spinning factories**.** The share of identified high point food industries and textile industry within the total manufacturing employment is (54 .1 %). The share of these within the total number of establishments in manufacturing industry accounts to (35.2 %).

Other high points industries identified are those sectors that provide input to the fast developing construction sector which accounts for 11% of the GDP in Şanlıurfa. These high point sectors are manufacture of builder's carpentry (2640), manufacture of bricks and tiles and construction products in clay (2661) and manufacture of plaster products for construction (2662).

Treatment and coating of metals (2851) is another key industry with a high LQ (4.2) value identified in Urfa. Urfa with its very rich cultural and religious heritage and historical places is an important tourist site in the South Eastern Anatolia. The high LQ values of 2851 sector is due to the very lively souvenir products trade in the city. A majority of the souvenirs are made form various metals and especially form copper.

Manufacture of pumps and compressors (2912) and manufacture of other agricultural machinery are two other key sectors identified. The agriculture based structure of the province gives rise to development of these industries in the city.

In general the share of the 19 high point manufacturing industries in the total manufacturing sector's employment of Şanlıurfa is as high as (74%). On the other hand share of establishments of these sectors in the total number of establishments in the manufacturing industry is (67.2%).

In the industry sector apart from the manufacturing industry four sub sectors are identified as key industries (high point sectors) in the region. Among these;

Construction of water projects (4524) is identified as having a very high LQ value (16.22). The significance of this industry is due to the South Anatolian Project - GAP and the Atatürk dam constructed in the region.

General Construction of Building and Civil Engineering Works (4521) is also another high point sector identified. This is due to the fact that Şanlıurfa has been receiving inward migration from the various provinces in the South Anatolian Region which gives rise to the flourishing of the constructions sector especially in the central province.

Table 10: Key Sectors in Şanliurfa Industry Sector

MANUFACTURING INDUSTRY (D)	Codes	LQ Value	Number of Firms (unit)	Number of Employees
Manufacture of food products, beverages and tobacco				
- **Manufacture of crude oils and fats**	1541	2,615745	9	86
- **Operation of dairies and cheese making**	1551	21,26409	6	1727
- **Manufacture of ice cream**	1552	2,448733	9	19
- Manufacture of grain mill products	1561	2,556871	142	324
- Manufacture of bread; manufacture of fresh pastry goods and cakes	1581	6,210733	803	3315
Manufacture of textiles and textile products				
- Preparation and spinning of cotton-type fibres	1711	2,005054	57	966
Manufacture of wood and wood products				
- Manufacture of builders' carpentry and joinery	2030	2,540999	366	766
Manufacture of other non-metallic mineral products				
- Manufacture of bricks, tiles and construction products, in baked clay	2640	1,957132	57	189
- Manufacture of concrete products for construction purposes	2661	2,268367	8	121
- Manufacture of plaster products for construction purposes	2662	2,436588	5	22
- Manufacture of ready-mixed concrete	2663	1,857636	6	105
Manufacture of fabricated metal products, except machinery and equipment				
- Manufacture of builders' carpentry and joinery of metal	2812	2,452018	106	270
- Forging, pressing, stamping and roll forming of metal; powder metallurgy	2840	1,113881	47	105
- Treatment and coating of metals	2851	4,265273	183	317
Manufacture of machinery and equipment n.e.c.				
- Manufacture of pumps and compressors	2912	2,556782	19	92
- Manufacture of agricultural tractors	2931	1,19153	11	34
- Manufacture of non-electric domestic appliances	2972	1,900737	42	106
Manufacture of electrical machinery and apparatus n.e.c.				

- Manufacture of electric motors, generators and transformers	3110	1,946323	10	73
- Manufacture of jewellery and related articles n.e.c.	3622	1,315522	82	103
(D) - KEY MANUFACTURING SECTORS (D) TOTAL			**1,968**	**8,740**
ELECTRICITY, GAS, WATER (E) and CONSTRUCTION (F)				
- Collection, purification and distribution of water	4100	1.12955	8	224
- Test drilling and boring	4512	1.595	7	14
- General construction of buildings and civil engineering Works	4521	2.03	67	1993
- Construction of water projects	4524	16,2211	3	794
- Other building installation	4534	1.45	32	47
Key sectors in E and F Total			**117**	**3,072**
Key Sectors in D, E and F Total			**2,085**	**11,812**

- High Point Sectors in Services

We identified two main services sectors that have LQ values greater than 1.5. These are

Code	SECTORS	LQ value
G	Wholesale and Retail Trade	1.87
I	Communication and Transportation	1.85

Most of the sub sectors within these two sectors have LQ values greater than one. Those subsectors that have LQ values greater than two are as follows (see Annex for LQ values of the sectors)

Services Sectors Having Lq Value Greater Than Two:

- Sale, maintenance and repair of motorcycles and related parts and accessories 5040
- Agents involved in the sale of furniture, household goods, hardware and ironmongery 5115
- Agents involved in the sale of food, beverages and tobacco 5117
- Wholesale of grain, seeds and animal feeds 5121
- Wholesale of dairy produce, eggs and edible oils and fats 5133
- Non-specialized wholesale of food, beverages and tobacco 5139
- Retail sale of meat and meat products 5222
- Retail sale of textiles 5242
- Freight transport by road 6024

Wholesale and Retail Trade, is a sector that has been growing in the recent years both in terms of its share in GDP of the region and also in employment. Its share has increased from 40% in 2004 52% in 2006. On the other hand the key sectors identified in our analysis are those services sectors that have a close input-out relationship with the agriculture sector such as wholesale of seeds, dairy products, retail sale of meat and meat products and textiles.

Freight Transport by Road has been found to have a very high LQ value (4.08). The main reason of this high share is due to the fact that Şanlıurfa is situated on the main road between Mersin Port and Habur Customs Gate to Iraq. In the recent years military equipment and food stuff arriving at Mersin Port are transported by road to Iraq through the Habur gate. On the other hand after the competition of reconstruction Works at Akçakale Customs Gate which is on the border between Şanlıurfa and Syria, freight Transport by road sector is expected to flourish even further.

Organic Agriculture and Sanliurfa

It is estimated that organic agriculture is carried out in more than 24 million hectares all over the world. The biggest parts of this area is in Australia (nearly 10 million hectares), Argentina (nearly 3 million hectares) and Italy (nearly 1.2 million hectares). While Australia has 42% of the organic agriculture area in the world, North America follows it although Latin America and Western Europe ranked first in the world for a long time in terms of organic food and beverage market. The sale of organic products reached 10.5 billion Dollars by increasing 8% in 2002. In 2002, Germany, the biggest market in Europe, spent 3.06 billion Dollars for organic agriculture; England, the third biggest market in the

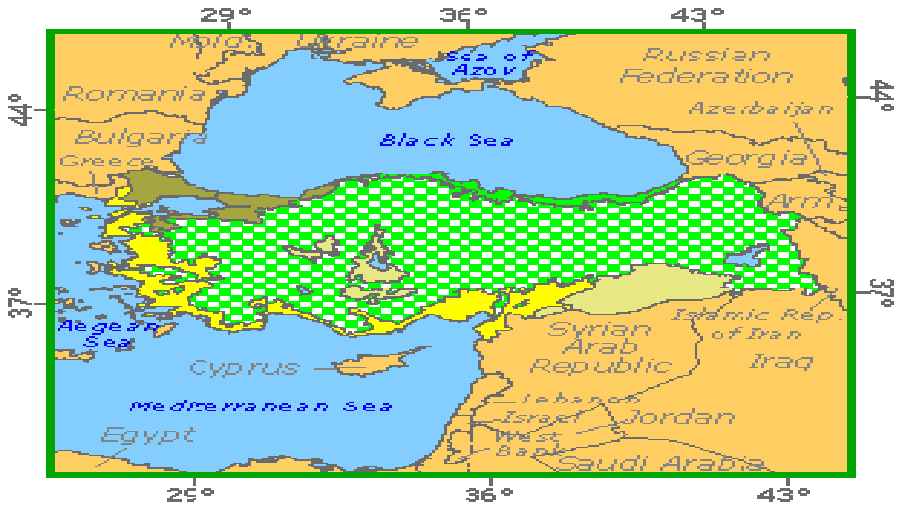
world spent 1.5 billion Dollars; and the markets of Italy and France spent 1.3 billion Dollar. North America organic product market is the fastest growing one in the world.

The sale of organic food and beverages reached 11.75 billion Dollars with an increase of 12% in 2002. Although the second largest organic agriculture area is in Latin America, it has a very small market in terms of marketing of these products (Turkishtime, 2004).

According to the estimations, the world's trade volume regarding organic products will increase from 11 billion Dollars to 100 billion Dollars within the next 10 years. Actors both public and private all around the world and especially in European countries, have realized the huge potentials this sector may offer and hence organic agriculture promises huge development prospects in the future

Ecologic Agriculture Organization Association (ETO) was established in 1992 in order to materialize a sound ecologic (organic) agriculture movement in Turkey. "II. Conference on Ecologic Agriculture in Mediterranean Countries" was held in Izmir by ETO within the same year. With the initiation of a new perspective on ecological agriculture in Turkey, Izmir city has become the leading center of this movement. Currently 12.275 organic producers produce 168.306 tons of 92 different types of ecologic products cultivating on a 46.523 hectare land area. Although there is lack of accurate data regarding net contribution of ecologic agriculture sector to the economy via exports which is due to various problems in customs legislation, it is estimated that this figure is nearly 150 million dollars.

Map 2: Ecological Zones in Turkey by FAO



Organic Agriculture in Şanlıurfa[2]

After 1995 with the introduction of GAP irrigated farming (as contrary to dry farming) became widespread in Şanlıurfa. Majority of the farmers started to plant cotton, which had a ready market outside hence spectacular increases in cotton production. However as a result of excessive irrigation, serious problems emerged such as salinity, drought and pollution of the soil through pesticides

The eligible areas for organic agriculture in Şanlıurfa province are in Siverek, Karacadağ, Bozova, Birecik, Akziyaret, Viranşehir, Hilvan geographic borders. On the other hand after the removal of land mines, a very large area suitable for organic agriculture will be obtained.

Map 3: Organic Agriculture Zone in Şanlıurfa

Organic Agriculture Products in Şanliurfa

Medical and Aromatic Plants

Anasone, Fenugreek, Cummin, Coriander, Mint (Mentha Piperita L. or the plant named as English mint has pharmacologic peculiarities and Turkey exports this product.), Thyme, Crocus (The market value of per kilo is almost 2000 USA Dollars. Its added value is quite high and it is in line with genetic material of Şanliurfa. It can only grow around Safranbolu in Turkey. The pilot production of this plant was carried out by GAP- (Agricultural Development Önder Çiftçi Consultancy Association.)

Nuts

Pistage, Almond, *Industrial Plants,* Cotton, Corn, Soy bean.

[2] GAP-GİDEM Entrepreneur Support Centers have been carrying out cluster analysis in the South-eastern Anatolia Region within the framework of EU-GAP Regional Development Programme 2002-2007 and in collaboration with UNDP. The below information is based on the findings of the Report on Organic Agriculture Clusters in Şanlıurfa (Bulu and Eraslan 2004)

Fruit trees

Fig, Grapes, Plum, Olive.

Vegetables

All kinds of vegetables can grow. The vehicles having “interfolding” feature is necessary in order to transport the vegetables.

Cereals and Grain

Barley, Wheat, Lentil, Chickpea.

Natural Flora

Reverse/Crying Tulip (The liquid that comes out from the plant represents the tears of Virgin Mary.)

Organic Husbandry

As it may be known, crop shift is necessary for organic agriculture. Within this context, fodder crops are advised as alternative products. “Fodder cost” in husbandry constitutes 70% of the total cost. Hence the product obtained from fodder crops during organic agriculture application will be used in organic fodder production, and in line with this practice, organic husbandry will improve in the region.

On the other hand the sub sectors of poultry and apiculture could not improve since the climate and geographic conditions of the region impede those. Only in Karacadağ area, there is an environment known as suitable for apiculture, and small scale apiculture is carried out there.

State of the Art

In Sanlıurfa Province, there are a limited number of producers producing via utilizing organic agriculture method. The products are as follows: medical and aromatic plants such as mulberry, pomegranate, tomato, grapes, wheat, soy bean, nigella, and pistachio and spices. Ceylanpınar is pretty suitable for organic milk.

Actors in Şanliurfa Organic Agriculture Group

A) Producers

Companies of Roza Ecologic Agricultural Nutrition Products Corp. and Selim Uludağ Organic Agriculture Corp., and farmers; İbrahim Ethem Polat and Mehmet Emin Yıldırım carry out organic agriculture. General Directorate of Ceylanpınar Agriculture Enterprise produces organic cotton and peanut as a trial. Moreover Koç-Ata-Sancak Nutrition and Agricultural Products Corp. operating as one of the most modern agriculture enterprises in the region has the potential yet it has no organic agriculture activity.

B) Non Governmental Organizations:

- *GAP Agricultural Development Önder Çiftçi Consultancy Association*
- *GAP Sustainable Agricultural Development Association*
- *AGRO-GAP Önder Çiftçi Consultancy Association*

C) DATA generating Institutions

- *Harran University, Faculty of Agriculture*
- *Siverek Vocational School of Higher Education*

D) State and Public Institutions

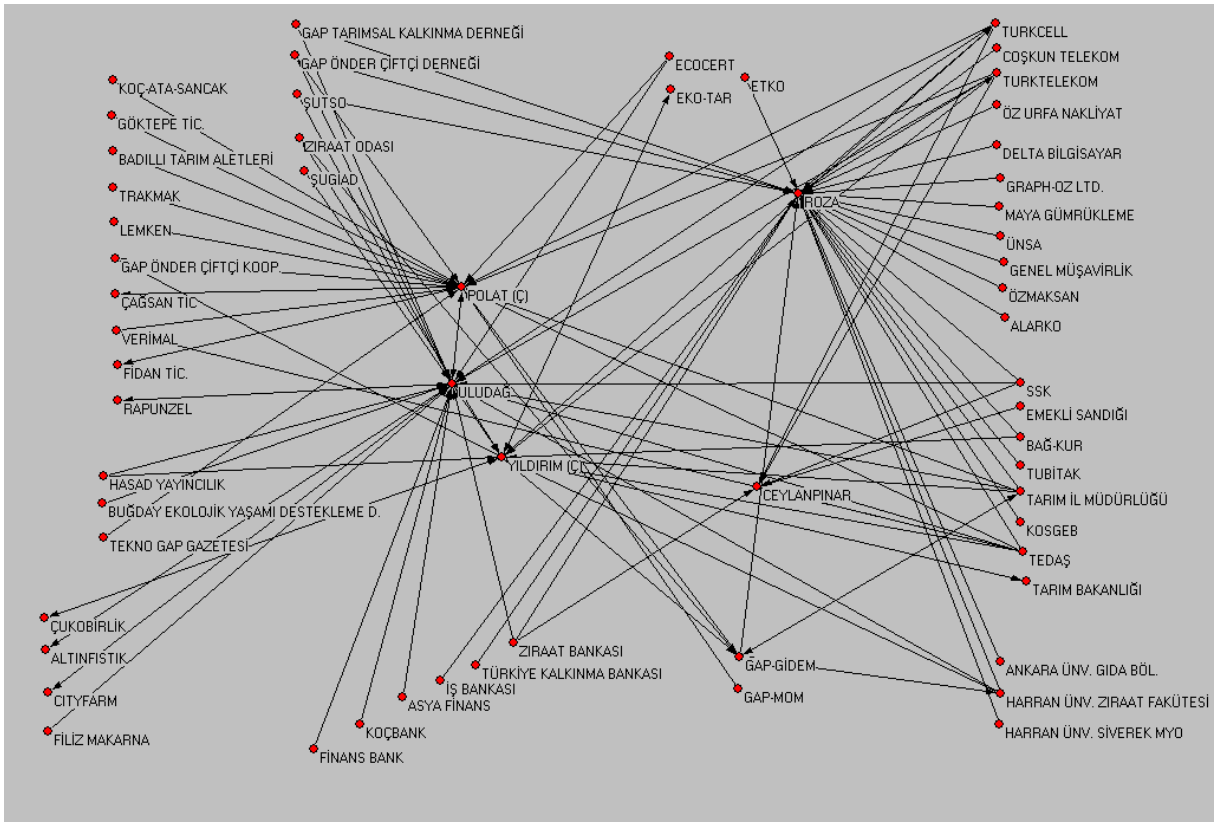
- *GAP - GİDEM*
- *Provincial Directorate of Agriculture*
- *Social Security Authority (SSK)*
- *Social Security Organization for Artisans and Self Employed (Bagkur)*

E) Other Institutions

- *Şanlıurfa Trade and Industry Chamber (ŞUTSO)*
- *Şanlıurfa Young Businessman Association (ŞUGİAD)*

F) Customers

Map 3: Şanliurfa Cluster Map



Source: Bulu and Eraslan, 2004.

- Major players, namely producers are limited
- The relations with certification organizations are weak
- Financing demand: Banking sector is advanced in the region yet new financing opportunities may be provided
- There is no adequate network with NGOs but there are relations between them
- There are few customers and most of them are domestic. This field should be certainly improved.
- The relations with data generating institutions are very weak
- There is adequate infrastructure that will meet energy demand
- The relation with GİDEM is developed
- There is quite limited relation with TÜBİTAK

According to the level analysis in grouping, the density of the other players; particularly public institutions and data generating institutions is relatively limited. It is of great importance that these players have active roles in terms of sound development of grouping in long run. For instance, there is only one network with TÜBİTAK.

Moreover, the density figure is 0.0376. The value of density is very close to zero. This demonstrates us that there is a limited relation between players. However, in spite of the fact that this situation indicates a weak grouping, it is seen that there is a serious potential to be acquired by enhancing the relations between players.

Findings and Conclusion

The challenges facing Şanlıurfa regarding its economic development is not unique, they are the same challenges found in rural areas all around the world. Although agriculture is still the most important economic sector in Şanlıurfa (with 42% of the population living in rural areas and the agriculture's share in regions GDP amounts to 43%), it is producing fewer and fewer jobs. This is evident from the fact that the employment share of agriculture has fallen from nearly 48% in 2004 to 26% in 2006 in TRC2 region. The region suffers from the highest outmigration rates all over Turkey. Declining employment opportunities in agriculture, inadequate access to education and leisure facilities and declining job opportunities in the public sector employment due to recent climate of fiscal restraint are among the main reasons of high rates of outmigration.

New regional development approaches and policies are responding these challenges in many different ways; and successful policies appear to have some common traits. First, regional policy in rural areas shifts from a focus on individual sectors (such as farm policy) to one based on territories or regions which involves coordination of policies at the regional level. Second the coordination of policies at the regional level often means forming partnership among various public departments and agencies, knowledge producing institutes as well as private and non profit sectors. (M.Pezzini, 2001). Third, regarding the identification of the sectors that have high growth potentials in the region and also the relevant policies to be implemented, "cluster" approaches have proved to be successful.

One important feature of Şanlıurfa is that due to its agricultural basis, rich land endowment, suitable climate and clean and arable land the region has high potentials for the improvement of organic agriculture sector. As a matter of fact local public departments and agencies consider the improvement and hence support of organic agriculture to enhance the region's economy. (M. Sayın, 2000). The organic cluster map study carrried out by GAP- GİDEM- Eastern Anatolian Project Entrepreneur Support Centers, reveals that there is a strong potential for the improvement of organic agriculture, however the network relations between the possible actors of an organic cluster are still weak.

Based on this background, this paper tried to find out the development potentials of an **agro-industry cluster** based on organic agricultural commodities in Şanlıurfa. The findings of the study based on LQ analysis and regarding the identification of high point industries (key sectors) in the industry and services sectors of Şanlıurfa, reveal that there is a strong potential for the improvement of an industrial structure based on organic agricultural products.

Our findings reveal that the majority of the key sectors of **industry** in Şanlıurfa are concentrated in either manufacturing of food products or preparation of textile fibres, industries that have their basic inputs obtained from the agriculture. The following list shows the key industries in Şanlıurfa revealing high LQ values

Key Industries	**LQ values**	**Basic Inputs from Agriculture**
Manufacture of crude oils and fats	2.6	Sesame, corn and cotton
Manufacture of diary products	21.1	Milk
Manufacture of Grain Mill products	2.5	Wheat
Manufacture of bread, Pastery and bread	6.2	Wheat
Preparation and Spinning of Cotton type fibres	2.0	Cotton

On the other hand the findings also support the fact that the majority of the key sectors identified in the **services** sector are involved in wholesale and retail trade of food and textile industry products. Services sectors with LQ values greater than 2 are:

- Agents involved in the sale of food, beverages and tobacco (code: 5117)
- Wholesale of grain, seeds and animal feeds (code:5121)
- Wholesale of dairy produce, eggs and edible oils and fats (code: 5133)
- Non-specialized wholesale of food, beverages and tobacco (code: 5139)
- Retail sale of meat and meat products (code: 5222)
- Retail sale of textiles (code:5242)

Clusters include spillovers of knowledge and enhance collective learning hence they play a crucial role in promoting innovation and entrepreneurial dynamics. Clusters are important because they allow companies to be more productive and innovative than they could be in isolation. The major actors of clusters are buyers and sellers interconnected to each other in a value added chain with forward and backward linkages. The key sectors identified in the industry and services sectors of Şanlıurfa demonstrate that such a value added chain of buyer - seller relations exists between these key industries and the conventional agricultural product sectors.

Past development policies tended to focus on rural areas as one uniform block treating them as homogenous with similar problem and opportunities and the policy design and implementation were basically based on subsidizing one sector such as the farming sector. Such an approach no longer reflects the present development opportunities for rural regions. Because each rural region have certain characteristics and resources – as geographic location, topography and climate, natural resource endowments, industrial heritage and endowments of human, physical and social capital - that shape their development trajectory and potential (M. Pezzini, 2001). Together with the new impetus in regional development policy there is a shift from an approach based on subsidizing sectors to one based on strategic investments and hence identification of possible development strategies per type of region.

In the light of the analysis carried out in this study and also of the new approaches in regional development policy, this paper lends support to the following three issues for Şanlıurfa Region:

First, agriculture still plays an important role in shaping the economy of Şanlıurfa and it remains as a wellspring of support for development. However, this would make sense if agriculture were conceived more as part of a restructuring process towards a multisectoral approach than as a traditional sector being subsidized.

Second, bearing in mind that the local public departments and agencies in Şanlıurfa give priority to the development of organic agriculture sector and cluster formation in shaping regions' development, organic agriculture cluster will constitute one component of such a multisectoral development strategy.

Third, the findings of this paper's reveal that there is great scope for the development of **agro-industry sectors** based on organic agriculture commodities, hence investments and support policies for the formation of an agro-industry cluster may constitute another component of such a multisectoral development strategy for Şanlıurfa.

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Appendix:

Codes of All Sector (Agriculture excluded)

C	C – Mining
D	D – Manufacturing
E	E – Electricity, Gas and Water
F	F – Construction
G	G – Wholesale and Retail Trade
H	H – Hotels, Restaurants
I	I – Transportation, Communication and Storage
J	J – Activities of Financial Intermediaries
K	K – Activities of Real Estate, Renting and Business
M	M – Education
N	N – Health Services and Social Services
O	O - Other Social and Personal Service Activities.

LQ Values of South Eastern Anatolia Provinces

	Adıyaman	Diyarbakır	ŞANLIURFA	Gaziantep	Kilis	Batman	Mardin	Siirt	Şırnak
C	0,960040202	0,75383	0,021158505	0,02887601	0	14,92483931	0,54036106	0	6,661757613
D	0,833825159	0,49877	0,686588001	1,461964956	0,77053548	0,316379861	0,389170675	0,401559492	0,203610065
E	1,349423199	2,06979	1,383	1,111297091	1,2793593	3,972229745	2,06142072	2,995452166	2,217218032
F	0,276626199	0,86853	1,8720	0,432922184	1,17203513	0,67438393	0,57921049	1,808098846	0,122809447
G	1,334440244	1,29268	1,3006	0,957868919	1,325022797	1,156697609	1,330260476	1,409736051	1,58847692
H	0,806300068	1,3909	0,664818571	0,609161988	0,794090056	1,062446102	0,80231181	1,163784149	0,890586833
I	1,453751	1,5665	1,8557	0,650152845	1,40554435	1,444889584	2,893630688	1,633837933	2,19511661
J	0,493820	0,74149	0,5578150	0,405080079	0,606171107	0,336514153	0,865843366	0,846290161	0,885174187
K	0,382346	0,77489	0,3541285	0,478592266	0,323739544	0,374641406	0,406899758	0,229543853	0,335874443
M	0,742014	1,3071	0,391332472	0,613351522	1,289786203	1,032441749	0,761802938	0,867100663	0,472849506
N	0,674317	1,0305	0,900675915	1,109713346	0,476573617	0,497933697	0,684346226	0,853826986	0,554624953
O	1,284323	1,1490	0,882878919	0,97187459	1,550645723	0,932073002	0,806667383	1,347324101	0,655912774

Key sectors and LQ Values in Services Sector in Şanlıurfa

Sector Code	Sub-Sector Code	Explanation	Employment	LQ Value
G	5010	Sale of motor vehicles	411	1,432949561
G	5020	Maintenance and repair of motor vehicles	1720	1,543789768
G	5040	Sale, maintenance and repair of motorcycles and related parts and accessories	121	2,998508614
G	5050	Retail sale of automotive fuel	776	1,444599375
G	5111	Agents involved in the sale of agricultural raw materials, live animals, textile raw materials and semi-finished goods	26	1,303299613
G	5112	Agents involved in the sale of fuels, ores, metals and industrial chemicals	14	1,186709644
G	5115	Agents involved in the sale of furniture, household goods, hardware and ironmongery	17	5,026523007
G	5116	Agents involved in the sale of textiles, clothing, footwear and leather goods	3	1,424629515
G	5117	Agents involved in the sale of food, beverages and tobacco	459	4,019813858
G	5121	Wholesale of grain, seeds and animal feeds	345	2,682279199
G	5122	Wholesale of flowers and plants	26	1,158745941
G	5133	Wholesale of dairy produce, eggs and edible oils and fats	260	3,839284253
G	5139	Non-specialized wholesale of food, beverages and tobacco	400	4,044435756
G	5143	Wholesale of electrical household appliances and radio and television goods	151	1,139086407
G	5144	Wholesale of china and glassware, wallpaper and cleaning materials	124	1,488467759
G	5151	Wholesale of solid, liquid and gaseous fuels and related products	132	1,040916873
G	5152	Wholesale of metals and metal ores	55	1,011472327

G	5154	Wholesale of hardware, plumbing and heating equipment and supplies	90	1,0272274
G	5155	Wholesale of chemical products	61	1,109285065
G	5156	Wholesale of other intermediate products	23	1,233825477
G	5211	Retail sale in non-specialized stores with food, beverages or tobacco predominating	3859	1,461874619
G	5221	Retail sale of fruit and vegetables	162	1,476733685
G	5222	Retail sale of meat and meat products	793	3,190614143
G	5224	Retail sale of bread, cakes, flour confectionery and sugar confectionery	95	1,237778294
G	5231	Dispensing chemists	650	1,859456195
G	5233	Retail sale of cosmetic and toilet articles	65	1,028509507
G	5241	Retail sale of textiles	904	2,176826675
G	5242	Retail sale of clothing	873	1,006980944
G	5243	Retail sale of footwear and leather goods	408	1,644321153
G	5244	Retail sale of furniture, lighting equipment and household articles n.e.c.	678	1,274234633
G	5245	Retail sale of electrical household appliances and radio and television goods	409	1,137251658
G	5246	Retail sale of hardware, paints and glass	1038	1,113051974
G	5247	Retail sale of books, newspapers and stationery	249	1,031608788
G	5248	Other retail sale in specialized stores	1834	1,207741598
G	5250	Retail sale of second-hand goods in stores	58	2,081680231
G	5261	Retail sale via mail order houses	9	4,257760665
G	5271	Repair of boots, shoes and other articles of leather	123	1,856735686

G	5272	Repair of electrical household goods	618	1,762765097
G	5273	Repair of watches, clocks and jewellery	55	1,763931147
G	5274	Başka yerde sınıflandırılmamış tamirler	170	1,531617503
I	6021	Other scheduled passenger land transport	657	1,232531463
I	6023	Other land passenger transport	1277	1,839655341
I	6024	Freight transport by road	5217	4,048866278
I	6321	Other supporting land transport activities	246	1,656481886

The Importance of ICT for the Knowledge Economy: A Total Factor Productivity Analysis for Selected OECD Countries

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Abstract

Science, technology and innovation have become key factors contributing to economic growth in both advanced and developing economies. In the knowledge economy, information circulates at the international level through trade in goods and services, direct investment and technology flows, and the movement of people. Information and communication technologies (ICT) have been at the heart of economic changes for more than a decade. ICT sector plays an important role, notably by contributing to rapid technological progress and productivity growth. Firms use ICTs to organize transnational networks in response to international competition and the increasing need for strategic interaction. As a result, multinational firms are a primary vehicle of the everspreading process of globalization. New technologies and their implementation in productive activities are changing the economic structure and contributing to productivity increases in OECD economies.

Economic competitiveness depends on productivity level and in the knowledge economy, ICT sectors determine the productivity level. As a result , we can say that the power of economic competitiveness of a country depends on the productivity of its ICT sector.

There are two ways to improve the TFP of ICT and to improve the power of competitiveness. First of all, if the selected countries solve their inefficiency problem by reallocation of resources, they can improve their TFP of the ICT sector and as a result they can be more competitive. Secondly, the technological improvement in these countries creates an expectation about increasing TFP of ICT sector for future. If there will be a sustainable technological improvement by innovation, it will cause a sustainable increase in the TFP of ICT sector and as a result it will cause a sustainable increase in competitiveness.

Introduction

Advance economies are becoming knowledge based economies in an increasing scope in the context of generation, using and dissemination of knowledge because of the fast improvements in science and technology. As a result of this progress, the importance of knowledge as a production factor is increasing. The engine of economic growth and development is knowledge, not physical goods or natural resources in such an economics based on knowledge networks. Knowledge economics is a term that is used to define an economic system in which the knowledge is generated, disseminated and used by firms, institutions, individuals and society to reach an advance social and economic development.

There are two kinds of knowledge called tacit knowledge and codified knowledge. While these two knowledge are complementary, the generation processes and the roles on learning process of these knowledge are very different from each other.

Tacit knowledge is not included by machineries. It is a kind of knowledge that emerges as a result of interaction between the environment, structure of social institutions, attitudes and norms. This knowledge contains the expertise and knowledge that is obtained by the experience of the production, marketing and distribution process. Additionally, it contains attitude forms that is settled and developed through time. Tacit knowledge can not be transformed into universal codes easily because it is the product of the specific and complex environment. Because of that feature, tacit knowledge is not universally accessible like codified knowledge. Tacit knowledge is also divided into two sub-groups called internal and external tacit knowledge. Internal tacit knowledge is formed by the rules and skills (know-how) that arise as a result of learning by doing process. However the source of the external tacit knowledge is social life. Entrepreneurs systematically see each other by means of various clubs and associations, local cooperatives, councils of regional management means.

Codified knowledge is a kind of knowledge which is included in machineries or in general, included in production devices. Because of that character, codified knowledge has the facility that everyone can reach by using universal codes. This relation is defined as hardware/software relation. Software is the knowledge or language that explains the universal usage of the machinery while hardware is the knowledge which is included in machinery. We can divide the codified knowledge into two sub-group called internal and external codified knowledge. Internal codified knowledge is the result of research and development (R&D) activities. External codified knowledge emerges as a result of recombination of different information bits in different contents during the collective works (projects) of universities, R&D departments of firms and different research centers.

Because of the pressure of global competition, firms are both increasing the scope of using the technology, especially information and communication technologies (ICT), and try to adopt their organizational structures to the process of knowledge economics (Kelleci, 2003:4).

In the knowledge economy, the most important issue is to generation, using and dissemination of knowledge. That issue gives ICT sector a vital importance because ICT sector is the fastest way of using and disseminating knowledge. As a result, we can say that the power of economic competitiveness of a country depends on the productivity of its ICT sector.

There is literature review in the second part of the study. In the third part, methodology that is used is explained. In the forth part, the data and the source of data is examined. In the fifth part, there is the empirical analysis of selected OECD countries. In the sixth and the last part, there is conclusion about the empirical analysis.

Literature Review

There are several studies about Total Factor Productivity (TFP) in the literature. When we look at the literature, we can see that most of the studies in literature try to explain the relationship between TFP and economic growth. Here we mention the some selected empirical studies in the literature.

Hulten (2000) argues that economists have long recognized that total factor productivity is an important factor in the process of economic growth. However, just how important it is has been a matter of ongoing controversy. Part of this controversy is about methods and assumptions. Total factor productivity growth is estimated as a residual, using index number techniques. It is thus a measure of our ignorance,' with ample scope for measurement error. Another source of controversy arises from sins of omission, rather than commission. A New Economy critique of productivity points to unmeasured gains in product quality, while an environmental critique points to the unmeasured costs of growth. This essay is offered as an attempt to address these issues. Its first objective is to explain the origins of the growth accounting and productivity methods now under scrutiny. It is a biography of an idea, is intended to show what results can be expected from the productivity framework and what cannot. The ultimate objective is to demonstrate the considerable utility of the idea, as a counter-weight to the criticism, often erroneous, to which it has been subjected. Despite its flaws, the residual has provided a simple and internally consistent intellectual framework for organizing data on economic growth, and has provided the theory to guide a considerable body of economic measurement.

Miller and Upadhyay (2002) try to find the answer of that question; “Do openness and human capital accumulation promote economic growth?” While intuition argues yes, the existing empirical evidence provides mixed support for such assertions. They examine Cobb-Douglas production function specifications for a 30-year panel of 83 countries representing all regions of the world and all income groups. They estimate and compare labor and capital elasticities of output per worker across each of several income and geographic groups, finding significant differences in production technology. Then they estimate the total factor productivity series for each classification.

Using determinants of total factor productivity that include, among many others, human capital, openness, and distortion of domestic prices relative to world prices, they find significant differences in results between the overall sample and sub-samples of countries. In particular, a policy of outward orientation may or may not promote growth in specific country groups even if geared to reducing price distortion and increasing openness. Human capital plays a smaller role in enhancing growth through total factor productivity.

Scarpetta and Tressel (2004) present empirical evidence on the determinants of industry-level multifactor productivity growth. They focus on 'traditional factors,' including the process of technological catch up, human capital, and research and development (R&D), as well as institutional factors affecting labor adjustment costs. Their analysis is based on harmonized data for 17 manufacturing industries in 18 industrial economies over the past

two decades. The disaggregated analysis reveals that the process of technological convergence takes place mainly in low-tech industries, while in high-tech industries, country leaders tend to pull ahead of the others. The link between R&D activity and productivity also depends on technological characteristics of the industries: while there is no evidence of R&D boosting productivity in low-tech industries, the effect is strong in high-tech industries, but the technology leaders tend to enjoy higher returns on R&D expenditure compared with followers. There is also evidence in the data that high labor adjustment costs (proxied by the strictness of employment protection legislation) can have a strong negative impact on productivity. In particular, when institutional settings do not allow wages or internal training to offset high hiring and firing costs, the latter reduce incentives for innovation and adoption of new technologies, and lead to lower productivity performance. Albeit drawn from the experience of industrial countries, this result may have relevant implications for many developing economies characterized by low relative wage flexibility and high labor adjustment costs. This paper--a joint product of the Social Protection Team, Human Development Network, World Bank, and the International Monetary Fund is part of a larger effort to understand what drives productivity growth.

Hallward-Driemeier et. al. (2002) use new firm level data from five East Asian countries to explore the patterns of manufacturing productivity across the region. One of the striking patterns that emerges is how the extent of openness and the competitiveness of markets affects the relative productivity of firms across the region. Firms with foreign ownership and firms that export are significantly more productive, and the productivity gap is larger the less developed is the local market. They exploit the rich set of firm characteristics available in the database to explore the sources of export firms' greater productivity. They argue that it is in aiming for export markets that firms make decisions that raise productivity. It is not simply that more-productive firms self-select into exporting; rather, firms that explicitly target export markets consistently make different decisions regarding investment, training, technology and the selection of inputs, and thus raise their productivity.

Han et. al. (2003) compare the sources of growth in East Asia with the rest of the world, using a methodology that allows one to decompose total factor productivity (TFP) growth into technical efficiency changes (catching up) and technological progress. It applies a varying coefficients frontier production function model to aggregate data for the period 1970-1990, for a sample of 45 developed and developing countries. Their results are consistent with the view that East Asian economies were not outliers in terms of TFP growth. Of the high-performing East Asian economies, their methodology identifies South Korea as having the highest TFP growth, followed by Singapore, Taiwan and Japan. Their methodology also allows us to separately estimate technical efficiency change, which is a component of TFP growth, and they find that, in general, the estimated technical efficiency of the high-performing East Asian economies was not out of line with the rest of the world.

Felipe (1997) surveys the empirical literature on total factor productivity (TFP) and the sources of growth in the East Asian countries. It raises the question whether the literature has helped us understand better the factors that have propelled growth in the region. The paper discusses the main theoretical aspects in the estimation of TFP growth, as well as the empirical results, and provides a survey of estimates of TFP growth for nine East and Southeast Asian countries. It is concluded that:

(i) The main merit of the literature is that it has helped focus the attention of scholars on the growth process of East Asia, and has made countries in the region aware of the importance of productivity;

(ii) The theoretical problems underlying the notion of TFP are so significant that the whole concept should be discarded;

(iii) The TFP growth estimates are contentious: they vary significantly, even for the same country and time period, depending on assumptions and data sources;

(iv) Research on growth in East Asia based on the estimation of TFP growth is an activity subject to decreasing returns. If we are to advance in our understanding of how East Asia grew during the last 30 years we need new avenues of research.

OECD Growth Project edited by Dirk Pilat (2003) is an important project about productivity and growth. Growth and productivity are on the policy agenda in many OECD countries, and therefore also affect work of the OECD. The organization was asked in 1999 by its member countries to examine the variation in growth performance in the OECD area, analyze its causes and provide guidance for policy making. The strong performance of the United States at the time and related claims about a "new economy" were among the reasons for this demand, as was the poor performance of several other OECD countries at the time.

Ark (2002) try to examine productivity and income differentials among OECD countries. Using a conceptual framework, which is rooted in a traditional growth accounting framework — but with several extensions — he focused on two sources of growth differentials. First he looked at the role of the "new economy," in the sense that *ICT has been a source of faster productivity growth in the United States***.** Then he looked at the impact of the creation of intangible capital, which has been identified as a necessary condition for exploiting the productivity advantages of ICT investment. The analysis suggests that differential realization of the potential to generate productivity accelerations from ICT has contributed to the differential economic growth performance among OECD countries. At the same time, it is difficult to precisely measure the contribution of the various factors at the macroeconomic level. One may even argue that the traditional methods for analyzing and measuring the relation between inputs and output at the macroeconomic level are, increasingly, failing to describe the processes that drive changes and differences in growth performance between firms.

Guerrieri et. al. (2005) argue that in the last half of the 1990s, labor productivity growth rose in the U.S. and fell almost everywhere in Europe. They document changes in both capital deepening and multifactor productivity (MFP) growth in both the information and communication technology (ICT) and non-ICT sectors. They view MFP growth in the ICT sector as investment-specific productivity (ISP) growth. They perform simulations suggested by the data using a two-country DGE model with traded and nontraded goods. For ISP, they consider level increases and persistent growth rate increases that are symmetric across countries and allow for costs of adjusting capital-labor ratios that are higher in one country because of structural differences. ISP increases generate investment booms unless adjustment costs are too high. For MFP, they consider persistent growth rate shocks that are asymmetric. When such MFP shocks affect only traded goods (as often assumed), movements in 'international' variables are qualitatively similar to those in the

data. However, when they also affect nontraded goods (as suggested by the data), movements in some of the variables are not. To obtain plausible results for the growth rate shocks, it is necessary to assume slow recognition.

Nicoletti and Scarpetta (2003) look at differences in the scope and depth of pro-competitive regulatory reforms and privatization policies as a possible source of cross-country dispersion in growth outcomes. They suggest that, despite extensive liberalization and privatization in the OECD area, the cross-country variation of regulatory settings has increased in recent years, lining up with the increasing dispersion in growth. The authors then investigate empirically the regulation-growth link using data that cover a large set of manufacturing and service industries in OECD countries over the past two decades and focusing on multifactor productivity (MFP), which plays a crucial role in GDP growth and accounts for a significant share of its cross-country variance. Regressing MFP on both economywide indicators of regulation and privatization and industry-level indicators of entry liberalization, the authors find evidence that reforms promoting private governance and competition (where these are viable) tend to boost productivity. In manufacturing, the gains to be expected from lower entry barriers are greater the further a given country is from the technology leader. So, regulation limiting entry may hinder the adoption of existing technologies, possibly by reducing competitive pressures, technology spillovers, or the entry of new high-technology firms. At the same time, both privatization and entry liberalization are estimated to have a positive impact on productivity in all sectors. These results offer an interpretation to the observed recent differences in growth patterns across OECD countries, in particular between large continental European economies and the United States. Strict product market regulations--and lack of regulatory reforms are likely to underlie the relatively poorer productivity performance of some European countries, especially in those industries where Europe has accumulated a technology gap (such as information and communication technology-related industries). These results also offer useful insights for non-OECD countries. In particular, they point to the potential benefits of regulatory reforms and privatization, especially in those countries with large technology gaps and strict regulatory settings that curb incentives to adopt new technologies. This paper--a product of the Social Protection Team, Human Development Network is part of a larger effort in the network to understand what drives productivity growth.

Bernard and Jones (1996) examine the role of sectors in aggregate convergence for fourteen OECD countries during 1970-87. The major finding is that manufacturing shows little evidence of either labor productivity or multifactor productivity convergence, while other sectors, especially services, are driving the aggregate convergence result. To determine the robustness of the convergence results, the paper introduces a new measure of multifactor productivity which avoids many problems inherent to traditional measures of total factor productivity when comparing productivity levels. The lack of convergence in manufacturing is robust to the method of calculating multifactor productivity.

Kask and Sieber (2002) argue that among manufacturing industries employing a substantial proportion of research and development and technology-oriented workers, the information technology industries exhibited particularly strong productivity growth over the 1987-99 period. This article examines productivity developments in a set of detailed industries representing the high-tech manufacturing sector and uses aggregate measures that were developed to permit comparison with the manufacturing industry as a whole. In addition to labor productivity and related measures, the analysis includes multifactor

productivity. This analysis is based on data produced by the BLS Office of Productivity and Technology, and the industries used are classified at the three-digit SIC level.

When we look at the power of competitiveness in literature, we see that economists directly relate competitiveness power to TFP. According to Bryan (1994), the industry which has the highest productivity level relative to its competitors is the successful industry. According to Khemani (1997), competitive power is has the same meaning with productivity. Competitive power is the power of increasing TFP of firms/industries/countries.

Data

In this study we use Telecommunications data as a proxy of ICT sector because of the data restrictions about ICT sector. The reason of selected telecommunications data as a proxy is that telecommunication is an important part of the ICT sector and it has a vital role in dissemination of knowledge. Our data source is OECD Telecommunications Database 2005 which can be reached at that web address [http://oecd-stats.ingenta.com/OECD/TableViewer/dimView.aspx]. We use panel data between the period 1980-2003 for selected 26 OECD countries. Our dependent variable is GDP (in USD) and independent variables are Total Staff in Mobile Telecommunication and Gross Fixed Capital Formation. We had to omit the data related with Czech Republic, Hungary, Poland and Slovak Republic. Because there are no sustainable data for the period 1980-2003 for these countries.

Methodology

The Malmquist Productivity Index

The Malmquist productivity index (MPI), as proposed by Caves, Christensen and Diewert (1982), is defined using distance functions, which allow one to describe multi-input, multioutput production without involving explicit price data and behavioural assumptions. Distance functions can be classified into input distance functions and output distance functions. Input distance functions look for a minimal proportional contraction of an input vector, given an output vector, while output distance functions look for maximal proportional expansion of an output vector, given an input vector. In this study, we use output distance functions.

Before we define the distance function we must first define the technology. Let $x_t \in R^N_+$ and $y_t \in R^M_+$ denote, respectively, an (Nx1) input vector and an (Mx1) output vector for period *t* (*t*=1,2,…,). Then the graph of the production technology in period *t* is the set of all feasible input-output vectors, or

$$GR_t = \{(x_t,y_t): x_t \text{ can produce } y_t\}, \quad (1)$$

where the technology is assumed to have the standard properties, such as convexity and strong

disposability, described in Fare et al (1994).

The output sets are defined in terms of GRt as:

$P_t(x_t) = \{y_t: (x_t,y_t) \in GR_t\}$. (2)

The output distance function for period *t* technology, as described in Shephard (1970), is defined on the output set $P_t(x_t)$ as:

$do^t(x_t,y_t) = \inf\{\delta_t: (y_t/\delta_t) \in P_t(x_t)\}$ (3)

where the subscript "o" stands for "output oriented". This distance function represents the smallest factor, δ_t, by which an output vector (y_t) is deflated so that it can be produced with a given input vector (x_t) under period *t* technology.

The productivity change, measured by the MPI, between periods *s* and *t*, can be defined using the period *t* technology as:

$$M_o^t(y_t, y_s, x_t, x_s) = \frac{d_o^t(x_t, y_t)}{d_o^t(x_s, y_s)}$$

(4)

Similarly, the MPI using period *s* technology may be defined as:

$$M_o^s(y_t, y_s, x_t, x_s) = \frac{d_o^s(x_t, y_t)}{d_o^s(x_s, y_s)}$$

(5)

In order to avoid choosing the MPI of an arbitrary period Fare et al (1994) specified the Malmquist productivity change index as the geometric mean of equations 4 and 5:

$$M_o(y_s, y_t, x_s, x_t) = \left[M_o^t(y_s, y_t, x_s, x_t) \times M_o^s(y_s, y_t, x_s, x_t)\right]^{1/2}$$

$$= \left[\frac{d_o^s(y_t, x_t)}{d_o^s(y_s, x_s)} \times \frac{d_o^t(y_t, x_t)}{d_o^t(y_s, x_s)}\right]^{1/2}$$

(6)

The MPI formula in equation 6 can be equivalently rewritten as:

$$M_o(y_s, y_t, x_s, x_t) = \frac{d_o^t(y_t, x_t)}{d_o^s(y_s, x_s)}\left[\frac{d_o^s(y_t, x_t)}{d_o^t(y_t, x_t)} \times \frac{d_o^s(y_s, x_s)}{d_o^t(y_s, x_s)}\right]^{1/2}$$

(7)

The first component of equation 7 measures the output-oriented technical change between period *s* and *t* whilst the second component measures shift in technology between the two periods. For further discussion of the MPI, refer to Coelli, Rao and Battese (1998).

Calculation of the Malmquist Productivity Index

The MPI has been calculated in various ways. These may be classified in two groups: those which require both price and quantity data, and those which only require quantity (panel) data. The price-based method was proposed by Caves, Christensen and Diewert (1982), who showed that if the distance functions are of translog form with identical second order terms and there is no technical and allocative inefficiency, then the Malmquist index can be computed as the ratio of Törnqvist output index and Törnqvist input index.

Fare et al (1994) subsequently showed that the MPI could be calculated without price data, if one had access to panel data. Furthermore, in this instance, the MPI can be decomposed into technical change and catch-up components, as shown in equation (7). Fare et al (1994) used Data Envelopment Analysis (DEA) methods to estimate and decompose the MPI. We now briefly outline their approach.

The Standard Malmquist DEA Method

Given suitable panel data are available, four distance functions must be calculated (hence four linear programs (LPs) must be solved) for each firm, in order to measure Malmquist TFP changes between any two periods, as defined in equation (7). First we define some notation. Let K, N, M and T represent, respectively, the total number of firms, inputs, outputs and time periods in the sample. Let φ denote a scalar, which represents the proportional expansion of output vector, given the input vector. Let $\lambda=[\lambda_1, \lambda_2, \ldots, \lambda_K]'$ denote the (Kx1) vector of constants, which represent peer weights of a firm. Let yit and xit represent the (Mx1) output vector and the (N×1) input vector, respectively, of the i-th firm in the t-th period (*t*=1,2,…T). Let Yt and Xt represent, respectively, the (MxK) output matrix and (NxK) input matrix in period *t*, containing the data for all firms in the t-th period. The notation for period *s* are defined similarly.

The four required LPs are:

$$[d_0^t(y_{it}, x_{it})]^{-1} = \max_{\phi,\lambda} \phi$$

Subject to (s.t.)

$$-\phi y_{it} + Y_t\lambda \geq 0$$

$$x_{it} - X_t\lambda \geq 0$$

$$\lambda \geq 0$$

(8)

$$[d_0^s(y_{is}, x_{is})]^{-1} = \max_{\phi,\lambda} \phi$$

s.t.

$$-\phi y_{is} + Y_s\lambda \geq 0$$

$$x_{is} - X_s\lambda \geq 0$$

$$\lambda \geq 0$$

(9)

$$[d_0^t(y_{is}, x_{is})]^{-1} = \max_{\phi,\lambda} \phi$$

s.t.

$$-\phi y_{is} + Y_t\lambda \geq 0$$

$$x_{is} - X_t\lambda \geq 0$$

$$\lambda \geq 0$$

(10)

$$[d_0^s(y_{it}, x_{it})]^{-1} = \max_{\phi,\lambda} \phi$$

s.t.

$$-\phi y_{it} + Y_s\lambda \geq 0$$

$$x_{it} - X_s\lambda \geq 0$$

$$\lambda \geq 0$$

(11)

The above four LPs are very similar to standard DEA LPs. In fact, equations (8) and (9) are standard DEA LPs, which measure the technical efficiency of the i-th firm in the t-th and s-th year, respectively. In equations (10) and (11) the i-th observation from the t-th period is compared to the technology constructed using the period s data, and vice versa. Thus, in these LPs the φ need not to be greater than or equal to one, if technical regress or progress has occurred. The above four LPs are required for each firm (or region in our study) in each pair of adjacent years. Thus, if one has data on K firms over T time periods, one must solve Kx(3T-2) LPs to construct the required firm-level chained indices (Coelli et al., 1998).

Empirical Analysis

Technical Efficiency (TE), change in TE, Technological change and change in Total Factor Productivity (TFP) is calculated by using Data Envelopment Analysis (DEA) and Malmquist TFP Index for selected OECD countries under the assumption of Constant Returns to Scale. The DEAP- XP software programme which is the advanced version of DEAP 2.1 written by Coelli (1996) is used for the calculation of these indexes.

Technical Efficiency

In the calculation of TE indexes, efficient reference borders are determined by using linear programming methods and the selected countries are compared with these efficient borders. If TE of a country is equal to one (TE = 1), it means that the country has perfect TE or it is on the perfect production border. If TE of a country is lower than one (TE < 1), it means that there is an inefficiency. In other words the inefficiency level is 1 – TE. Inefficiency level shows the inefficient using of production factors. If the TE is lower than 1 (if the inefficiency level (1-TE) is bigger than zero), it means that optimal production can not be reached with given inputs under the current technology level or current production level can be reached by using inputs lower than current level so the production factors are unproductive. The lower TE means the lower producing performance for a country.

In table 1, Technical Efficiency Index under the Assumption of Constant Returns to Scale is given. Luxembourg is the only country that has perfect TE (TE=1) in the period of 1980 – 2003. It is the one which determines the best production border for all years. It is called "reference country." There are other countries which has TE = 1 in different years. These countries had the effect on determining the best production border for different years. However, Luxembourg has the best performance for all years.

United Kingdom (UK) has an impact to determine the best production level in 1980, 1982 and between the period 1999-2002. Italy has an impact to determine the best production level in 1990, 1991 and between the period 1993-2002. Sweden has an impact to determine the best production level between the period 1993-2003. United States (US) has impact to determine the best production level between the period 1988-1992. Denmark has an impact to determine the best production level in 1992, 1994 and between the period 1980-1982. When we look at Turkey, we see that it has an impact to determine the best production border just only in years 1980 and 2003.

If we order the countries from the most technical efficient to the less technical efficient according to the mean of TE for selected period, we can have ordering like that: Luxembourg, UK, Italy, Sweden, US, Denmark, Belgium, Mexico, Netherlands, France, Switzerland, Germany, Austria, Iceland, Ireland, Canada, Norway, Japan, Finland, New Zealand, Spain, Turkey, Greece, Australia, Portugal and Korea (Republic of). The average of the sample data is 0.837 and the Mean of TE for Turkey is below that average (TE = 0.767).

Table 1: Technical Efficiency Index under the Assumption of Constant Returns to Scale

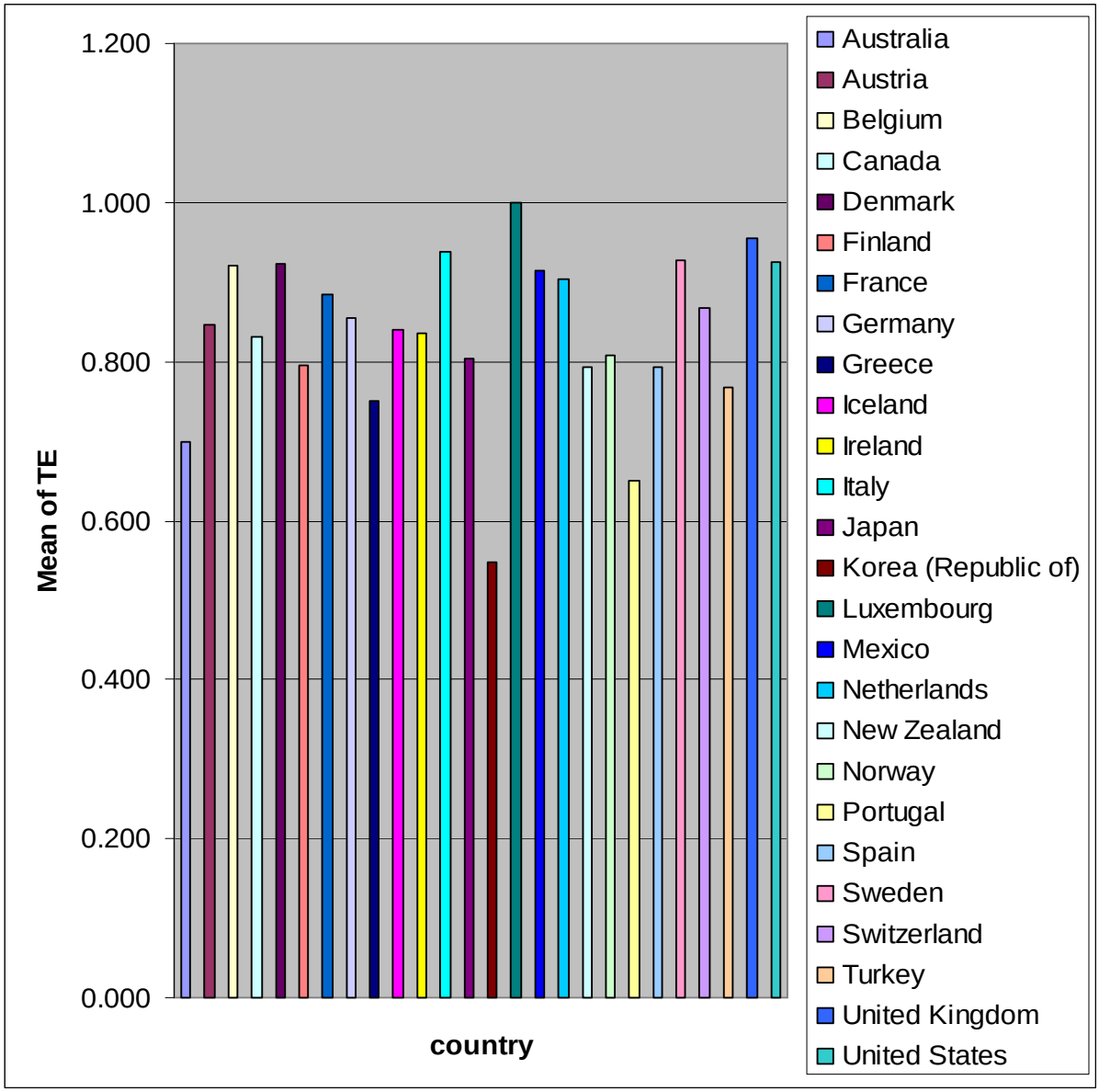
Country/Year	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**
Australia	0.715	0.603	0.690	0.687	0.673	0.607	0.675	0.669	0.679	0.677	0.769
Austria	0.850	0.787	0.833	0.775	0.785	0.714	0.870	0.914	0.911	0.869	0.909
Belgium	0.884	0.866	0.911	0.961	0.983	0.901	1.000	1.000	0.981	0.905	0.897
Canada	0.829	0.699	0.784	0.814	0.858	0.780	0.840	0.809	0.836	0.811	0.836
Denmark	1.000	1.000	1.000	0.946	0.900	0.770	0.836	0.886	0.955	0.914	0.982
Finland	0.737	0.643	0.658	0.627	0.669	0.621	0.718	0.729	0.747	0.689	0.727
France	0.871	0.822	0.818	0.795	0.834	0.786	0.902	0.911	0.919	0.866	0.900
Germany	0.899	0.846	0.857	0.777	0.800	0.765	0.896	0.937	0.955	0.885	0.877
Greece	0.694	0.639	0.750	0.679	0.834	0.733	0.759	0.782	0.793	0.770	0.755
Iceland	0.767	0.748	0.731	0.756	0.764	0.735	0.903	0.913	0.958	0.920	0.937
Ireland	0.649	0.589	0.670	0.757	0.825	0.870	1.000	1.000	1.000	0.999	0.932
Italy	0.843	0.795	0.809	0.764	0.765	0.735	0.916	0.980	0.986	0.951	1.000
Japan	0.651	0.661	0.653	0.650	0.671	0.726	0.764	0.796	0.918	0.854	0.727
Korea (Republic of)	0.546	0.553	0.568	0.530	0.541	0.515	0.571	0.560	0.585	0.563	0.506
Luxembourg	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Mexico	0.898	1.000	1.000	1.000	1.000	0.881	0.930	0.974	0.960	1.000	0.976
Netherlands	1.000	1.000	1.000	0.922	0.860	0.779	0.917	0.972	0.978	0.905	0.936
New Zealand	0.779	0.697	0.685	0.666	0.648	0.583	0.746	0.727	0.816	0.821	0.885
Norway	0.759	0.722	0.707	0.636	0.645	0.644	0.693	0.721	0.756	0.784	0.882
Portugal	0.613	0.516	0.527	0.542	0.679	0.688	0.743	0.651	0.635	0.647	0.665
Spain	0.870	0.738	0.786	0.784	0.871	0.778	0.847	0.835	0.830	0.770	0.778
Sweden	0.943	0.853	0.888	0.854	0.851	0.766	0.869	0.842	0.836	0.755	0.868
Switzerland	0.875	0.835	0.964	0.929	0.901	0.885	0.864	0.858	0.848	0.747	0.771
Turkey	**1.000**	**0.869**	**0.892**	**0.894**	**0.899**	**0.732**	**0.696**	**0.664**	**0.640**	**0.757**	**0.763**
United Kingdom	1.000	0.985	1.000	0.993	0.940	0.881	0.967	0.912	0.866	0.794	0.851
United States	0.955	0.846	0.917	0.900	0.865	0.808	0.954	0.955	1.000	1.000	1.000
mean	0.832	0.781	0.811	0.794	0.810	0.757	0.841	0.846	0.861	0.833	0.851

Table 1: Technical Efficiency Index under the Assumption of Constant Returns to Scale (continue)

Country/Year	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	Mean	Degree of inefficiency
Australia	0.778	0.757	0.708	0.700	0.718	0.726	0.688	0.698	0.711	0.786	0.740	0.679	0.642	0.699	0.301
Austria	0.867	0.856	0.879	0.867	0.900	0.875	0.857	0.859	0.844	0.834	0.821	0.824	0.826	0.847	0.153
Belgium	0.915	0.909	0.884	0.913	0.924	0.907	0.883	0.890	0.924	0.914	0.895	0.907	0.927	0.920	0.080
Canada	0.853	0.853	0.853	0.824	0.892	0.889	0.804	0.815	0.854	0.905	0.873	0.831	0.794	0.831	0.169
Denmark	0.964	1.000	0.971	1.000	0.972	0.967	0.904	0.881	0.919	0.899	0.867	0.805	0.789	0.922	0.078
Finland	0.781	0.871	0.935	0.990	0.977	0.944	0.868	0.855	0.875	0.857	0.813	0.871	0.856	0.794	0.206
France	0.888	0.900	0.896	0.920	0.930	0.939	0.936	0.953	0.941	0.923	0.898	0.860	0.822	0.885	0.115
Germany	0.839	0.812	0.794	0.802	0.849	0.853	0.840	0.851	0.866	0.856	0.877	0.893	0.882	0.855	0.146
Greece	0.723	0.762	0.768	0.831	0.859	0.830	0.794	0.779	0.756	0.719	0.703	0.693	0.613	0.751	0.249
Iceland	0.898	0.920	0.930	0.956	0.990	0.864	0.839	0.708	0.761	0.746	0.779	0.880	0.738	0.839	0.161
Ireland	0.951	0.963	1.000	0.937	0.908	0.835	0.796	0.777	0.720	0.701	0.749	0.736	0.668	0.835	0.165
Italy	1.000	0.979	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.997	0.938	0.062
Japan	0.833	0.864	0.976	0.965	0.755	0.713	0.740	0.758	0.906	1.000	0.981	0.910	0.802	0.803	0.197
Korea (Republic of)	0.486	0.485	0.515	0.530	0.526	0.517	0.530	0.542	0.585	0.633	0.635	0.573	0.532	0.547	0.453
Luxembourg	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.000
Mexico	0.927	0.905	0.915	0.900	0.989	0.905	0.805	0.787	0.808	0.823	0.868	0.857	0.812	0.913	0.087
Netherlands	0.942	0.922	0.889	0.912	0.944	0.916	0.887	0.908	0.814	0.845	0.824	0.800	0.804	0.903	0.097
New Zealand	0.993	0.972	0.845	0.789	0.754	0.778	0.814	0.855	0.881	0.901	0.865	0.808	0.719	0.793	0.207
Norway	0.905	0.916	0.806	0.855	0.859	0.848	0.776	0.704	0.796	1.000	1.000	1.000	0.954	0.807	0.193
Portugal	0.653	0.684	0.701	0.696	0.700	0.695	0.638	0.625	0.645	0.655	0.657	0.670	0.697	0.651	0.349
Spain	0.782	0.810	0.787	0.806	0.807	0.806	0.789	0.779	0.778	0.765	0.745	0.740	0.723	0.792	0.208
Sweden	0.914	0.993	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.926	0.074
Switzerland	0.831	0.819	0.900	0.890	0.887	0.894	0.878	0.867	0.895	0.878	0.873	0.876	0.849	0.867	0.133
Turkey	**0.684**	**0.687**	**0.584**	**0.629**	**0.670**	**0.644**	**0.595**	**0.669**	**0.783**	**0.759**	**0.916**	**0.991**	**1.000**	**0.767**	**0.233**
UK	0.908	0.986	0.990	0.975	0.979	0.982	0.985	0.965	1.000	1.000	1.000	1.000	0.962	0.955	0.045
United States	1.000	1.000	0.938	0.958	0.926	0.913	0.894	0.886	0.880	0.902	0.927	0.927	0.872	0.926	0.074
Mean	0.858	0.870	0.864	0.871	0.874	0.855	0.829	0.824	0.844	0.858	0.858	0.851	0.818	0.837	0.163

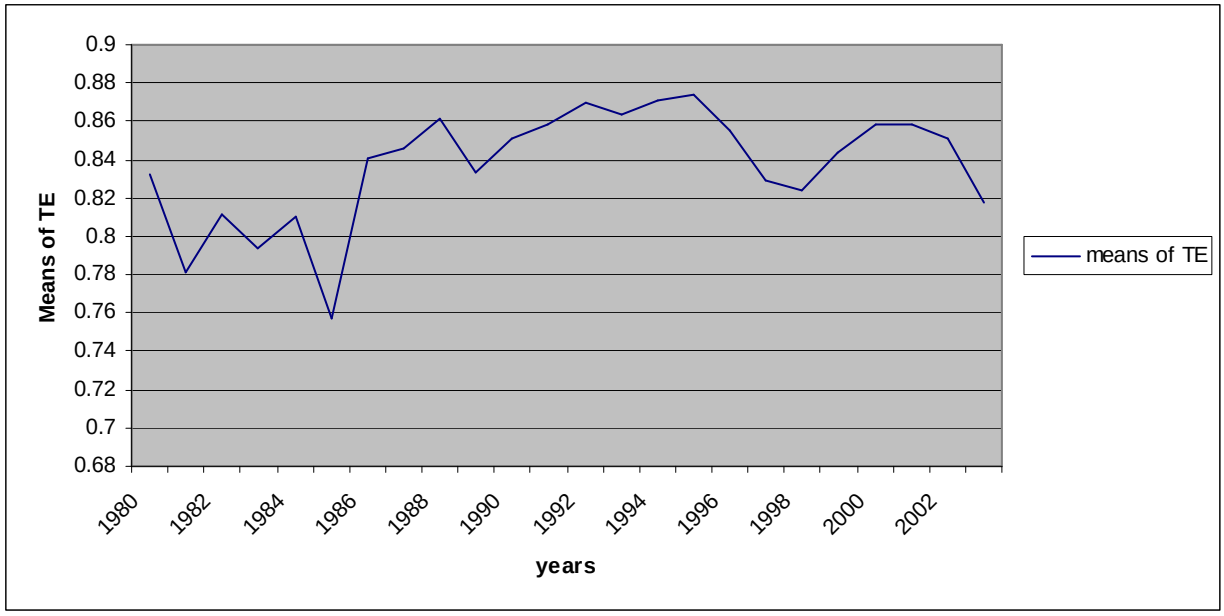
There are exciting results that we cannot expected before for example Korea and Japan which are developed in high levels in last decades has a lower TE in selected period. Korea is the last country according to mean of TE which is equal to 0.547. When we look at the figure 1, we will see that there are 12 countries below the average TE (= 0.837) and 14 over the average. The countries below the average are Australia, Canada, Finland, Greece, Ireland, Japan, Korea, New Zealand, Norway, Portugal, Spain and **Turkey**. However, the countries over the average are Austria, Belgium, Denmark, France, Germany, Iceland, Italy, Luxembourg, Mexico, Netherlands, Sweden, Switzerland, UK and US.

Figure 1: Means of TE



In figure 2, we can see that TE of countries was at its lowest level in 1985 (TE = 0.757) and at its highest level in 1995 (TE = 0.874). Also we can say that there is a relatively sustainable increase in the period between 1985-1995.

Figure 2: Annual Means of TE between 1980-2003



We can conclude that most of the European Union Members are has a TE level over the sample average while Japan and Korea are below the average. However the average level of TE index for the period 1980-2003 is lower than 1 (=0.837). It means that, in selected OECD countries, optimal production can not be reached with given inputs under the current technology level or current production level can be reached by using inputs lower than current level so the production factors are unproductive.

Changes in Total Factor Productivity

If the changes in total factor productivity (TFPCH) index is greater than one (TFPCH > 1) shows that there is an increase in TFP. If the TFPCH is lower than one (TFPCH < 1), it means that there is a decrease in TFP. There are two components of TFP, these are changes in technical efficiency (EFFCH) and changes in technology (TECHCH). If these two indexes are higher than one, it means that there are improvements in both technical efficiency and technology. If they are lower than one, it means that there are decline in both technical efficiency and technology. In another word, if EFFCH index is higher than one (EFFCH > 1), there is a bigger catching – up effect for the country. If TECHCH index is higher than one (TECHCH > 1), it means that production border shifts up.

We can divide EFFCH index into two sub-index called changes in pure efficiency (PECH) and changes in scale efficiency (SECH). SECH index shows the achievement of producing in an appropriate scale.

Decomposition of Malmquist TFP index is useful to determine the sources of the changes in TFP (Deliktaş, 2002:263).

We can see in the table 2 that the annual average value of EFFCH index is 0.999. It means that there is a decreasing in technical efficiency in general. However, there is no decrease

in the components of EFFCH. Both the average of PECH and SECH are equal to 1. Although TECHCH index is increased by %1.8, EFFCH index is decreased by %0.1 and also TFPCH index is increased by %1.7 in the period of 1980-2003 for all countries. The increase in TECHCH causes the increase in TFP. In another words, the reason of the improvement in TFP is technological improvement, not the changes in technical efficiency.

The value of EFFCH indexes which belong to Belgium, Finland, Ireland, Italy, Japan, Norway, Portugal and Sweden are higher than one. It means that these countries have higher catching-up effect to reach the optimal production border/frontier. In other words, these countries are successful to catch up the best production border that is determined by the reference country (Luxembourg). The most successful country for catch up is Norway. However Australia, Austria, Canada, Denmark, France, Germany, Greece, Iceland, Korea, Mexico, Netherlands, New Zealand, Spain, Switzerland, UK and USA have EFFCH levels lower than 1. It means that there is no catching – up effect in these countries. In addition, Luxembourg and Turkey have the EFFCH indexes equal to 1. Luxembourg is the reference country and Turkey is stable so Turkey has no success or failure to catch up the best production border. In other words, annual average technical efficiency level of Turkey is not changed.

According to the technological change index (TECHCH), Japan obtains the highest technological improvement in the period of 1980-2003. Switzerland, Norway, Luxembourg, Italy, Netherlands, Spain, Austria, Belgium, Korea, France, Germany, Denmark, US, Sweden, Finland, Portugal, Australia, Canada, Ireland, Iceland, UK, Greece, New Zealand, Mexico and Turkey follow Japan respectively. In that period all countries have the technological improvement and annual average TECHCH index is measured 1.018 and TFPCH index is measured 1.017 for all countries. TECH index is higher than 1, it means that the annual average of best production border is shifted up by technological improvement.

Table 2: Malmquist Index Summary of Country Means

Country	Effch	Techch	Pech	Sech	Tfpch
Australia	0.995	1.012	0.998	0.997	1.007
Austria	0.999	1.023	0.999	1.000	1.022
Belgium	1.002	1.021	1.001	1.001	1.023
Canada	0.998	1.012	0.999	0.999	1.011
Denmark	0.990	1.016	0.990	1.000	1.006
Finland	1.007	1.015	1.007	1.000	1.021
France	0.997	1.019	1.000	0.998	1.017
Germany	0.999	1.018	1.000	0.999	1.017
Greece	0.995	1.010	0.995	1.000	1.004
Iceland	0.998	1.012	1.000	0.998	1.011
Ireland	1.001	1.012	1.001	1.001	1.013
Italy	1.007	1.025	1.004	1.004	1.032
Japan	1.009	1.048	1.008	1.001	1.058
Korea (Republic of)	0.999	1.020	1.004	0.994	1.019
Luxembourg	1.000	1.025	1.000	1.000	1.025
Mexico	0.996	1.003	0.992	1.003	0.999
Netherlands	0.991	1.023	0.994	0.997	1.013
New Zealand	0.996	1.007	0.996	1.000	1.003
Norway	1.010	1.026	1.010	1.000	1.036
Portugal	1.006	1.014	1.006	1.000	1.020
Spain	0.992	1.023	0.991	1.001	1.015
Sweden	1.003	1.016	1.002	1.001	1.019
Switzerland	0.999	1.034	0.996	1.003	1.033
Turkey	**1.000**	**1.002**	**1.000**	**1.000**	**1.002**
United Kingdom	0.998	1.011	1.000	0.998	1.009
United States	0.996	1.016	1.000	0.996	1.012
Mean (geometric)	0.999	1.018	1.000	1.000	1.017

EFFCH: Changes in technical efficiency, TECHCH : Changes in technology, PECH: Changes in pure efficiency, SECH: Changes in scale efficiency, TFPCH: Changes in total factor productivity.

When we look at the TFP of countries, we can see that Japan has the highest increase in annual average TFP. Norway, Switzerland, Italy, Luxembourg, Belgium, Austria, Finland, Portugal, Sweden, Korea, Germany, France, Spain, Ireland, Netherlands, US, Canada, Iceland, UK, Australia, Denmark, Greece, New Zealand, Turkey follow the Japan respectively. Only Mexico has a decrease in its annual average TFP. The source of that decrease is the decreasing in technical efficiency.

Conclusion

The performance of ICT sectors of selected OECD countries are considered by using Data Envelopment Analysis (DEA) for the period of 1980-2003. The levels of technical efficiency, changes in technical efficiency, technological change and the changes in TFP are calculated in this study for all selected OECD countries. Here are the main evidences that we reach as a result of the study.

First of all, according to the results of the technical efficiency index Luxembourg is the reference country (TE = 1) and Korea has the worst performance. Secondly, there are technological improvements in all countries (TECHCH > 1), however there are declines in technical efficiencies (EFFCH < 1). Thirdly, the effect of technological improvement is higher than the effect of declining in technical efficiency, as a result of this, there are positive changes in TFP in all countries except Mexico. According to EFFCH and TFPCH indexes, Turkey is under the average level of selected OECD countries. According to the technological change index (TECHCH), Japan obtains the highest technological improvement and according to EFFCH index, the most successful country for catch up is Norway in the period of 1980-2003.

Most of the European Union Members are has a TE level over the sample average while Japan and Korea are below the average. However the average level of TE index for the period 1980-2003 is lower than 1 (=0.837). It means that, in selected OECD countries, optimal production can not be reached with given inputs under the current technology level or current production level can be reached by using inputs lower than current level so the production factors are unproductive.

There are two ways to improve the TFP of ICT and to improve the power of competitiveness. First of all, if the selected countries solve that inefficiency problem by reallocation of resources, they can improve their TFP of the ICT sector and as a result they can be more competitive. Secondly, the technological improvement in these countries creates an expectation about increasing TFP of ICT sector for future. If there will be a sustainable technological improvement by innovation, it will cause a sustainable increase in the TFP of ICT sector and as a result it will cause a sustainable increase in competitiveness.

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The Comparison of Technical Efficiency and Productivity Growth in Transition Countries and the Soviet Union Countries

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Abstract

This study compares economic performance of the 15 transition economies for two periods: The Soviet Union Countries and transition countries. These periods include data of countries for 1970-1989 and 1991-2003. It is known that centrally planned economies are criticized for widespread economic inefficiency and low total factor productivity. Thus, in order to see how the efficiency levels and productivity growth of the former Soviet Union countries have changed during the transition or market-based period, we compare two periods using Data Envelopment Analysis.

The results of analysis indicate that, on average, technical efficiency has slightly increased, however, total factor productivity decreased due to technical regress over the transition period when compared to the era of Soviet Union for 15 countries.

Introduction

The Soviet Union grew rapidly through the mid of 1970s due to rapid and successful planned capital accumulation[1]. Therefore, a powerful rivalry occurred between the Soviet Union and the United States until 1980s. However, in the mid of 1980s, the political and economic structures of the Soviet Union and the Eastern European planned countries started to crumble (Case and Fair, 2004).

By the end of 1991, the Soviet Union collapsed and the fifteen Soviet Union countries declared their independences. The 12 of these countries formed the commonwealth of Independent States, CIS, in December 1991 except for Baltic countries (Estonia, Latvia and Lithuania). After collapse of the Soviet Union, these 15 countries have also decided to transform from planned economy to market-based economy. Then they are called the transition economies. It is argued that the underlying economic reason of the transition was the ever-worsening economic inefficiency in the pre-transition period due to economic production occurred overwhelmingly in the public sector and the use of resources was determined by political decisions made within the planning office. Therefore, it is expected that economic efficiency would increase after transition to the market economy. However, at the beginning of the transition the production efficiency; therefore, the per capita GDP decreased. Most transition economies recovered pre-transition GDP levels only after 2000 (Deliktas and Balcilar 2005).

For most analysts (see e.g. Lipton and Sachs (1990), Hinds (1990), establishing the market economy in transitional economies mainly depends on four inter-related policies on the micro-economic side: price liberalization, integration to the world economy, reducing barriers to entry by new firms and privatization. These policies also suggested by the International Monetary Fund and the World Bank (Deliktaş and Emsen, 2002). They are the main ingredients of a successful transition from socialist economy to a market based economy. The establishment of market supporting institutions, social safety to deal with unemployment and poverty, and external assistance have also a vital importance in transition process. The transition process to a market economy is not complete until these ingredients can be reached. It was hoped that these policies taken together would motivate a supply response at the industry level which would alter the structure of national production, the pattern of sales, both domestically and internationally, the quality and variety of output and enterprise productivity (Estrin, 1996).

However, transition process to market economy is not easy and may take a longer time. Advocates of shock therapy believe that the economies in transition should proceed immediately on all fronts. On the other hand, advocates of a gradualist approach suggest building up market institutions first, gradually decontrol prices, and privatize only the most efficient government enterprises first. Of course, these two approaches may have different effect on performances of economies. Deliktaş ve Balcilar (2005) indicated that the annual mean technical efficiency level of advanced reformers is higher than that of the slow reformers in 1991-2000. However, the advanced reformers had a larger total factor productivity decline than the slow reformers due to technical regress in the same period.

[1] The Soviet Union's economy was growing much faster than that of the United states during the late 1950s (Case and Fair, 2004).

Generally, it is expected that transition to market economy would increase economic performance and then the transition economies have a higher of production frontiers in the transition period than in the pre- transition period. Because, the transition to market economy may cause production efficiency to increase due to private-owned enterprises, independent financial institutions. Accordingly, the transition economies can be thought of as operating either on or within best-practice frontier; and the distance from the frontier as reflecting inefficiency. Over time, a country can become less or more efficient and "catch-up" to the frontier or the frontier itself can shift, indicating technical progress. In addition, a country can move along the frontier by changing proportion of inputs used in production. Hence, output growth can be thought in terms of three different components: efficiency change, technical change, and input change. Economists often refer to the first two components collectively as "total factor productivity change" (Osiewalski et al. 1998)

In the literature, there are some studies about growth and performance measurement of nations. These studies use different approaches (Rao et al. 1998b). The first approach focuses on growth in real per capita income or real GDP per capita. This indicator can be considered as a proxy for the standard of living achieved in a country. The second approach is to examine the extent of convergence achieved by the poor countries and measure disparities in the global distribution of income. The third and most widely used recent approach is to consider productivity performance of economic decision units. This approach bases on a partial measure, such as output per person employed or per hour worked, and multi factor productivity measures based on the concept of total factor productivity and its components, such as technical efficiency change and technical change. Total factor productivity is considered as an important indicator of economic performance of nations. Technical efficiency change is also an indicator of the level of catch-up and convergence among the countries (Deliktaş and Balcılar 2005).

In this paper I employ the Malmqüist total factor productivity change index developed by Caves et al., 1982. In our study, following Fare et al., 1994, Malmqüist TFP change index is considered as a joint effect of the shift in the production frontier (technological progress) and a movement towards the frontier (efficiency change). The Malmqüist TFP change index is computed by the data envelopment analysis (DEA).The DEA used here is deterministic. There some advantageous of this approach: It does not require a specific underlying functional form. It enables a decomposition of TFP growth into changes in technical efficiency and changes in technology. The DEA has been widely used in various areas (Coelli and Rao, 1998).

The main objective of this paper is to examine how much progress has the Former Soviet Union (FSU) countries made in terms of technical efficiency and total factor productivity growth by considering two periods: pre-transition period (1970-1989) and transition period (1991-2005).

The remainder of the paper is organized as follows. The second section briefly outlines the major sources of data and describes all the variables used in the study. The third section defines the methodology used in the analysis. The fourth section presents empirical results and the fifth section concludes the paper.

Data

Measurement of total factor productivity usually requires either data on input and output prices or the measures of inputs and output. As known, it is difficult to collect data on the prices of inputs and output. However, Malmqüist indices require information about quantities or values of inputs and outputs not prices. The inputs and outputs of decision-making units are used to determine distance functions by the DEA. In this paper, the input and output data of the FSU countries for transition period were obtained from the World Development Indicators 2006 (WDI) published by the World Bank. On the other hand, data for the pre-transition period were obtained from the Center of Economic Analysis and Forecasting in Moscow. All data for the pre-transition period is annual for 1970-1990. For the pre-transition period output was measured by real net material product (in 1973 constant rubbles)[2] and capital input was measured by capital stock in 1973 constant rubbles and labor was measured by the number of employment. In transition period, output was measured by real GDP (constant 1995 US dollars) for each country. Inputs used in our model are labor and capital. Labor input was measured as the total labor force**.** The capital stock for each country was cumulatively calculated from gross fixed capital formation (constant 1995 US dollars) by taking 1989 as the base year for the transition countries.

Methodology

In this study the measure we use to analyze productivity performance of the FSU countries is the DEA based on Malmqüist TFP indices. These indices were introduced by Caves et al., 1982. Malmqüist indices allow for technical efficiency change and technological change indices by means of distance functions. The distance functions can be either in input-oriented form or output-oriented form. The output-oriented form is used in this study. Because it is more appropriate to investigate the achievable maximal output increase with respect to the allocation of inputs rather than to calculate the maximum proportional contraction of the input vector (Angeriz et.al. 2006).

As stated by Fare et al., 1994. By following Coelli et al., 1998, p.158 and Fare et al., 1994, we define a production technology at time t=1, …T, which represents the outputs, $y_t = (y_t^1, \ldots, y_t^M)$, which can be produced using the inputs $x_t = (x_t^1, \ldots, x_t^k)$, as:

$$R^t = \{(x_t, y_t) : x_t \text{ can produce } y_t\}. \qquad (1)$$

The equation (1) represents the feasible output set that can be produced by the given input vector. Following Shephard 1970, the output distance function relative to technology of R^t can be defined as:

$$D_0^t(x_t, y_t) = \min\{\varphi : (x_t, y_t / \varphi) \in R^t\}. \qquad (2)$$

[2] NMP = Net Material Product. The Soviet concept of Net Material Product omitted from GNP services not directly related to production, such as passenger transportation, housing, and output of government employees not producing material output.

The distance function is the inverse of Farrel's, 1957, measure of technical efficiency, which calculates how far an observation is from the frontier of technology. Distance $D_0^t(x_t, y_t) = 1$ if and only if (x_t, y_t) is on the frontier of the technology, $D_0^t(x_t, y_t) \leq 1$ if and only if $(x_t, y_t) \in R^t$ (Karadağ et al. 2005).

Similarly, the output-oriented distance function can be defined with respect to period t benchmark technology as

$$D_0^t(x_{t+1}, y_{t+1}) = \min\left\{\varphi : (x_{t+1}, y_{t+1} / \varphi) \in R^t\right\} \qquad (3)$$

where φ corresponds to the minimum value required to deflate the period t output vector of the unit onto the production surface of a benchmark fixed in the same period.

Following Fare et al., 1994, Malmquist index of productivity change between period *t* and *t+1* is defined as

$$MTFP_0^{t,t+1}(x_t, y_t, x_{t+1}, y_{t+1}) = \left[\left(\frac{D_0^{t+1}(x_{t+1}, y_{t+1})}{D_0^t(x_t, y_t)}\right)\left(\frac{D_0^t(x_{t+1}, y_{t+1})}{D_0^{t+1}(x_t, y_t)}\right)\right]^{1/2}, \qquad (4)$$

where $D_0^{t+1}(x_t, y_t)$ denotes the distance from the period *t* observation to the period *t+1* technology.

Efficiency and technical changes are the two components of TFP change (see Nishimizu and Page 1982; and Fare et al., 1994, for pioneering studies) as defined below:

$$MTFP_0^{t,t+1}(x_t, y_t, x_{t+1}, y_{t+1}) = \frac{D_0^{t+1}(x_{t+1}, y_{t+1})}{D_0^t(x_t, y_t)} \text{x} \left[\left(\frac{D_0^t(x_{t+1}, y_{t+1})}{D_0^{t+1}(x_{t+1}, y_{t+1})}\right)\left(\frac{D_0^t(x_t, y_t)}{D_0^{t+1}(x_t, y_t)}\right)\right]^{1/2}, (5)$$

The first term on the right-hand side of equation (5) represents the technical efficiency change (EC) and measures the convergence or catch-up performance of the country to the best-practice frontier by comparing the technical efficiency measure in period t+1 with respect to period t. The second squared bricked term on the right-hand side of equation (5) indicates technological change (TC) over time.

Hence Malmqüist total factor productivity change defined in equation (5) becomes

$$MTFP_0^{t,t+1} = EC \cdot TC. \qquad (6)$$

When there is an increase in the level of productivity from period t to t+1 then the $MTFP_0^{t,t+1} > 1$, otherwise there is a decrease in the TFP if $MTFP_0^{t,t+1} < 1$ and no change if $MTFP_0^{t,t+1} = 1$ from period t to t+1. On the other hand, the index (EC) is bigger than one, it indicates that the country is catching up the best-practice frontier from period t+1 to period t. If the index is smaller than one, the country is falling behind of the best-practice frontier, and the index is one, the country has not improved its position with respect to the best-practice frontier between two periods. The TC index can also be explained in the same manner, but it provides a measure of the rate of change of the best-practice frontier between periods t+1 and t. If the index is bigger than one, it indicates technical progress and if it is smaller than it implies technical regress.

Malmqüist distance functions and therefore, total factor productivity indices mentioned above can be obtained by the DEA linear programming programs. The DEA method was developed by Charnes *et al*., 1978. Since then, there has been a large literature about the application of DEA methodology specifically in the area of calculations of TFP changes. Charnes et al., 1995, and Seiford, 1996, give the comprehensive review of this method. Also, panel data applications of DEA method are widely used in the literature (see for example, Milan and Aldaz, 2001; and Singh et al., 2000, Deliktaş 2002, Deliktaş and Balcilar, 2005, Karadag et.al, 2005, Deliktaş et al. 2005, Angeriz et al. 2006).

The output-oriented DEA model for a single output used in this study is closely related to Coelli et al., 1998. The model can be formalized as follows. Consider the situation for the *N* industries, each producing a single output by using *K* inputs. For the *i*-th industry x_{it} is a column vector of inputs, while y_{it} is a scalar representing the output. *X* denotes the $K \times NT$ matrix of inputs and *Y* denotes $1 \times NT$ matrix of output. The CRS output-oriented DEA model is given by;

$$\max_{\phi,\lambda} \phi, \qquad (7)$$

subject to

$$-\phi\ y_{it} + Y\lambda \geq 0,$$

$$x_{it} - X\lambda \geq 0,$$

$$\lambda \geq 0,$$

where $1 \leq \phi < \infty$, λ is a $NT \times 1$ vector of weights. $1/\phi$ defines technical efficiency score, which varies between zero and one, with a value of one indicating any point on the frontier. The linear programming problem must be solved *NT* times in order to provide a value of ϕ for each industry in the sample.

Empirical results

Technical efficiency levels for transition economies

Table 1 presents estimates of annual means of efficiency levels for the transition economies over the 1991-2005 period. Efficiency index lies between zero and one. One indicates full efficiency and zero indicates full inefficiency for a country. The efficiency levels of countries are calculated by Equation (7) based on the DEA.

According to annual averages of efficiency levels for all countries, which are given in the second column of Table 1, Lithuania appears to be the most efficient countries, followed by Azerbaijan, Estonia, and Latvia. On the other hand, Tajikistan appears to be the least efficient countries, followed Ukraine and Belarus. Average efficiency level for the transition economies is 0.634 over the 1991-2005 period.

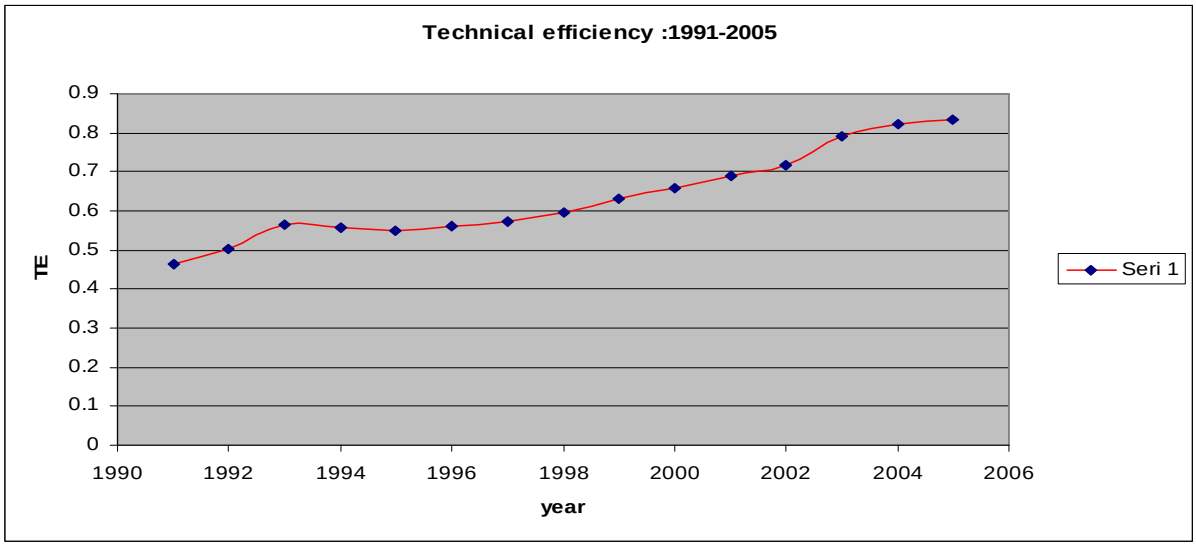
Table 1: Technical efficiency levels for transition countries (1991-2005)

Country	**Annual mean for each country** (1991-2005**)**	**year**	**Annual mean of 15 countries**
Armenia	0.502	1991	0.463
Azerbaijan	0.979	1992	0.502
Belarus	0.473	1993	0.565
Estonia	0.978	1994	0.559
Georgia	0.532	1995	0.548
Kazakhstan	0.511	1996	0.561
Kyrgyzstan R.	0.567	1997	0.574
Latvia	0.944	1998	0.598
Lithuania	0.999	1999	0.633
Moldova	0.536	2000	0.657
Russian F.	0.614	2001	0.689
Tajikistan	0.422	2002	0.717
Turkmenistan	0.511	2003	0.790
Ukraine	0.430	2004	0.821
Uzbekistan	0.506	2005	0.832

The third column of Table 1 gives the annual means of technical efficiency scores of 15 countries for each year. This column indicates that the annual means of technical efficiency scores increased from 0.463 to 0.832 over the 1991-2005 period except for 1994 and 1995.

Figure 1 also shows annual means of technical efficiency scores of the transition countries over the 1991-2005 period.

Figure 1: Mean technical efficiency levels of transition economies



Technical efficiency change, technological change and total factor productivity change for transition economies

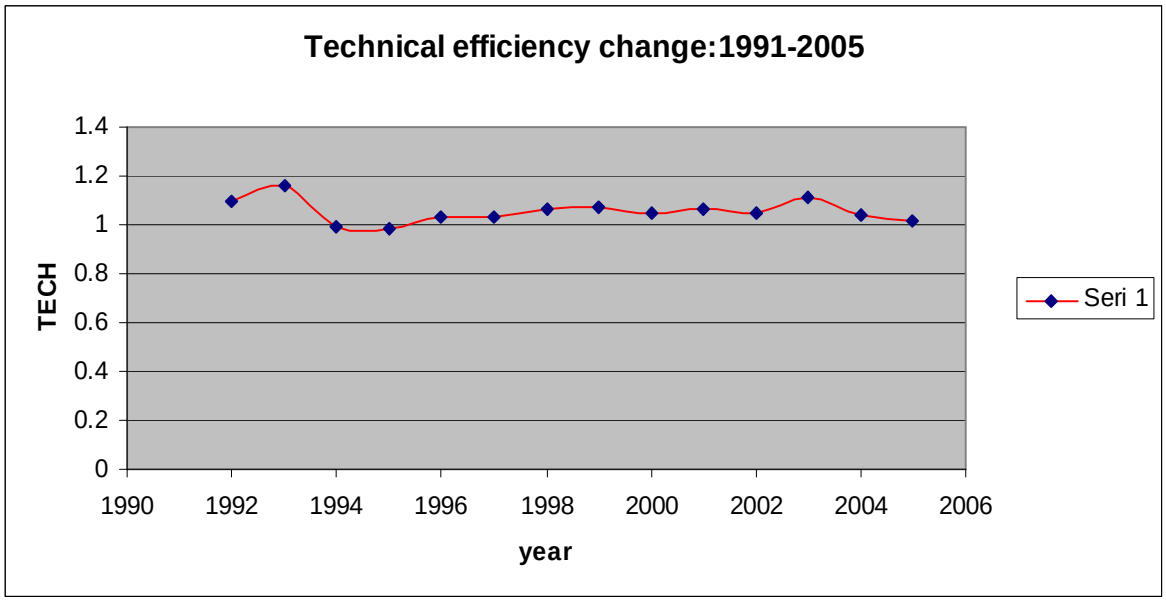
Table 2 presents the means for he technical efficiency change, technological change and total factor productivity change indices of the transition economies. Over the period of 1991-2005, the mean technical efficiency change is 1.054 and technological change is 0.854 and the TFP change is 0.902. As the table shows, the average rate of growth in the mean technical efficiency is 5.4 percent over the 1991-2005 period. The increasing efficiency over the entire sample period is an indicator of a country's performance in adapting the global technology, and therefore represents the catch-up factor (Rao and Coelli 1998b). The rate of growth in efficiency also indicates a more efficient use of the existing technology over time. Table 3 also presents information on the year-to-year evaluation of the TFP change and changes its components. The negative efficiency change occurred in1994 and 1995.

Table 2: Annual means of technical efficiency change, technological change and total factor productivity change in Transition economies, 1991-2005

year	Mean technical efficiency change	Mean technological change	Mean total factor Productivity change
1992	1.097	0.604	0.663
1993	1.164	0.699	0.813
1994	0.991	0.823	0.816
1995	0.986	0.893	0.880
1996	1.033	0.888	0.917
1997	1.034	0.911	0.942
1998	1.065	0.883	0.940
1999	1.076	0.884	0.951
2000	1.050	0.932	0.979
2001	1.061	0.940	0.998
2002	1.049	0.921	0.966
2003	1.111	0.888	0.987
2004	1.043	0.949	0.989
2005	1.015	0.844	0.857
Mean	**1.054**	**0.856**	**0.902**

Note: For each year, the change given is that over the previous year (e.g. 1992 gives the change over 1991-1992).

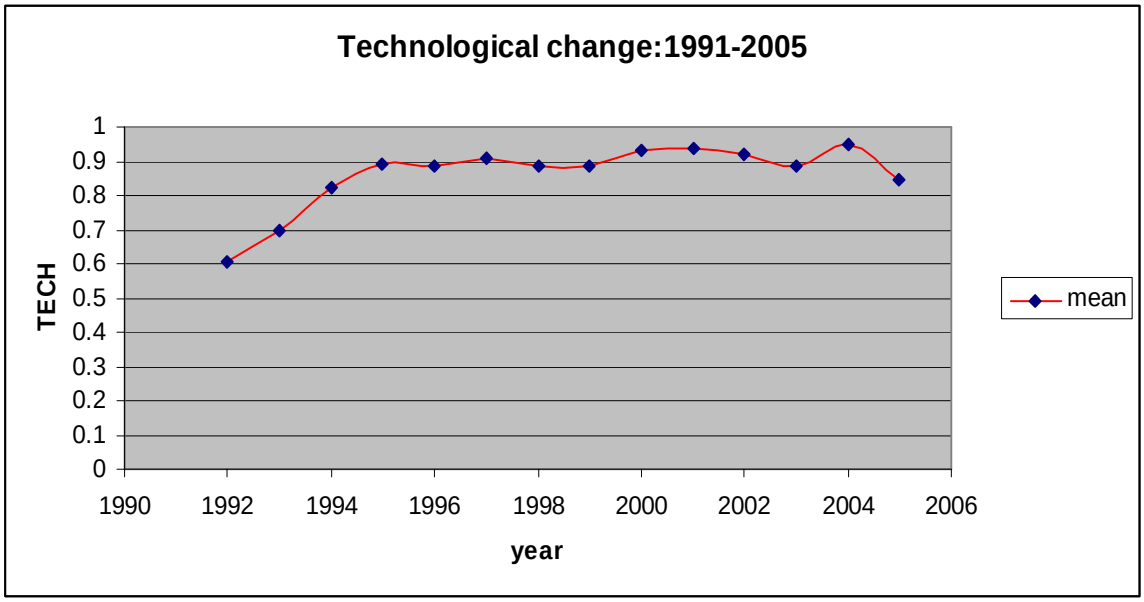
Figure 2: Mean technical efficiency change for transition economies



The third column in Table 3 shows that average technological change in transition economies is negative, with an average technical change about -14.4 percent, over the 1991-2005 period. That is, there is a technological regress over the whole period. The transition countries have suffered from substantial capital losses during the first half of

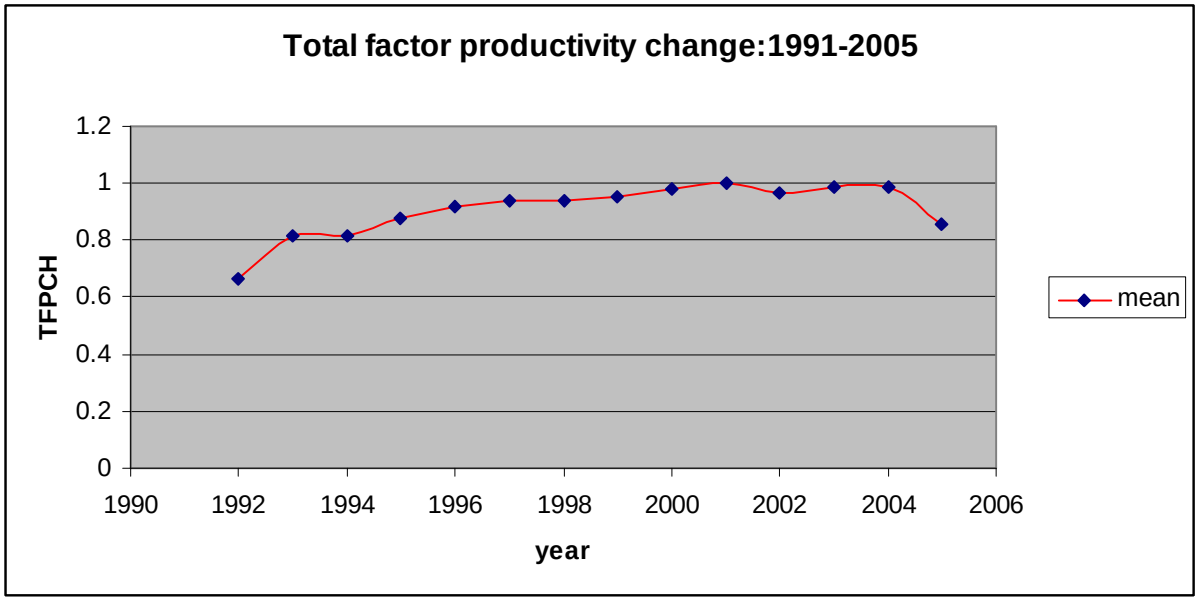
1990s. Therefore, a negative technical change is not unexpected for these countries (Deliktaş and Balcilar, 2005). Taskin and Zaim (1997) estimated a -1.38 percent technical change for low-income countries. Deliktaş and Balcilar (2005) estimated a -4.3 percent technological regress for 25 transition economies over the 1991-2000 period. Angeriz et al. (2006) calculated -2.7 percent technological regress for European Union regional manufacturing region over the 1986-2002 period.

Figure 3: Mean technological change for transition economies



The column four in Table 3 presents the TFP change indices for transition economies. The TFP growth is important because it determines the real standard of living that a country can achieve for its citizens. There is a simple link between productivity growth and the standard of living (Deliktaş and Balcilar 2005). The TFP change index can be decomposed into technical efficiency change and technological change as given equation (5). The decomposition of total factor productivity change makes it possible to understand whether the countries have improved their productivity levels simply through a more efficient use of existing technology or through technical progress. Furthermore, these two components make up for the overall productivity growth. The average annual TFP change index for the transition countries is 0.902 over the 1991-2005 period. The negative TFP growth rate is due to significant technical regress and slight increase in the efficiency. Overall, we observe that the average annual growth in technical efficiency is 5.4 percent, but the average annual technical change is -14.4 percent. The sum of these two changes is -9.8 percent. That is, the average annual TFP in the transition countries has declined by 9.8 percent over the 1991-2005 period due to a technical regress over the entire period.

Figure 4: Mean total factor productivity change for transition economies



Technical efficiency levels for the pre-transition economies

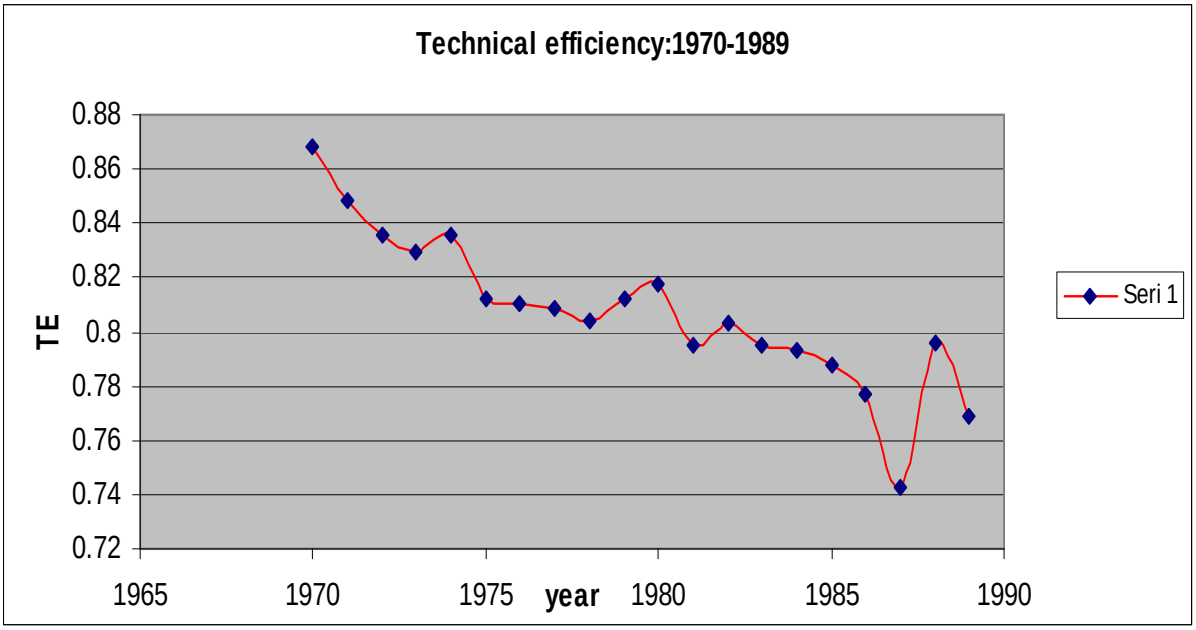
Table 3 presents estimates of annual means of efficiency levels for the pre- transition economies (or the FSU countries) over the 1970-1989 period. Over the entire period, average efficiency level for the FSU countries was calculated as 0.806. It is higher than that of transition period. According to annual averages of efficiency levels for all countries, Belarus and Latvia were the most efficient countries while Turkmenistan was the least efficient country in the same period. It is also seen that annual mean of technical efficiency score of 15 countries was the highest in 1970. The level of changes in technical efficiency is given in Table 4.

Table 3: Technical efficiency levels for the Soviet Union economies (1970-1989)

Country	Annual mean for each country (1970-1989)	year	Annual mean of 15 countries
Armenia	0.933	1970	0.868
Azerbaijan	0.744	1971	0.848
Belarus	1.000	1972	0.836
Estonia	0.950	1973	0.829
Georgia	0.757	1974	0.836
Kazakhstan	0.607	1975	0.812
Kyrgyzstan R	0.747	1976	0.810
Latvia	1.000	1977	0.809
Lithuania	0.851	1978	0.804
Moldova	0.894	1979	0.812
Russian F.	0.862	1980	0.818
Tajikistan	0.730	1981	0.795
Turkmenistan	0.488	1982	0.803
Ukraine	0.826	1983	0.795
Uzbekistan	0.711	1984	0.793
		1985	0.788
		1986	0.777
		1987	0.743
		1988	0.796
		1989	0.769

Figure 5 shows annual means of technical efficiency scores of the pre-transition countries over the 1970-1989 period.

Figure 5: Mean Technical Efficiency Levels in Soviet Union Economies



Technical efficiency change, technological change and total factor productivity change for the Former Soviet economies

The second column of Table 4 gives the mean technical efficiency changes in the pre-transition period with respect to countries. Over the whole period mean technical efficiency change score is 0.992 indicating that the economies fell further behind the best-practice frontier. However, the positive efficiency change occurred for some years, such as 1974, 1979, 1980, and 1988.

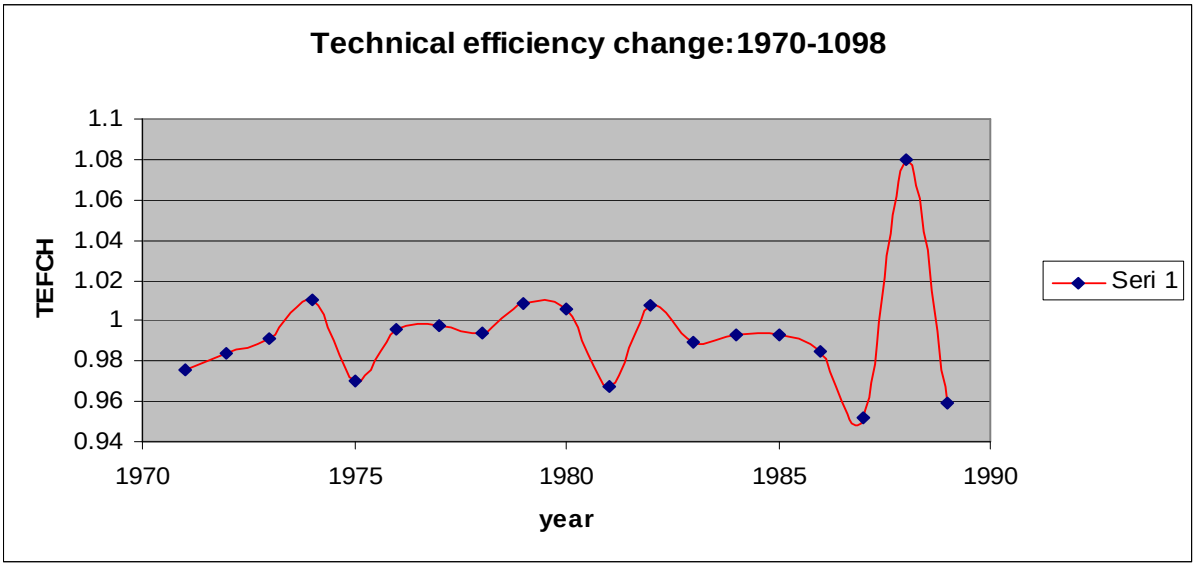
Table 4: Annual means of technical efficiency change, technological change and total factor productivity change in the Soviet Union economies, 1970-1989

Year	Mean technical efficiency change	Mean technological change	Mean total factor productivity change
1971	0.976	1.031	1.006
1972	0.984	0.999	0.983
1973	0.991	1.014	1.005
1974	1.010	0.995	1.005
1975	0.970	1,027	0.995
1976	0.996	1.008	1.004
1977	0.998	0.989	0.986
1978	0.994	1.006	1.000
1979	1.009	0.986	0.996
1980	1.006	0.990	0.996
1981	0.967	1.031	0.997
1982	1.008	0.990	0.997
1983	0.989	1.014	1.003
1984	0.993	0.997	0.990
1985	0.993	0.981	0.974
1986	0.985	1.001	0.986
1987	0.952	0.998	0.941
1988	1.080	0.997	1.077
1989	0.959	1.050	1.008
mean	**0.992**	**1.005**	**0.997**

Note: For each year, the change given is that over the previous year (e.g. 1971 gives the change over 1970-1971).

Figure 6 presents mean technical efficiency change of the FSU countries over the 1970-1989 period. In this period, technical efficiency change fluctuated and decreased on average.

Figure 6: Mean technical efficiency change for the Soviet Union economies



The third column of Table 4 presents mean technological change indices of the FSU economies in the study period. The average annual technological change was 1.005. That is, this period had a technical progress, on average. However, some years negative technological changes were recorded. The mean of technological change is presented by Figure 7.

Figure 7: Mean technical change for the Soviet Union economies

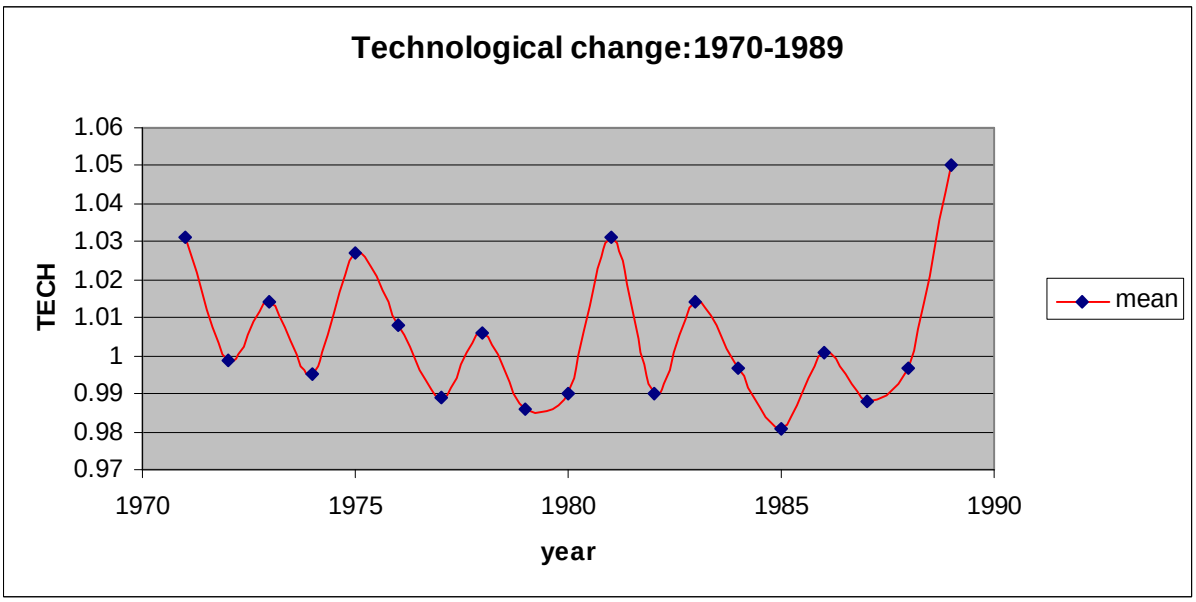
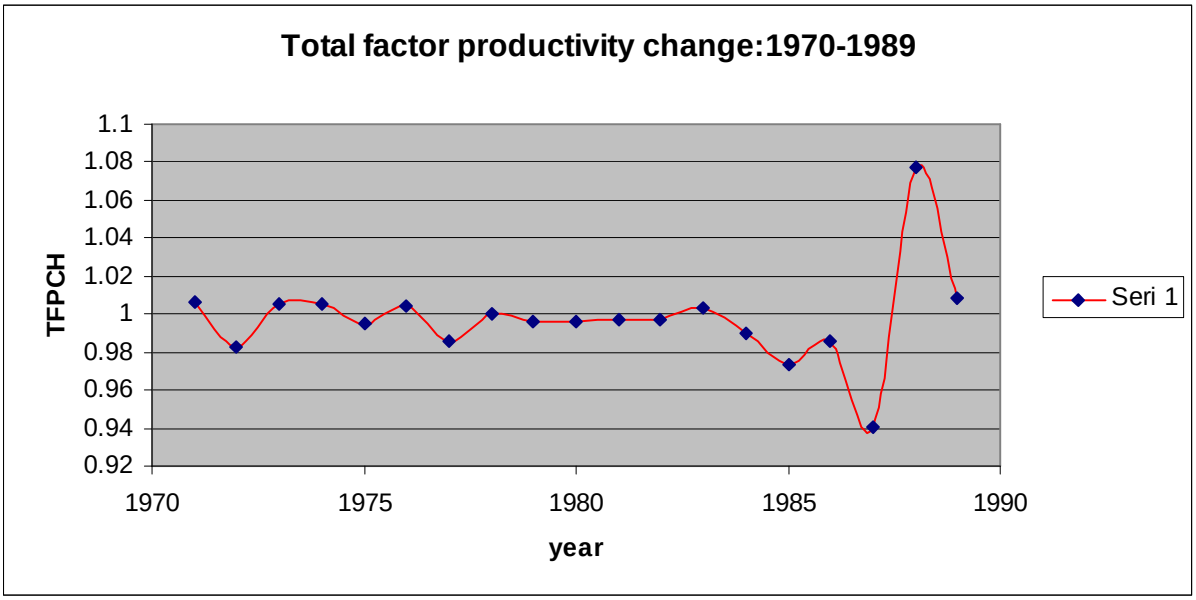


Table 4 also presents the mean of total factor productivity change over the 1970-1989 period. The mean of TFP change was 0.997, which can be decomposed into technical efficiency change of 0.992 and technological change of 1.005. The mean TFP change index indicates that the Soviet Union economies experienced a negative factor productivity growth due to the declining technical efficiency level over the entire sample period. In this

period, the technological progress was offset by a declining technical efficiency, so that the TFP growth of -0.03 percent per annum was measured.

Figure 8 presents the TFP growth scores of the FSU economies over the period 1970-1989. It is seen that the TFP growth almost smoothly moved from 1970s until the mid of 1985s, but then it dropped in 1987 and sharply increased due to technical efficiency increase in 1988 and technological progress in 1989.

Figure 8: Mean total factor productivity growth for the Soviet Union economies



Conclusion

I calculated Malmqüist total factor productivity indices for the 15 transition economies over the 1991-2005 period and the Soviet Union economies (after 1991 they are called transition economies) over the 1970-1989 period using the DEA methods.

According to findings of the study, the transition to the market economy reduced inefficiency in the formerly planned economies. These economies have an increasing efficiency level over the transition period, on average. On the other hand these countries have suffered from technical regress and the overall result has been an average total factor productivity decline.

In the Soviet Union, while the countries had a technological progress, on average, they had a declining efficiency level in the 1970-1989 period. In both periods, the TFP growth is negative. The negative TFP growth in transition period can be explained by technical regress while the negative TFP growth in the pre-transition period can be explained by a declining technical efficiency level.

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World Development Indicators, 2006.

Capital Flows and the Non-Tradables in the Turkish Economy after Capital Account Liberalization

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Abstract

This paper investigates the relationship between capital flows and the share of the non-tradables sector in the Turkish economy after capital account liberalization. Findings support a lagged, yet positive effect of capital flows on the share of non-tradables, which brings the economy more vulnerable to the risk of reversal of capital inflows. This underline the importance of a regulation controlling foreign currency denominated borrowings of private sector firms with limited export earnings and elimination of excessive official reserve accumulation which acts as an implicit bailout guarantee.

Introduction

Most of the developing countries liberalized their capital accounts in the 1990s. Liberalization has led to an increase both in the volume and the volatility of international capital flows[1]. Capital surplus of developing countries fluctuated between US$200.1 billion and US$12.9 billion from 1996 to 2002; and increased up to US$82.9 billion in 2003 (UNCTAD, 2004: 58). Net capital flows to Turkey have also increased significantly since the capital account liberalization in 1989. In 2005, the capital surplus of Turkey reached US$ 44 billion approximately, while it was only US$ 780 million in 1989. According to the official statistics, as of the third quarter of 2007, the total foreign debt stock of Turkey is $247 billion (approx. 50% of the annual GDP), 18% of which is short-term[2].

Since the outbreak of the East Asian financial crisis in 1997, the destabilizing effects of volatility of capital flows on developing countries gained central interest in macroeconomics literature. In their seminal paper, Prasad et al. (2003:41) argue that "…, the increase in the 1990s of the volatility of consumption relative to that of income for the MFI [more financially integrated] economies suggests that financial integration has not provided better consumption smoothing opportunities for these economies." In the same vein, Radelet et al. (1998:71) state "…that international financial markets are inherently unstable, at least for developing countries borrowing heavily from abroad at short maturities and in foreign currency". They also stress that there is no evidence suggesting increased financial integration stimulates higher growth in developing countries.

After the Asian crisis, various studies examined the relations among the pro-cyclical behavior of bank credits, price bubbles in the real estate markets and banking crises. Herring and Watchter (1999) and Hilbers *et al.* (2001) show that in economies where banks own a bigger portion of total assets, an increase in real estate prices may start credit-asset price bubble spirals. Similarly, a fall in real estate prices may cause a financial sector distress through reducing the value of bank capital. Collyns and Senhadji (2002) analyze how this spiral ended in with a crisis in Asian countries. Tornell *et al*. (2003), on the other hand, suggest that growth in the relative share of the non-tradables as a whole during capital inflows is one of the important factors causing financial crises in developing economies; while they still favor capital account liberalization on the grounds that despite the crises, long-term average growth rates in these countries are still higher than the pre-liberalization period.

Without dwelling on the issue of long-term growth effects of international capital flows, this paper investigates the real locative effects of foreign credit between tradable and non-tradable sectors (T - and N - sectors henceforth, respectively) in the Turkish economy after the capital account liberalization. Three other studies touched upon the same issue: Yenturk (1999), Çimenoğlu and Yenturk (2005) and Çiftçioğlu (2005) suggest that there is a rising trend of the share of the N-sector investments since the capital account liberalization in Turkey. However, because of the limitations of the dataset used, no statistical analysis was carried in those studies. This paper seeks to contribute to the literature by measuring the scope of the effect of capital flows on the size of the N-sector

[1] For detailed statistics on capital account liberalization by IMF-member countries, see IMF (2006). For a further discussion on instability and volatility of capital flows see Gabriele et al. (2000).

[2] All the data used in this paper is available at the website of Central Bank Republic of Turkey (www.tcmb.gov.tr) and International Financial Statistics of IMF.

production in the Turkish case. It is shown that, in the post-liberalization period, capital inflows stimulated higher growth rate of the N-sector relative to the GDP.

The next section identifies the channels through which capital flows affect T- and N-sectors asymmetrically. The third section depicts how capital flows affected growth and the share of the N-sector in GDP after liberalization in the Turkish economy. Section (iv) provides estimation results. The last section concludes.

Asymmetric Effects of Foreign Capital Flows on Output in Developing Economies

Capital inflows and outflows to a small and open economy affect output asymmetrically. FitzGerald (2000) shows that depressing effects of capital outflows on output dominate the growth effect of inflows in developing countries. Fixed capital formation stimulated by a foreign credit is irreversible; therefore, any adjustment in course of an outflow should be carried through the working capital of firms, which causes output to shrink.

There is also another asymmetry arising from different financing opportunities of T- and N-sector firms. Pledging export earnings as collateral, the T-sector firms can access to external finance while N-sector firms are constrained by the volume of domestic credit. An increase in capital account surplus, therefore, mostly benefits N-sector firms by removing limits on the volume of credit in the banking sector (Tornell and Westermann, 2003). Using a dataset from 35 countries for 1980-1999 period, Tornell et al. (2003) show that foreign credit growth causes N-sector output to grow relatively faster than T-sector in developing countries, an effect which puts them more prone to self-fulfilling crises.

The asymmetry between the financing opportunities of N- and T-sectors is not the only mechanism for N-sector to grow faster during capital inflows. Sachs and Larraín (1993) show that because output is limited by domestic production in N-sector by definition, an increase in aggregate demand caused by a foreign credit expansion shifts production away from T-sector, for which demand can be met by imports. On the other hand, using the data from the Bangladesh economy Hossain (1999) asserts that, because N-sector mostly consists of services for which income elasticity of demand is high, growth stimulated by a credit expansion causes the share of N-sector in GDP to increase.

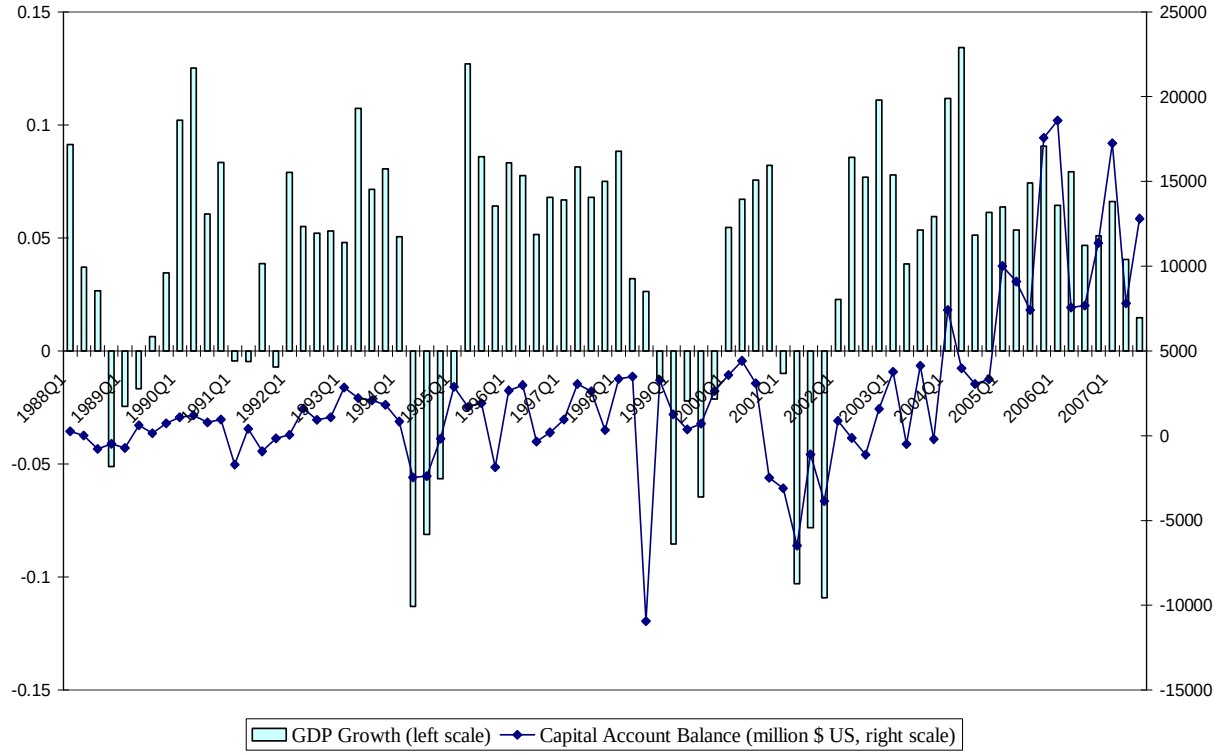
Real exchange rate appreciation caused by the increased demand for N-sector produces a deterioration in the balance of payments, which is considered to be a key factor in making of financial crises. The irreversibility of investments during a capital outflow intensifies the effect of such a crisis on N-sector. This exacerbates the social cost of crises considering the labor-intensive nature of N-sector, which consists mostly of services.

Capital Flows and the Share of the N-Sector in the Turkish Economy

Like many other developing countries, there has been a strong correlation between the capital flows and growth in the Turkish economy, historically. This correlation has even become stronger with the growing integration with the world economy and increasing size of the capital flows since the 1990's. Boratav and Yeldan (2001:9) state that prior to the capital account liberalization, foreign capital was used to finance the current account deficit, which was mainly determined by the growth rate of the GDP. However, after the capital account liberalization this linkage has been reversed with capital inflows determining the size of the domestic demand, hence, current account deficits. Two

important consequences of this reversal are the broken link between current and capital accounts, resulting with excessive reserve accumulation, and the increase in the volatility of the growth rate. In the post-liberalization period, three major crises hit the Turkish economy; each being preceded by net capital outflows (fig. 1).

Figure 1: Foreign capital flows and growth

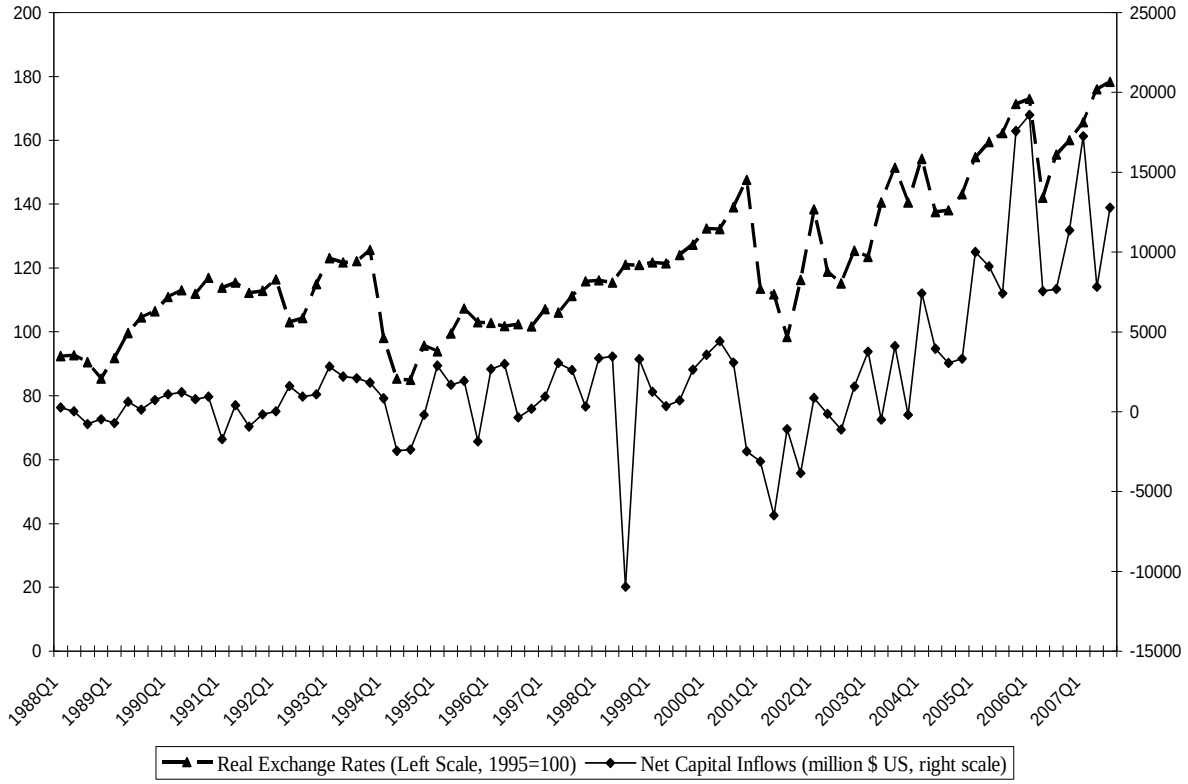


As pointed in the previous section, capital flows affect real exchange rates mainly through two channels: On the real side, inflows may increase the demand for goods and services produced in the N- sector as Sachs and Larraín (1993) point out. The increased demand raises the N-sector good prices, where the T-sector prices are determined in the world markets. On the financial side, inflows may lead to an appreciation through increasing the supply of foreign currency. This appreciation affects the size of the N-sector depending on the price elasticity. With the income effect being constant, the N-sector is expected to grow with appreciation provided that the elasticity is less than unity. In the opposite case, the net effect will depend on the relative importance of demand and price effects of capital flows.

Figure 2 plots the capital flows and real exchange rates in the Turkish economy since the first quarter of 1988. Agénor et al. (1997) and Çimenoğlu and Yentürk (2005) suggest that there is a causality relation between the two, where the former affects the latter[3]. On the other hand, Agénor et al. (1997) emphasize the importance of a third factor, namely the fiscal policy changes, determining both the size of the capital flows and private domestic absorption, which affects the relative price of non-traded goods.

[3] See also Ulengin and Yentürk (2001) and Celasun et al. (1999) for a concise evaluation of the effects of capital flows on the Turkish economy.

Figure 2: Foreign capital inflows and real exchange rates

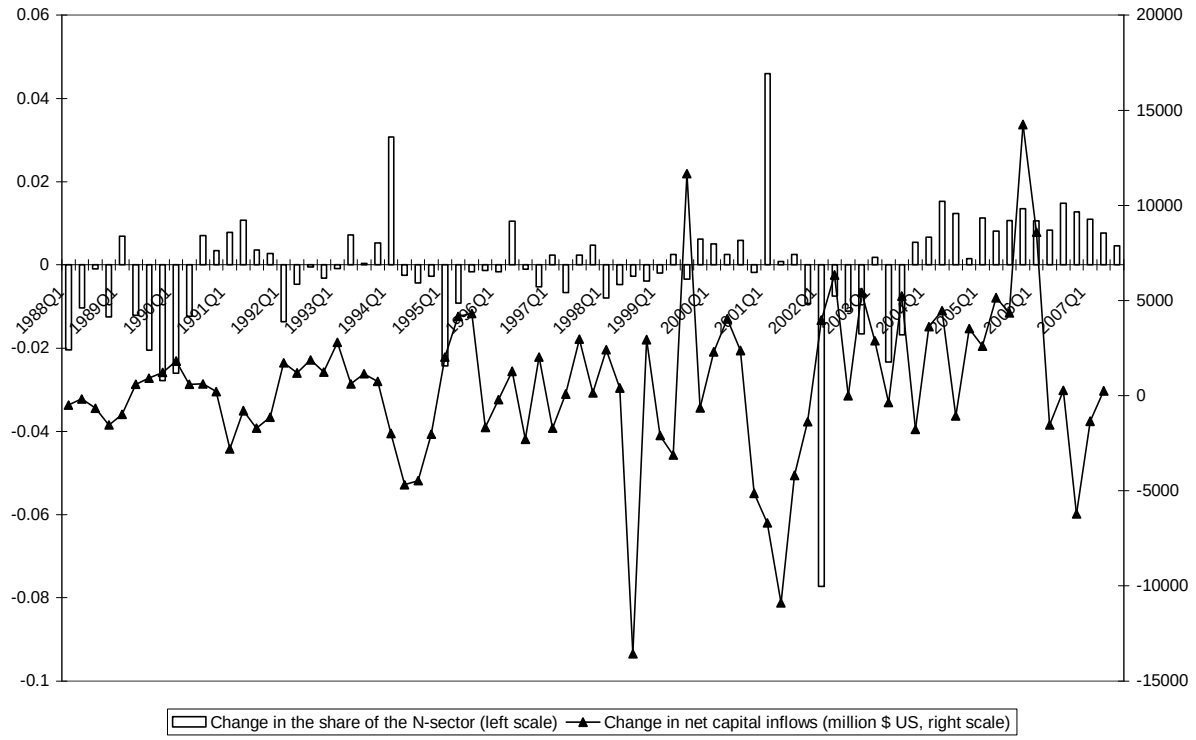


There are few previous studies, which provide some descriptive data on the positive effect of capital flows on the share of the N-sector in GDP in the Turkish economy. Using the annual investment data published by the State Planning Organization (SPO), Yenturk (1999) and Çimenoğlu and Yenturk (2005) explain the growth in the share of N-sector investments as an outcome of increased profitability of this sector following exchange rate appreciation after the capital account liberalization. Çiftçioğlu (2005), on the other hand, emphasize the demand-increasing effects of capital inflows for the N-sector, which causes exchange rate appreciation. Tornell et al. (2003) provide some econometric evidence in their multi-country panel regressions; however, they do not provide cross sectional results. The definition of the N-sector in their analysis includes the construction industry only, which is quite restrictive.

Data and Results

In this section, the extent of the effect of the capital flows on the relative size of the N-sector in Turkey is investigated. The N-sector is defined as the sum of production in construction, wholesale and retail, ownership of dwellings, and professions and services activities. The share of these activities in GDP fluctuated between 25% and 35% in 1987Q1 – 2007Q3 period. Because the data shows high level of seasonality, it is used in the forth-differenced form. The changes in capital flows and the share of the N-sector in GDP from the previous year values are plotted in Figure 3. The figure implies a lagged effect of capital flows on the N-sector: the peak values of the change in the N-sector share follow the changes in capital flows after 3 to 6 quarters.

Figure 3: Foreign credit growth and the share of the N-Sector in GDP



Following the literature on the well-known "St. Louis equation" I investigate the real effect of monetary aggregates (capital flows) on real variables (the change in the relative size of the N-sector) in an Almon-lag framework. Before performing the regression analysis two separate unit root tests were performed. Table 1 shows that both the change in net capital inflows (DIFINANCE) and the change in the size of the N-sector (DIFNT) from the previous year values are stationary.

Table 1: Unit root tests

	ADF			Phillips-Perron		
Variable	Lag length	Test statistic	Prob. value	Bandwidth	Test statistic	Prob. value
DIFINANCE	3	-5.9965	0.0000	4	-6.5473	0.0000
DIFNT	4	-2.9029	0.0498	5	-6.2809	0.0000

Table 2 reports the Almon-lag estimation results[4]. The appropriate lag of DIFINANCE (11) was decided using Akaike Information Criteria values (AICs) based on *ad hoc* estimations[5]. It was necessary to include autoregressive (AR(.)) and moving average terms (MA(.)) to overcome the serial correlation problem. Thus, the model estimated here is an ARMAX with X values being the polynomial distributed lags of DIFNT. Results with third and second order polynomials are reported in the table. Both estimations produce similar

[4] Eviews 5.0 is used in estimations.
[5] The diagnostic values reported in Table 1 were obtained from the transformed coefficients of Almon-lag estimations.

results but the adjusted-R^2 and AIC values favor the third order one. The LM tests for serial correlation up to 12 lags (Table 3) indicate that there is no problem of autocorrelation in the residuals.

Table 2: The Effects Capital Flows on the Size of the N-Sector

	ALMON-LAG ESTIMATIONS			
	Estimations with a second order polynomial		**Estimations with a third order polynomial**	
Variable	**Coefficient**	**t-statistic**	**Coefficient**	**t-statistic**
C	-0.00140	-8.907	-0.00126	-7.272
AR(1)	0.24722	2.457	0.22645	2.59889
MA(4)	-1.38689	-66.559	-1.36088	-69.023
MA(12)	0.41412	21.917	0.39307	23.374
Lags:				
0	-0.00041	-1.196	-0.00081	-1.627
1	-0.00017	-0.902	-0.00019	-1.146
2	0.00003	0.420	0.00021	1.715
3	0.00020	2.870	0.00044	2.167
4	0.00033	2.815	0.00054	2.475
5	0.00043	2.919	0.00053	3.060
6	0.00049	3.303	0.00047	4.314
7	0.00051	4.149	0.00040	4.432
8	0.00050	5.517	0.00034	2.480
9	0.00045	3.859	0.00035	1.920
10	0.00036	1.617	0.00046	2.248
11	0.00024	0.633	0.00071	2.724
Sum of lagged effects	**0.00295**	**5.018**	**0.00346**	**6.315**
R^2	0.7121		0.7303	
Adj. R^2	0.6833		0.6983	
AIC	-6.6901		-6.7255	
F-Stat	24.7309		22.8204	
Prob (F-stat)	0.0000		0.0000	

Table 3: Diagnostic tests

	LM Tests for serial correlation			
	1st estimation		2nd estimation	
	F-Statistic	Probability	F-Statistic	Probability
Lag 1	0.0113	0.9157	0.0691	0.7936
Lag 2	0.1390	0.8705	0.1149	0.8917
Lag 3	0.6757	0.5705	0.3967	0.7559
Lag 4	0.5173	0.7233	0.3338	0.8540
Lag 5	0.8503	0.5203	0.7754	0.5717
Lag 6	0.9650	0.4577	0.6524	0.6880
Lag 7	1.0790	0.3898	0.7371	0.6416
Lag 8	0.9422	0.4906	0.6493	0.7326
Lag 9	0.8361	0.5866	0.6028	0.7886
Lag 10	0.9066	0.5344	0.7559	0.6692
Lag 11	0.8179	0.6226	0.7244	0.7097
Lag 12	0.7545	0.6920	0.6519	0.7868

The DIFNT data used in estimations are in billion US dollars. Thus, findings imply that a USD 10 billion increase in the capital account balance has a cumulative growth effect on the share of N-sector in GDP from 3 to 3.5 %.

Conclusions

This paper examined the effects of foreign capital inflows on the share of the non-tradables production in the Turkish economy since the capital account liberalization. I employed Almon-lag estimation procedures to account for the lagged nature of the effects of the credit increases on the real side of the economy. The findings indicate that there is a significant impact of capital flows on the size of the N-sector: a billion dollar change in the capital flows has a distributed affect on the size of the N-sector around 0.35 percent in 11 quarters. This brings us to the conclusion that the continuous growth in the relative size of the N-sector prior to the 2001 crisis and since the fourth quarter of 2003 (see figure 3) can largely be explained by the excessive capital inflows.

If the T-sector firms need the N-sector inputs for production, as suggested by many authors, what are the risks brought by this N-sector-led growth? The legal regulations following the currency crisis of 2001 limited the short-positions to be maintained by the banks to 20 percent of the balance sheet total. However, there is no regulation limiting the international borrowings of commercial firms without foreign dominated assets. Findings in this study indicate that, since the capital account liberalization foreign capital flows to the Turkish economy have been mostly directed to the N-sector firms whose assets are domestic currency denominated. As also suggested by Özmen and Yalçın (2007), the liability dollarization in Turkish corporate sector remains as an important source of fragility against financial shocks. This underlines the importance of legal regulations on and monitoring of foreign borrowings of the corporate sector.

An important factor encouraging foreign creditors to take the risk of lending to the N-sector is excessive official reserve accumulation of the central bank, which acts as an implicit bailout guarantee. As of July 2007 the volume of the official reserves of the central bank reached up to $ 69 billion, which corresponds approximately 18 percent of the GDP. In addition to the cost of holding excessive reserves, this policy stimulates foreign credit to be directed to the firms without foreign exchange revenues, which puts a limit to the exports potential of the economy in the long run.

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The Analysis of the Romanian Business Environment in the Context of the Adherence to the European Union

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Abstract

Performance is a state of competitivity that ensures the maintenance and the development on the market, where everybody attempts to reach the first place. Each enterprise will take advantage from the business environment, and in order to get one step ahead the others it will „invent" new methods of winning the competition, since nowadays performance has got larger valencies (global performance or lasting development). This paper tries to assess the Romanian business environment on sectors of activity, especially in the year 2007, when Romania has become a member of the European Union and to make comparisons between the Romanian business environment and that of other countries. We believe that a valid analysis of the business environment is very important as it helps the enterprises to be aware of the direction they are heading and contributes to pointing out the favourable factors it should develop, the ones that give them a competitional advantage, but also the factors that have a bad influence. Moreover, we try to present the strengths and the weaknesses, the opportunities and the drawbacks of the Romanian business environment.

Introduction

In a world of competition, that has become increasingly dynamic, as a result of changes within the financial environment and of the increase of risk once with the economical-financial disturbances and the globalization of money and capital exchange, the achievement of ***„excellence" in business*** represents the only way of survival and development of enterprises in a competitive economy. One of the ways to achieve excellence is performance, thus more people speak today of ***global performance.*** This new approach upon performance is currently known as ***lasting development,*** which has three objectives: the increase of economic-financial performance of the company, the development of the efficiency of the surrounding environment and the stimulation of social development. Therefore, we can say that global performance represents the sum of economic-financial, ecology and social performances.

In the present conditions of the globalization of world economy, an enterprise is performant if „it creates added value for its shareholders, satisfies the clients demand, takes into account the opinion of employees and protects the surrounding environment. Thus, shareholders are satisfied because the enterprise has reached the target of rentability, clients trust in the future of the enterprise or the quality of its products and services, employees are proud of the company they work in, and the society benefits, through the policy adopted by the enterprise, of the protection of the surrounding environment."[1]

To meet these objectives, we consider that the ***analysis of the business environment*** in which the enterprise develops its activity has a great importance, especially in the present conditions when performance has much exceeded the borders of traditional approach which used to take into account only the economic-financial objectives, because the factors that influence the business environment, the advantages or restrictions it presents, can facilitate or stop the achievement of global performance. On the other hand, it is not at all surprising the fact that the environment in which the enterprise develops its activity is not organized to respond to its vision and interests but, on the contrary, many components of the environment can be opposite so that the enterprise is the one that has to permanently adapt to environment changes, and adaptation implies firstly knowledge and information.

The business environment is a sum of factors that affect the capacity if the enterprise to develop and maintain successful transactions with its partners. Romania's adherence and integration in the European structures has had, still has and will further have a major impact upon the local business environment. In these conditions, we are going to speak not only about the Romanian business environment, but also about the European business environment in which, once with the elimination of borders, many changes will take place regarding the national enterprises and the national economy, in general.

In what concerns the history of the economic and social-political of Romania along the last decade, the most important step made by our country has been the ***adherence to the European Union***, a reality which offers both possibilities of development and some aspects that could stop this process.

[1] Jianu Iulia, *„The performance – a notion which looking for define . Ambiguity and clarity"*, Accounting, Expertise and Business Audit Review, no. 5/2006, Bucharest, pag. 18.

The history of Romania's integration in the European economic block began in1995, when the European Council required the Commission to present its point of view regarding Romania's adherence to the European Union, after that on the 22nd of July it had handed the official request of adherence. In accordance to this desideratum, on the 15th of July 1997 was born the so-called community "aquis[2]", that made rough critics to Romania's request of adherence. The final decision was based on the criteria from Copenhagen, by which it was admitted the fact that Romania had passed through an important development regarding the achievement of political conditions, but also remarked that on mean time period (not even speaking of the short term situation) the country faces great problems with economic competitivity and reaching the European competitive level. The biggest concern to that moment was the fact that judicial homogenization was not even a priority to our country, while on the structural plan, not even the most elementary legislation was adopted.

Starting with 1998 the Commission has yearly elaborated a "monitoring" report. The first such report admitted the fact that the first criterion from Copenhagen, namely political stability, was achieved, but Romania was still steady with national economy and its competitivity worsened. In 1999 social problems regarding the protection of the under-aged were discussed, together with the issue of discrimination against gypsies. However, the general economic situation still recorded no improvements, but there was considerable progress in taking the community aquis.

In spite of major economic problems, the European Union has proposed the Commission to start negotiations and talks regarding Romania's adherence. The focus point of the official discussions on this purpose was chosen on the15th February 2000, this fact being mentioned in an addendum to the report of the Helsinki Meeting from December 1999. Also, on the same date, there began talks with Slovakia, Latvia, Lithuania and Malta, countries that managed to meet the requirements of the European Union 3 years earlier than Romania.

Parallel to preparations for the start of negotiations, our country has developed a sustained effort to shape an economic strategy in the mean term. This strategy, sustained by a political statement of support made by the entire political, social and economic spectrum in Romania, was presented to the European Commission on the 20th of March 2000. On May 30, 2000 it was approved and transmitted to the European Commission the plan of action so that the strategy objectives be put into practice. The strategy regards the rigorous assessment of the social costs of transition and promotion of reform, as well as of the adherence to the European Union, ensuring the necessary financial and legal support. Moreover, one of the objectives of the strategy was *to create a favourable business environment, based on a coherent and stable legislation framework able to ensure the development of market economy, the reduction of transition costs and of fiscal burden; to promote specific measures to stimulate the small and mean enterprises; to define clearly property laws, ensure adequate management and judicial structures, able to ensure the application of law and the respecting of contract obligations.*

From 2000 the country reports elaborated by the European Commission already describe an economic and social-political situation about to improve, pointing out the progress in the social plan regarding the situation of minorities and harmonization of legislation, and

[2] The official opinion of the European Union, represented by the European Comission.

in 2004 Romania was given the ***status of functional market economy*** – the last criterion that had to be met. Therefore, talks with the purpose of adherence were closed on December 14, 2004. Criteria from Copenhagen were achieved with some exceptions; in the case of eight domains Romania required and received departing from the achievement of the expectancies of the Union. These domains were the free circulation of services and capital, legislation regarding economic competition, agriculture, transports, the problem of taxes, the energy policy, the protection of environment. The chapter with the most difficult issues was that concerning the competitional policy and those from the domain of internal and judicial policy.

In 2002 was set the date of adherence, on January 1, 2007. Although 2007 was already fixed as the time of the adherence, there also arouse the certainty of great sacrifices from Romania in the time left. With this purpose, in the treaty of adherence, as final disposition, it was mentioned the fact that if the country would not meet until the moment of the adherence all the objectives it had agreed with, the date could still be changed to the 1st of January 2008.

25 aprilie 2005 was the date when Romania together with Bulgaria signed the treaty of adherence to the European Union. In the context of this treaty the two countries could achieve the status of member with full rights starting with the 1st of January 2007. Romania had waited for 12 for the de jure adherence to take place. We say de jure because in what concerns the commerce and the partnership between Romania and the European block the de facto integration had taken place previously. The failure of the CAER brought a rapid – but not sudden – reorientation of the Romanian commerce towards the European Union, a phenomenon specific to all the other countries from Central and Eastern Europe. By the end of 1999, more than 65% of Romania's exports headed to the European Union, while imports coming from the European Union reached a percentage of 60%. The European Union-15 represented in 2001 59,6% of the commercial fluxes of Romania. The figures can be compared with the amount of inter-European commerce of many of the states of the European Union. We can say that at least from the commercial point of view – with the exception of certain tax barriers for agriculture and of some industrial sectors protected by the European Union – Romania integrated de facto within the community commerce right before 2007.

The year 2007 marks the passage from the phase of acquiring of acquis to the phase of generation of acquis and construction of the political Union. The fact that Romania has adhered to the UE in 2007 left few time to companies to prepare, in case they have not yet done that. The business environment becomes more competitive, and Romanian companies have to compete with firms renown in Europe.

After 2007, the activity of firms from Romania has to be licensed on the market according to the European standards of competitivity. The activity of companies has to be assessed by informatised systems (in present there are SAP and SIVECO, but there will also be introduced another American system). There is some danger – not very imminent however – that the Romanian economy not be able to meet the European technological standards.

Romania is now in the centre of attention for the European Union from two main reasons. Firstly, it is one of the countries that recently adhered and even if it was supposed from the previous time to prove stability and economic growth, bow it is even more supposed to do that, and it must compare its strengths and achievements "with the members of a select

club".[3] Secondly, Romania is part of a courageous project[4] of the European Union in what regards the development in the Black Sea area. This project has a great importance among the objectives of the development policy of our country. One of these objectives is the strengthening of collaboration within the Organization of Economic Cooperation of the Black Sea for the development and effective application of projects already agreed upon (energy, financial and bank system, transport, tourism), with the view to update its activities to the priorities of national economy and the interests of groups of Romanian businessmen.

From these reasons, the development of economic competition and of services in Romania is both the goal of our country and of the European Union, while in the opposite case their plans could be slowed down or even stopped.

One year after the integration in the European Union, due to reforms from the sector of credits and tax payment, Romania holds the 48th place from 176, in the classification of states with the most favourable business environment, according to the annual report „Doing Business 2008"[5] realized by the World Bank. This classification eas made in accordance with a certain methodology, based on data from 10 domains regarding the period April 2006-June 2007.

The classification made by the World Bank and the International Finance Corporation is based on time and cost indicators meant to respect the requirements of public administration about the setting of a business, the functioning, commercial activity, fiscality and closing of the business. This classification does not concern variables such as the macroeconomic policy or quality of infrastructure, the fluidity of currency, the perception of investors or the rate of criminality.

According to this classification regarding the attractivity of the business environment, Romania steps 7 positions compared to the previous year (from the 55th place), recording significant progress only in two of 10 domains, after which the classification was realized, namely: *the easiness to contract credits* (from 32 in 2006, to 13 in 2007) and *the easiness to close (liquidate) a business* (from 109 to 81). It stepped one position from the previous year in what concerns the domain of *tax payment* (from 135 to 134) and the domain of *transborder transactions* (from 39 to 38). In exchange, regresses were recorded with the results obtained in five of the most significant domains (less than 12 places from 2006) as follows: *the setting of a business* (from 14 to 26), *the staff employment* (from 133 to 145), *the property recording* (less than 11 places from 2006, from 112 to 123). At chapters *obtaining of licenses* and *protection of investors*, there was also some regress, less significant however (from 87 to 90, respectively from 32 to 33). In a single domain – *the contract application* – Romania occupied the same position in both years (position 37).

[3] Dragos Pîslaru, founding member of the Group of Applied Economy.

[4] The initiative to institutionalize the interest for the Black Sea area manifested itself in 1992, when 11 surrounding states founded the Organization of Economic Cooperation at the Black Sea (BSEC), which set as its objective the gradual integration of the region in the world economy, especially the European one. It was firstly taken into consideration the potential of the market and the resources of the region. The European Union did not define clearly a policy for the Black Sea area, but the example of the Euro-Mediterranian partnership, or Finland's attempts to cooperate in the Northern area suggest that there won't be long until such a policy is shaped.

[5] http://www.doingbusiness.org/economyrankings/

If we take into account the classification for the area of Eastern Europe-Central Asia, Romania stands, according to the same report, on the 9th place of the 28 countries, after Estonia, Georgia, Latvia, Lithuania, Slovakia, Armenia, Hungary and Bulgaria, being followed by Slovenia, Czech Republic, Turkey, Kazakhstan, Poland.

Within the region, Romania stands out by the attractivity of the business environment, occupying the first 5 places at the following chapters: *the easiness to contract a credit* (2nd place in the region), *protection of investitors* (3rd place), *the easiness to start a business* (4th place), *transborder transactions* (5th place). Among the 28 economies of the region, Romania stands in the middle of the classification at the following chapters: *obtaining of licenses* (the11 th place), *application of contracts* (the 13th place) and *closing (liquidation) of a business* (the 15th place). It is situated on the last places at 3 of the 10 chapters according to which the classification was made, namely: *tax payment* (the 20th place), *staff employment and property record* (the 26th place). The leader of the group that realized this report, Simeon Djankov, pointed out the fact that states from Eastern Europe and the former Soviet block surpassed the states of Eastern Asia in what concerns the attractivity of the business environment, some of them even compared to states from Western Europe (for example Estonia, Georgia, Latvia, Lithuania which are nowadays classified in front of countries like Belgium, Germany, Austria or France).

A classification made by the Economist Intelligence Unit (EIU)[6] forecasts that in 2008 Romania would stand on the 45th place with 5,46 points on a scale from 1 to 10. Thus, Romania maintains the place obtained in 2007 when it got 5,32 points.

The classification was made on basis of data obtained at the level of economies from 70 states all over the world. To make the top there were taken into consideration ***100 quantitative and qualitative variables*** organized into ***six distinct categories***, feed into the e-readiness rankings. The six categories (and their weight in the model) are[7]:

- ***connectivity and technology infrastructure (20%);***
- ***business environment (15%)***; As in previous years, scoring model in 2008 makes use of our existing Business Environment Rankings, which evaluates over 70 separate indicators grouped in ten categories of criteria, such as political stability, macroeconomic health and the country's overall policy towards free enterprise. Utilizing these allows us to assess each country's ability to maintain a stable, secure and unfettered place to conduct commerce in the manner in which it attracts and fosters (or repels and hinders) digital commerce. The rankings for this category reflect our view of each country's expected performance in the five-year period of 2008-2012[8].
- ***social and cultural environment (15%);***
- ***legal and policy environment (10%);***
- ***government policy and vision (15%);***
- ***consumer and business adoption (25%).***

The data used in the rankings are sourced from the Economist Intelligence Unit, Pyramid Research, the World Bank, the World Intellectual Property Organization and others.

[6] http://www.eiuresources.com/mediadir/
[7] www.eiu.com/sponsor/ibm/e-readinessrankings2008
[8] *„E-readiness rankings 2008. Maintaining momentum A white paper from the Economist Intelligence Unit"*, The Economist Written in co-operation with The IBM Institute for Business Value

Qualitative criteria are assessed by the Economist Intelligence Unit's extensive network of country experts, and their assessments are reviewed by top economists.

In the classification on regions, most points (the first three places), for the region of Central and Eastern Europe (see table no.1) were obtained by countries like: Estonia, Slovenia, Czech Republic (these being the countries with most „nominations" for the first three places), then Slovakia, Lithuania and Hungary, each with one „nominalization" for the first three places in the categories the classification was made. In the following table we present the situation of the top of countries from Central and Eastern Europe, on categories of criteria and points.

Table 1: The situation of the classification of countries from the region of Central and Eastern Europe in top 70

Categories of criteria **Country**	**Connectivity and technology infrastructure (20%)**	**Business environment (15%)**	**Social and cultural environment (15%)**	**Legal environment (10%)**	**Government and vision (15%)**	**Consumer and business adoption (25%)**	**Overall score**	**Place 2008/ 2007**
Estonia	**6,50 (*)**	**7,81 (*)**	6,73	**7,80 (*)**	**6,25 (*)**	**7,60 (**)**	**7,10**	**28**/28
Slovenia	**6.40 (**)**	7.32	**7.00 (*)**	6.60	**6.10 (**)**	**7.70 (*)**	**6.93**	**29**/29
Czech Republic	**5.95 (***)**	**7.42 (**)**	**6.87 (**)**	**6.90 (***)**	**5.70 (***)**	**7.20 (***)**	**6.68**	**31**/31
Hungary	5.30	7.08	6.47	6.90	5.55	6.75	**6.30**	**33**/34
Slovakia	5.40	**7.42 (***)**	**6.40 (***)**	6.90	4.70	6.05	**6.05**	**36**/39
Latvia	5.60	7.10	6.20	6.90	4.70	6.10	**6,03**	**37**/37
Lithuania	5.00	7.09	6.33	**7.20 (**)**	4.70	6.35	**6,03**	**38**/41
Romania	4.70	6.57	5.47	6.30	5.25	5.20	**5,46**	**45**/45
Bulgaria	4.40	6.79	5.33	6.30	4.55	4.70	**5,19**	**48**/48
Note: The symbols (*), (**), (***) attached to the points allotted to criteria according to which the classification is made, signify the position (I, II, III) the respective country occupies by the amount of points obtained to one of the 6 criteria, for the Central and Eastern European region								

Source: "E-readiness rankings 2008. Maintaining momentum A white paper from the Economist Intelligence Unit", The Economist written in co-operation with The IBM Institute for Business Value

The process of adherence to the European Union triggered off the improvement of the business environment in many of the states from Central and Eastern Europe, however these states' motivation to implement reforms decreases once with the acquiring of the quality of member of the European community, according to the report realized by the European Intelligence Unit (EIU). At the international level, the same report assesses that the business environment will maintain favourable for the next five years (2008-20012), in spite of obstacles like: the intensification of protectionism, the risks of the security system and macroeconomic disturbances, which might transform in big global threats. With all these, the process of globalization is still yet to go on. The international trend of liberalization and regulation will be further sustained by important factors, such as the increasing concurential pressures upon multinational companies and the competition between different countries for foreign investments.

In order to resist to the strong competition in the current context of globalization, the Romanian business environment, as part of the European business environment, has to offer attractive conditions both for local and foreign enterprises, with the view to increasing the country competitivity.

A country competitivity represents its capacity to create and maintain the institutional, economic and infrastructure conditions that would favour the setting/attraction and development of companies producing goods and services at a higher quality and/or at lower prices than in case of external competitors. The capacity of competition manifests itself both on international and on national markets, as related to the goods and services from import.

In present the country competitivity is mainly ensured by the small costs of work and of certain local raw materials and manifests itself in sectors characterized by a relatively small added value. This model of competitivity is specific to many countries situated to a lower level of economic development. At the same time, taking into consideration the increase of internal prices, the external opening of the country, the abundance of cheap manpower in other countries, the intense emigration of citizens, ***our comparative advantages determined by small costs will erode more and more, while the technological lagging behind developed countries could get worse***. This is why it is necessary to ensure a gradual transition from competitivity determined by the cost factor to the competitivity determined by the efficiency factor and the quality factor together with the orientation of the economy towards branches with a relatively higher added value. Competitivity based on efficiency and quality will be the basic source of lasting economic growth and development and improvement of living standards for people.

The increase of competitivity on internal and external markets by ensuring the transition from competitivity based on costs to competitivity based on efficiency and quality. The most important progress indicators are:

- Rate of growth of work productivity on sectors and branches of activity;
- The relative work productivity in Romania (compared to similar indicators in the main competing countries in the region – Bulgaria, Latvia, Lithuania, Ukraine etc.);
- Structure of raw added value on sectors and branches of activity;
- Rate of finite products within the total of exports;
- Growth of the amount of GNP;
- Amount of intensive products in technology within the total volume of production;
- Rate of growth of exports on the main sale markets, related to the total growth;
- Rate of main local products on the segments of external market

A first step in this direction was made in Romania by elaborating the project of the **National Export Strategy (NES)**.[9] This process is the result of collaboration between state institutions with attributions in the economic domain and private environment. The identification of sectors with potential for export has determined the realization of a plan of measures annexed to the document which states the intention to increase substantially the exports for the following years.

[9] *National Export Strategy 2005-2009*, Commission of Strategy, Competitivity, Marketing and Branding, Council of Export, August, 2004

The initiatives and measures from the NES are focused on: *technological development, identification of resources and products required on external markets, improvement of the process of production of services, reduction of production costs, programs of training for the staff, support for research and design, promoting of the Romanian scientific research abroad, development of services of quality certification, development of business alliances between companies and associations which act especially at the level of the region, diversification of services, growth of manager skills and preparation of firms for the competition from the European market after the 1st of January 2007.*

The domains with potential for export were identified by work groups built on the principle of public-private partnership. The 23 sector groups identified the opportunities of development of the offer for export in the following domains: clothing, furniture, wine, glass and pottery, chemical products, technology of information and communications, machine constructions, machine equipment and components, rural tourism, ecology agriculture, spa services, crafts, electronics and electrotechnics, culture and other emerging services representing the protection of environment, research, development, quality certification, transport etc. In exchange, the 7 intersector groups have focused upon the identification of common parameters to all sectors with potential for export which have to be respected in order to reach the target of the strategy (competivity for export of Romanian enterprises, commerce information, commerce financing, quality management, skills development, facilitation of commerce, promotion and branding, research and innovation).

According to the Strategy, Romania, in its quality of exporting country, has to focus on products with great value, on attracting local and foreign investments, introducing in the system of production components that are now imported (for example in the sector of clothing, the raw materials produced in the country), the branding of exporting sectors, identification of market niches etc..

The first projects of sector branding regard the domains of IT, vineyard-wine, furniture and clothing. To their achievement contribute, besides the Ministry of Economy and Commerce through the Department of External Commerce, other ministries, syndicates, professional associations.

The elaboration of the National Export Strategy took nine months and it was launched under public debate at the beginning of September 2005. The technical assistance was provided by the International Centre of Commerce from Geneva OMC/UNCTAD.

In order to achieve successfully the SNE objectives, it is necessary to evaluate the Romanian economic environment to know its strengths and weaknesses, so that the initiatives and measures proposed have a real base of realization. Specialists assigned from the organizations that collaborated with the government to elaborate the strategy had no easy task SWOT analysis of the entire Romanian economy is rather difficult to make because there are significant differences between its sectors and sub-sectors, and the climate in which the economic activity develops is the result of national and international wide interaction of several factors.

The sum of these factors constitute the external macroenvironment which exerts an indirect influence upon it, while the reverse influence is less significant or does not exist. Just by taking a look at the dimension of the enterprise we may notice that this can do little or

almost nothing to have an impact upon its macroenvironment. It just has to monitor its evolution and prepare for unavoidable changes. In exchange, the business environment can produce many effects upon the microeconomic activity by the measures taken by organizations in charge.

The macroenvironment includes a complex set of variables that form together a framework led by the following factors: economic factors, technical and technological factors, the demographic factor and the structure of population, social-cultural factors, political-judicial factors and natural factors.

The SWOT[10] analysis realized on groups of factors was based on an aggregation of several SWOT analyses prepared by every of the teams specialized in strategy (see Table no.2)

Table 2: The SWOT analysis of the Romanian business environment

STRENGHTS	**WEAKNESSES**
Human resources, social capital, infrastructure of education and research	**Human resources, social capital, infrastructure of education and research**
►Great amount of manpower, at low costs and an acceptable level of initial education ;	►Lack of synchronization, communication and cooperation between companies, research institutions and the public sector; between banks and companies; between the suppliers of utilities and natural resources and processors;
►The existence of infrastructure of research and training (schools and institutes) specialized on important domains of activity such as: wood processing, machine construction, machine components, industrial equipment, textiles, chemicals etc.	►Insufficient connections and cooperation between the needs of the business sector and the educational system in the curriculum area (IT, furniture, textiles);
►The educational system has the infrastructure, the institution and human resources well—prepared and distributed in territory in strategic domains (IT&C, textiles, furniture, chemicals and oil-chemicals, engineering) ;	►Low capacity of association in a business or between firms in order to create marketing, branding centres etc.
►The good concentration of foreign languages speakers in the big cities;	►Low level of knowledge about foreign markets and the effects of the UE integration, globalization and liberalization;
►Very well-prepared specialists with key positions in transnational companies;	►Lack of understanding the need of quality control and certification, of creating and protecting brands and
►Cultural heritage specific to the European context.	

[10]http://www.cpisc.ro/files/13_septembrie/SNE_document_final;
www.mie.ro/euroimm/%3Fid2%3D0301+analiza+swot+a+comertului+exterior+romanesc

Natural resources and the environment ►Natural resources available for wood processing (90% of the main types of regenerative wood), quality of soil; ►Increased biodiversity, climatic conditions good for the health and unique ecology systems as the Danube Delta; ►Natural conditions good for the agriculture. **Other significant factors regarding competitivity** ►Friendly business environment and a national infrastructure in course of modernization with UE funds. Macroeconomic stability. ►The existence of industries able to provide and adapt the offer within the national value chain for the integration on vertical of the products of strategic sectors such as: furniture, car industry, chemicals, electric objects, metal processing and IT&C; ►Complementarities and capacity of vertical specialization in European industries like car construction, car components etc.; ►Long tradition in manufacturing sectors like: textiles, wood processing, chemistry and oil chemistry, metal processing; ►Governmental support for strategic sectors in certain key areas such as: development of the infrastructure IT&C; ►Increased interest and pro-active attitude of business associations for ecologic farms and the special priority of this sector in the programs of adherence and integration Romania-UE combined with the introduction of legislation accordingly;	industrial property or of the requirements, advantages and priorities for a lasting development, rural development and protection of environment; ►Focus on sectors with low added value/strategies based on reduced costs; ►Insufficient capacity of industries (IT, ecology agriculture, food processing) to absorb funds due to low demand and lack of entrepreneur skills; ►Lack of management skills and brand building and networks of distribution on foreign markets which determine a low degree of market sophistication ►Insufficient marketing resources, market development and promotion at the level of company, association, macroeconomic and public level; ►Lack of experience of farmers in creating business plans and getting financing from available sources like the UE SAPARD program; ►Low adaptability of manpower and low level of learning all along the time of life; ►An important segment of population affected by poverty and social exclusion **Natural resources and the environment** ►High level of wood cutting and use of wood resources in primary industries with small added value, such as export of unprocessed wood and timber; ►Low protection and promotion of biodiversity; ►Inefficient agriculture (exceedingly

►The measure of the internal market; ►Favourable geographic conditions such as: fast connections with foreign markets with good possibilities of car, railway, sea and Danubian transport.	intensive in labour), the excessively fragmented agriculture surface; ►Poorly developed touristic infrastructure and inadequate marketing; ► High energy intensity **Other factors significant for competitivity** ►Technological disparity and low level of modernization of technologies (viticulture, furniture and other processing sectors), low productivity, high costs (excepting the labour); ►Disparity from advanced standards of quality and environment; ►Digital disparity in the electronic commerce, e-business and the use of IT services and of computer-assisted technologies; high costs for the Internet and phone infrastructure; ►Lack of information about markets and marketing skills; ►The inexistence of a coherent image of sectors; ►The business environment is still altered by monopol agreements, corruption cases and the lack of collaboration, communication, transparency; ►Connections with producers of textiles, ornaments, accesories etc. of companies from the final sectors (clothing and textiles) were broken; ►Weak links on the value chain between final processors of oil-chemical goods such as tyres, plastic materials etc. and suppliers of raw materials and increased costs of production in primary

	industries ; ►Financial blockings at the level of productive companies; ►Lack of cooperation between foreign investments in sectors considered as an important source of managerial know-how, transfer of technology and access to foreign markets and other production factories within the respective sectors, even if they have different production profiles; ►Insufficient efforts of restructuring and recapitalization for the infusion of new technologies capable of helping the sector and create and increase the added value of the product; ►Dependence on raw materials and imported accessories such as: lack of offers of local raw materials and insufficient technical endowment of primary sectors; ►Flawed local legislation regarding the commerce of goods, exports and transport; ► Degraded and insufficient infrastructure/ low accessibility inside and outside the country.
OPPORTUNITIES **Human resources, social capital, infrastructure of education and research** ►Romania's adherence to the UE. Romania will benefit from the UE of research and education infrastructures, legislation framework and support schemes; ►Education and research will be more tied to production; ►Good general knowledge of foreign languages allowing the development of	**THREATS** **Human resources, social capital, infrastructure of education and research** ►External brain drain, especially in the case of IT specialists, engineers, mathematicians, inventors; ►Lack of a well-developed school of industrial design with connections with the business environment in important production sectors such as: textiles,

delocalizaed services; ►Dimension (the second country as population from the new member states -10+2 and the seventh of all UE countries); ►New sources of investment, including the Structural and Cohesion Funds; ►Development of business infrastructure; ►Bigger direct foreign investments; ►Modernization of the capital and of other city centres where most of the learned population lives; ► The necessity/acceptation of the need to change; **Natural resources and the environment** ►Increased interest for the protection of environment and biodiversity in the world and in Europe; ►A new type of consumer, interested in ecology, protection of environment, biodiversity; ► Romania as touristic destination – niche tourism -potential knot in the region for natural gases and electric energy transport ►Modernization of agriculture **Other factors significant for competitivity** ►Romanian enterprises will benefit of the scale economy of the great community market; ►Liberalization and globalization of commerce and the modernization of business models; ►Delocalization and growth of competition	clothing, furniture etc. ►Focusing of human resources upon unspecialized activities with small gains; ►Lack of interest of enterprises regarding the use of the results of the activities of research-development and innovation for the improvement of competitivity of products and services; ►Low interest for innovation and original brands. **Natural resources and the environment** ►Loss of biodiversity and rural cultural heritage because of chaotic economic activities; ►Concentration of activities in cities and an unbalanced development between cities and rural areas; ►Climatic changes/degradation of the natural environment. **Other factors significant for competitivity** ►Integration but not convergence within the EU; ►Greater exposure to competition on globalized markets; ►Value chains of the strategic sectors are inefficient and weak, having reduced profits and being much too dependent on international value chains; ►Strenghtening of Romania's position/image as an economy focused on sectors with low added value;

between CTNs and IMMs to set or enter world value chains; ►The great importance given by the UE to the "new economy" and the high-tech sectors, development of infrastructure, energy efficiency, protection of environment; ►The existence of IT&C, electric, electronic and hardware industries relatively developed and a great number of specialists in this domain who can face the requirements of informatisation; The application of e-commerce/e-governing techniques ►Complete liberalization of public acquisitions	►Poor e-business infrastructure; ►Lack of significant information about the market in highly specialized domains (IT externalization, industrial subcontracting, organic farms); ►Inconsistent country branding; ►Low productivity and efficiency in the consume of utilities and raw materials as compared to competition; ►Aggressive foreign competition borrowing segments from the local market in sectors such as: textiles, furniture, metal and wood processing etc. due to liberalization and integration. ►migration of certain industrial sectors towards external locations with lower costs ►long periods of stagnation/economic decline at European or world level

Considering this SWOT analysis we can say that the Romanian economy has a relatively small level of competitivity in the European context, and Romania attracted smaller investments per capital, as compared to other countries from the region, because of the absence of a transparent legislation frame and an increased competition in the region. The competitive disparity compared to the rest of the EU member states cannot be ignored in the conditions of the importance the European market has for Romania. It is very likely for this disparity to grow within the perspective of an even greater liberalization and integration of the world commerce, leaving the Romanian exporters in a critical situation.

In spite of the continuous opening of the external commerce and in spite of significant performances of exports, Romanian exports are still not enough diversified. This is mainly due to the fact that only few enterprises run innovative or research activities in the development of their products and activities. A short look upon the principal Romanian exports proves the fact that the majority of them are traditional sectors. There hasn't been much innovation and, for this reason, there are still few industries intensively using new technology.

In consequence, Romania's strategic priority should now be ***the competitive advantages***, ***the development of capacity and competence of exporting sectors, attraction of local and foreign investments and creation of an economy able to develop in conditions of free commerce in a more globalized market.*** Direct foreign investments (ISD) represent a source of capital, of know-how, of technology and management skills and stimulate economic growth. Romania has to become a better candidate for the absorption of direct foreign investments, especially those oriented towards export.

Romania can no longer be defensive or protectionist, but focus on problems of access or regularization of supply of products and services for domestic market. The introduction of the common custom tax once with Romania's adherence to European structures from January 2007, imposes a fast adaptation to the conditions of the international market. It is essential that productive sectors take into account this aspect.

Competitive advantages do not appear out of protectionism, rates or preferential access to market. In fact, these measures can have a negative effect upon economic performances because they lower the motivation of enterprises for efficiency, quality and innovation.

From this point of view, we consider useful the analysis of the situation of Romanian economy through the basic economic-financial and money indicators for the period 2000-2007 (table no.3). This period is extremely important for the economic situation of our country because it coincides with the beginning of negotiations and talks concerning Romania's adherence to the EU (the 15th of February 2000), with the obtaining by Romania of the status of functional economy (the year 2004) and the integration in European structures (January 1, 2007).

Table 3: Situation of the principal macroeconomic indicators at the level of the Romanian economy for the period 2000-2007

	UM	2000	2001	2002	2003	2004	2005	2006	2007
ECONOMIC GROWTH AND ASSOCIATED FACTORS									
Value of Gross National Product (current prices)	Mil. lei (RON)	80377,3	116768,7	151475,1	197564,8	246468,8	288047,8	342418	**404708,8**
Rhythm of growth of GNP	%	2.1	5.7	5	4.9	8.3	4.1	7.7	**6**
Rhythm of growth of the industrial production	%	7.1	8.4	6	3.1	4.3	2.5	6.9	**5.1**
Rhythm of growth of the final consume	%	1.4	6.3	2.4	6.9	10.2	8.5	12.6	**10.2**
Raw formation of fix capital	%	5.5	10.1	8.2	9.2	10.1	13	16.1	**28,.9**
COMMERCE AND INVESTMENTS									
FOB exports	Mil. Euro	11273	12722	14675	15614	18935	22255	25850,5	**29380,3**
FOB imports	Mil. Euro	13140	16045	17427	19569	24258	30061	40745,8	**50882,6**
Commercial balance	Mil Euro	-1867	-3323	-2752	-3995	-5323	-7806	-14895,3	**-21502,3**
Direct foreign investments	Mil Euro	1147	1294	1212	1946	5183	5213	9082	**7069**
Deficit of current account	Mil Euro	-1494	-2488	-1623	-3060	-5098	-6883	-9973	**-16872**
INFLATION									
IPC(end of the year)	%	40.7	30.3	17.8	14.1	9.3	8.6	4.9	**6.57**
IPC(mean)	%	45.7	34.5	22.5	15.3	11.9	9.0	6.03	**5**
LABOUR									
Population in charge	Thousands of people	4623	4619	4568	4591	4420	4704	4575	**4717,2**

Unemployed	Thousands of people	1007	827	761	659	558	523	460,5	**367,8**
Rate of unemployment (end of the year)	%	10.5	8.8	8.4	7.4	6.2	5.9	5.2	**4.1**
EXCHANGE RATE									
RON/USD (end of the year)	-	2.5926	3.1597	3.3500	3.2595	2.9067	3.1078	2.5676	**2.4564**
RON/USD (mean)	-	2.1693	2.9061	3.3055	3.3200	3.2637	2.9137	2.8090	**2.4383**
RON/EUR (end of the year)	-	2.4118	2.7881	3.4919	4.1117	3.9663	3.6771	3.3817	**3.6102**
RON/EUR (mean)	-	1.9956	2.6027	3.1255	3.7556	4.0532	3.6234	3.5245	**3.3373**

Source: *The reports of the National Bank of Romania (http://www.bnr.ro/) and the Statistic Yearbooks of Romania during 2000-2007 edited by the National Institute of Statistics (http://www.insse.ro/)*

The analysis of data from the table and other data we hold shows us some important aspects during the respective period, especially in 2007, regarding the situation of Romania:

- The increase of the GNP in the last two years is an actual fact. We can say that the Romanian people started to work better and harder. In the first semester of 2006 it was recorded the biggest rhythm of growth of the Gross National Product (GNP) from 2001 until now: 7,4%, compared to the same period of the year 2005, according to the National Institute of Statistics. A special support to this performance was brought by the growth of productivity of work. The high level of productivity of work reflects the result of correct restructuring measures. Re-allotment of sources (for example migration of labour from the industrial sector to agriculture; subventions allotted to heavy industry, most from the state) have partially altered the real economic growth. If in 2007, after Romania's adherence to the European Union the Romanian state no longer allotted subventions to the mining sector. Unprofitable mines were closed or will be closed. We are speaking of about 370 localities from 22 counties that are affected from a social and economic point of view. Romania has a strategy of restructuring of mining societies, but besides these mining areas need social and economic regeneration. The main purpose of the project is increasing the capacity of local communities to administrate the economic and socială situation in the area. The project has created business centers and offered support for new entrepreneurs. There was also a component of microcredits (there were offered approximately 2.500 microcredits with a total value of 5.589.140 dollars) and one for financial stimulants for employers and for reforming of manpower (at the end of the project for 2006 there were reported 6.736 newly created workplaces).
- Although Romania's exports depend to a considerable extent on the process of transformation of raw materials in final products, there was not possible to balance the export and the import. One example in this sense is Romania's commercial deficit in the agriculture and food sector. The degree of coverage of imports by exports maintains at about 80% by year.
- One potential winner of the market liberalization could be the sector of services because of the fact that it is relatively intensive in latest technologies (thus losing its competitivity) and especially because it includes in a percentage of 60% work force. It is estimated a constant decrease of the competitive disadvantage from the European Union,

due to the unitary cost of the Romanian manpower which is much under the European one and due to gain in efficiency through imports of technology. Therefore, services contribute to the sold of the general balance sheet and to the macroeconomic development of the country.

- The domain from which Romania could take much profit is that where exported „products" are „intensive in manpower" while from imports it could win only if the products are „intensive in technology", but not the goods of final use, that have no impact or significance for Romania's production or exports, but machines and equipment used as inputs for the sectors less intensive in technology.
- In 2004 from the total of manpower employed 30 % were working in services, compared to 31,5% hired in agriculture domains, 25,9% in industry, 10,3 % in the commerce and 2,3% in other domains. Even if at the end of 2007, Romania records the lower rate of unemployment from the entire period analyzed, the truth is that we deal with an under-use of existing manpower and in the context of the future deficit of manpower from the European Union, Romania has great chances to become a source for the attraction of human resources by European industries[11] (either directly, through migration of labour, or indirectly, by subcontracting). As a matter of fact, this thing is in progress now and is starting to become a threat to the Romanian manpower market. From the second half of 2007 Romania has also started to face the lack of specialized labour especially in the domain of services. This situation would not be such a great matter in the hypothesis of repatriation the income. The problem lies however elsewhere. More than half of the money sent in the country by the Romanian people go to rural areas. In the stage of the development of Romanian rural from 2007 this repatriation exclusively means consume, so the sums brought back in the country are not invested, decreasing the chances for a real contribution to the formation of GNP.
- Romania succeeded to attract more direct foreign investments than we would have expected according to the relative part it holds from the world gross national product. This means that it makes visible efforts to attract investments and is going through continuous liberalization. In this context Romania offers good perspectives of economic growth, a high level of qualification of manpower, considerable natural resources, capacities in the domain of scientific research, advanced infrastructure and an efficient financial support especially due to massive privatizations from these domains in the past 7 years.
- The summer drought has strongly affected the economic growth, this being placed at the level of 6% and has determined the increase of inflation not only for 2007 but also for 2008
- The first year in the European Union brought some important news for Romanian economy. The most important of these is the great fluctuation of money exchange, after long periods in which the rate of exchange was heading in a single direction. Now during the same year we have witnessed a record-appreciation (at the middle of August 2007, the rate of exchange leu/Euro being of 3,15 lei/Euro) and a record devaluation (at the end of 2007, the rate of exchange leu/Euro being of 3,61 lei/Euro) with a disparity of almost 20%. This was due, on the one hand, to the increase of prices at food because of the drought that affected the agriculture, and on the other hand, to the world economic crisis generated by the fall of real estate markets from the SUA and Great Britain, and to the inflation from the EU.
- The rhythm of growth of imports up the rhythm of growth of exports situated Romania on the 5th place among the EU states in what concerns the extent of the commercial deficit. Moreover, the deficit of current account and the worsening of the

[11] We include here in the name of industry the domain of services.

perspective of country rating are other factors that reduced the interest of investors for Romania. At the end of January 2008, the rating agency Fitch had to change from „stable" to „negative" Romania's perspective, as result of the deepening of the deficit of current account, one of the biggest in the world, it is shown in the press communicate quoted by Standard Business.

- The lowering of the interest of investors because of the decline of macroeconomic indicators, in what regards the transactions from the Stock Exchange Bucureşti, has reduced the mean volume transactioned, in November, to 14,2 million Euro compared to 22,8 million Euro in July (according to statements made by chief-economist from East Capital).
- A major problem that Romania faces is corruption. One year after the integration in EU the efforts made by governors to diminish its level seem inefficient. The study presented by the company Transparency International[12] (TI) regarding world corruption, shows that Romania is placed on the first positions, together with countries like Cambodia, Pakistan or region Kosovo. Just like in 2006, in 2007 also the most corrupt institutions in the country are the political parties and the Parliament. The citizens' perceptions upon corruption in certain sectors are also worrying, a fact which might influence the business environment. Opposite to the neighbouring country, Bulgaria, where corruption manifests at the level of criminality, in Romania acts of corruption are restricted to thefts, frauds, traffic of influence, bribery.
- With all these, in 2007 there were recorded unprecedented growths in almost all domains of activity, only agriculture passed through the worst year after the Revolution, because of the drought, causing unfavourable effects in the food industry.
- The incomes grew in 2007 in a rhythm that places Romania on the second place in the EU and on the fourth place in the world, while sales of cars and goods surpassed any previous expectations and constructions went from record to record, even if it is recorded a deficit of manpower in this sector (of approximately 150.000 workers).

Romania's integration in the EU has also brought some elements of novelty or in absolute premiere for the Romanian economy, in certain domains such as:

- The first year with ***mandatory private pensions***;
- In the ***exchange market*** the most waited event was the initial public offer Transgaz, other events being represented by the finalization of the privatization of the company Electroputere, the cancellation of the capital increase from Oltchim, the announcement from AVAS of auction sale of Antibiotics Iaşi. Moreover, the Stock Exchange from Warsaw became shareholder of the Financial and Goods Stock Exchange from Sibiu;
- ***The bank domain*** was marked by the apparition of new players (Bank of Cyprus, Millennium Bank), the fluctuations of the interest rates policy, the loosening of norms of crediting made by the NBR, the starting of the staff crisis from the bank domain and the fast extension of bank infrastructure;
- The explosion from the ***domain of constructions***, in spite of the deficit of manpower;
- The record ***car registrations***, 2007 being the year with the most registrations for new cars;
- There were achieved 57 km of ***highway*** of the 784 km in execution;

[12] http://www.transparency.org/news_room/latest_news/press_releases_nc/2007

- ***The agriculture production*** more than twice smaller than that from 2006 (from 15,63 million tones of cereals, to 7,11 million tones of cereals because of the drought has had a negative impact upon economy);
- ***The fiscal system*** went through some changes: the exemption from the payment of the imposit on dividends received from its branches if they are in another member state and fulfill certain conditions, the return to custom payment of the AVT corresponding to imports from extracommunity countries; decrease of custom taxes at electronic and electrocasnic products imported from the countries outside the EU; the introduction of green tax for electronic and electrocasnic products; impositing by 16% of the partake and real estate transactions;
- In the ***energy domain*** it was finalized the process of liberalization of natural gases and electricity, consumers, including the home ones being able to choose their supplier, according to the advantages of offers; it was put back in function reactor 2 from Cernavodă; the acquisition Shell Gas Romania by Petrom which undertook the business with liquiefid gas; the sale of 75% of shares of The Rompetrol Group to the state company Kaz MunaiGas from Kazakhstan; transaction Petrom-Petromservice in which Petrom undertook the division of oil services from Petromservice.

2007 was a much better year from the economic point of view than it seemed, even if previous periods required great sacrifices in order to integrate our country in the European structures. From now on Romanian economy cannot be separated from the European and the world economy, on the contrary its influences will be stronger. The effects of the American real estate crisis are just at the beginning and 2008 is the year when they will be more visible.

In conclusion, we can say that Romania's adherence to the European Union has led and will further lead to the improvement /attractivity of the Romanian business environment by filtering the economies active on the market.

With all sacrifices made, Romania still has the potential to win from its adherence to the European Union. The competitivity of services is increasing, this fact being attractive both for internal but especially for external investors, who have another important reason to enter the Romanian market of services: the opening of markets, especially for the members of the European Union, then for the entire world economy due to the many conventions and agreements signed by the EU within the OMC for market liberalization and for the reduction of the level of tariff and nontariff protection.

One of the best directions to follow for Romania in the present moment would be a budget policy that could redirect public expenses to domains that would strengthen the human capital of the country, the infrastructure and administration capacity, while the competition policy should redirect the state support towards the domain of research-development. There should also be encouraged the risk capital for innovative firms, and the government should provide co-financing for a fund of risk capital in order to support these firms. The best way to support research in the private sector would be indirect financial measures, which are allowed by EU regulations.

However, to achieve these objectives, Romania needs a strategic effort at the national level based on the development of competitive advantages, to create a performant economy. Romania must further open its economy to stimulate the competitivity based on efficiency, quality and innovation. It is essential that our country be able to generate and maintain

more added value on the production chain. This process has to be related to substantial increases in productivity and diversification of the capacities of production, and exports are the most efficient way to sustain social-economic growth.

The European Union has accepted us and is now giving us a helping hand through the infusion, in 2008, of structural funds with favourable effects upon the evolution of economy, including of the money exchange, in spite of the fact that the rate of absorption will probably be low, judging by the experience of the states from the region.

By measure that Romania will be able to recognize the domains benefiting from the adherence and the time to reorient towards these domains is shorter, costs and disadvantages will balance with gains and advantages brought by this process, but it further depends on the Government of Romania, through its organizations in charge, how would it further promote and develop economic, political, legislation reforms with great impact upon the Romanian economic environment.

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www.doingbusiness.org

www.insse.ro – National Institute of Statistics

www.bnr.ro – National Bank of Romania

www.mie.ro – Ministry of European Integration

http://epp.eurostat.ec.europa.eu/ - statistics of the European Commission

http://www.infoeuropa.ro/ - Centre of Information of the European Commission in Romania

www.eiu.com/sponsor/ibm - Economist Intelligence Unit Written in co-operation with The IBM Institute for Business Value

Insolvency

It can be seen that the highest bankruptcy rate in 2006 was in **Hungary** (1% in 2006 rapidly decreasing as compared to 2005).Second place goes to **Romania,** and in 2005 it was Croatia. In Romania's case, an increase was registered in the number of companies being under bankruptcy with 45,9% in 2006 as compared to 2005, and this was primarily due to the issuing of the new law for insolvency published in July 2006, law that protects the lenders. The large amount of insolvencies at the end of 2006 was also caused by the long period of time allocated to law suits, actually less than half of the total of insolvencies were lawsuits opened in 2006. In 2007 it was expected to have the same type of evolution, by rapidly increasing with 50% for the companies that would go bankrupt, mainly because of the new legislation combined with the EU one, which would destroy the small companies which have an unstable financial situation. In **Poland**, the rate of registered insolvents is extremely low, almost, but the number of bankruptcy reported does not reflect on the real situation, because all cases of lack of actives are rejected by the court and there are no official records on the number of rejected cases.

There is a small percentage of bankruptcy in **Bulgaria**, fact which is primarily due to the complicated procedure and the duration of bankruptcy in this country.

Except for Romania, the number of bankruptcy for the countries that have joined the EU in 2006 can be observed, fact which underlines the capacity of the new EU economies to overcome the competition on the unique market, invalidating the provisions regarding the number of bankruptcies, especially for the small and intermediate businesses.

Inflows and Outflows of Services in the EU and Turkey

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Abstract

Services have increasingly becoming a predominant field in the economies globally, yet it is difficult to categorize services as a tertiary sector due to the fact that it constitutes a dynamic component of other sectors in the knowledge era. It encompasses traditional economic activities such as tourism, transportation, construction, financial and business services; and also other activities such as counseling, data processing, and technical analysis. Services have a high share in the total output and maintain a high percentage in value added and employment in the western world. Services are subject to foreign trade and foreign direct investment substantially due to the globalization process and technological changes. The same trend for services is witnessed in Turkey, like in the EU.

The objective of this paper is to show insufficient intra-trade in the EU and opportunities for Turkey in the trade of services. The method of analysis is comparative based on empirical data.

Introduction

Services are increasingly seen as an engine of economic growth and employment in the EU, as well as in Turkey and other countries. Services account for seventy percent of economic activity in the European Union, and a similar proportion of overall employment. Growth in the economy is essentially driven by services. The same trend is witnessed in Turkey, with services having a share of 64 percent in GDP and and 51 percent in total employment (State Planning Institute, 2006). Services occur at every stage of the business process. This underlines the economic importance of services in the European Union.

The rapid growth of services is an indication of fundamental changes in the production and consumption structures of our societies. Particularly the use of new information and telecommunication technologies causes forms of value adding, which are characterized by a more intensive division of work and a higher degree of specialization. In the course of changed patterns of value adding, complex interaction processes between the production of goods and services, and between customers and service providers take place. Therefore it is widely accepted that the growth of services can not be comprehended, nor be explained, by a mere sectoral view (Granz, 2005).

There is an ever-growing number of different services, ranging from more traditional service sectors such as transport, retail distribution, telecommunications, tourism and the regulated professions, to more recently developed services such as waste management, energy conservation, management consulting, data processing and technical analysis and testing.

Services include four broad categories: Distributive trade (sale, maintenance/repair of motor vehicles; wholesale/commission trade; retail trade and repair of personal goods), Hotels and Restaurants, Transport and Communications (land transport, transport via pipelines; water transport; air transport; supporting transport activities, travel agencies; post and telecommunications), Real Estate, Renting and Business Activities (real estate activities; renting of machinery, and of personal and household goods; computer and related activities; resarch and development; other business activities).

Services were the main activity of 13.1 million enterprises in the EU-25 in 2003, which generated a turnover of 10 363 billion euro. Producing a value added of 2 650 billion euro, and employing 69 million persons, services accounted for 55 % and 59 % respectively of the total non-financial business economy. In terms of employment, it was the largest sector, well ahead of industry and construction, with shares of 30 % and 11 % respectively. In 2003, 99.9 % of the business population in services were small and medium-sized enterprises. These enterprises accounted for 68.5 % of employment and 63 % of value added (Urbanski, 2007).

When looking more closely at employment in services, the sector clearly employs a high share of women, part-time workers and self-employed. Of those working part-time, 75 % were women, which was only two percentage points more than the average for the non-financial business economy. The share of self-employed (19%) in the services workforce was also higher than the nonfinancial business economy average. The importance of services in Member States' economies was greater in terms of employment than for value added which indicates relatively low apparent labour productivity (value added per person employed). The gross operating rate – which is one indicator of profitability, was 11 % in

2003. The most profitable services activities were renting of machinery, real estate activities, and post and telecommunications. It was also these same activities that were the most productive (Urbanski, 2007).

Employing around 55 million persons in 2001, or nearly 55 % of total employment in the European Union (EU) market economy, business-related services have been by far the main source of job creation in the EU. Business services cover knowledge-intensive business services, such as information technology (IT) consulting, management consulting, advertising and professional training services, as well as operational services consisting of services such as industrial cleaning, security services and secretarial services. The business services sector is not just the largest creator of employment, it also adds more value to the economy than any other macro-economic sector. It has the highest growth potential, more new enterprises are created than in any other sector, and business-related services provide the foundation for the knowledge-based economy. The main challenges in a knowledge-based economy relate to the ability to remain competitive, and that depends to a great extent on the capacity to invest in IT and R&D. Unfortunately, in this respect the EU is trailing far behind the United States: overall IT expenditures in the EU amounted to 4.2 % of GDP in 2001 compared to 5.3% in the US, whilst EU average R&D expenditures were 13 % - with large differences across Member States - against the US figure of 34 %. Business services lag behind the growth in productivity recorded in the United States. It is frequently stated that this will constitute a threat to future employment in Europe. There is a genuine danger that services jobs may be transferred to the US and Asia unless the political authorities respond quickly to the challenges facing business-related services in the EU.[1]

It should also be noted that the services sector is the main provider of jobs attracting new groups to the labour market as part-time employment or in low-skilled jobs (Nielsen, 2005). In this paper, inflows and outflows of services will be analyzed from the perspective of international trade and FDI, in the EU and Turkey. The following section will depict the justifications and measures for liberalizing services in the EU for completing the internal market. The third section will display the present situation of inflows and outflows of services in the EU and Turkey in comparison with their world trade and intratrade in the EU. The conclusion part will sum up the arguments discussed in the paper and will highlight the disadvantageous position of the EU in intratrade of services and the advantageous position of Turkey in the international trade of services.

Liberalization of Services in the EU

Barriers in services for the internal market

Since the 1988 Cecchini report, much progress has been made towards creating a single European market for goods. The single market for services is, however, still in its infancy. In most service sectors, less than 5 per cent of production is exported to other EU member states. Research done by the European Commission established that this is at least partly caused by trade costs resulting from a multitude of regulatory barriers in the member states (Kox et al., 2004).

[1] http://europa.eu/scadplus/leg/en/s70002.htm

While the single market has largely been achieved for the EU market for goods, the services sector has lagged behind. This has resulted in sluggish activity, low productivity growth, high prices, that show a wide dispersion and relatively high inflation in this sector. Both the OECD product market regulation study and the European Commission study on internal market barriers conclude that there are large barriers to trade between the EU countries.[2]

The Lisbon European Council adopted an economic reform program with the aim of making the EU the most competitive and dynamic knowledge-based economy in the world by 2010. A key part of this program is to make the Internal Market work for services. With this aim the Commission adopted its two-stage Internal Market Strategy for Services. The Commission's Report, which completed the first stage, attempted to draw up a comprehensive inventory of the Internal Market barriers that continued to inhibit services.[3]

As the reasons why services are not frequently traded between Member States, the Commission spent some time on the legal and economic analysis of the issues including a consultation with Member States, other European institutions and stakeholders. This resulted in the publication of a 'Report on the State of the Internal Market for Services' in July 2002. This report set out, in detail, the legal, administrative and practical obstacles to the free movement of services across borders in the EU. The large-scale consultation which formed the basis of the report involved the European Parliament, the Economic and Social Committee, the Committee of Regions, Member States and interested parties, and was carried out throughout 2001 and early 2002. This report provided a basis for actions that would be launched as a second stage in 2003. It concluded that there was still a huge gap between the vision of an integrated EU economy and the reality as experienced by European citizens and European service providers.[4]

Because of the complex and intangible nature of services and the importance of the know-how and the qualifications of the service provider, the provision of services is often subject to much more complex rules covering the entire service activity than is the case for goods. Furthermore, while some services can be provided at a distance, many still require the permanent or temporary presence of the service provider in the Member State where the service is delivered. Whereas with goods only the goods themselves are exported; in the case of service provision, it is often the provider himself, his staff, his equipment and material that cross national borders. As a result, some or all of the stages of the business process may take place in the Member State where the service is provided and be subject to requirements differing from those in the Member State of origin.

Lack of information, transparency, and confidence, divergent rules between various Member States, cultural and language barriers prevent consumers from enjoying the full benefits of the Internal Market. Barriers to trade in services penalize in particular small and medium sized enterprises. Given the predominance of SMEs in service operations, this has clearly acted as a considerable hindrance the development of the Internal Market for services. Services are intricately intertwined. They are often provided and used in combination and feature as inputs at each stage of the service provider's business process. Barriers to one service will trigger knock-on effects for other services and also for the

[2] http://www.olis.oecd.org/olis/2005doc.nsf/linkto/ECO-WKP(2005)36
[3] http://ec.europa.eu/internal_market/services/services-dir/background_en.htm
[4] ibid

wider industrial economy, given the integration of services into manufacturing. Many barriers are horizontal and affect a range of service activities.[5]

Although barriers are widespread, they have a number of common traits in both their origins and effects. It is apparent that while the previous Internal Market programs were effective in removing physical and technical barriers, these have been replaced by legal barriers arising from national, regional and local regulation. In addition, new barriers arise from the behaviour of administrations, including the use of discretionary powers or heavy and non-transparent procedures, which favour domestic operators. A number of difficulties result from unsatisfactory application of certain EU instruments. It seems obvious that Member States lack the necessary confidence in the quality of each other's legal regimes and are reluctant to adapt their own regimes where necessary to facilitate cross-border activities.[6]

Services Directive

The Lisbon European Council adopted an economic reform program with the aim of making the EU the most competitive and dynamic knowledge-based economy in the world by 2010. A key part of this program is to make the Internal Market work for services. The freedom of establishment, set out in Article 43 of the Treaty and the freedom to provide cross border services, set out in Article 49, are two of the fundamental freedoms which are central to the effective functioning of the EU Internal Market. The principle of freedom of establishment enables an economic operator to carry on an economic activity in a stable and continuous way in one or more Member States. The principle of the freedom to provide services enables an economic operator providing services in one Member State to offer services on a temporary basis in another Member State, without having to be established.

These provisions constitute the basis for the modification of national laws of the member states. While some important developments and progress in the field of services have been brought about through specific legislation in certain sectors (telecommunications, broadcasting, and financial services), for the bulk of services the principles of freedom of establishment and free movement of services have been clarified and developed over the years through the case law of the European Court of Justice.[7]

Following the report, in January 2004, the Commission made a proposal for a directive on services in the Internal Market. The Services Directive was finally adopted by the European Parliament and the Council in December 2006 and will have to be transposed by the Member States by the end of 2009. This directive is aimed at eliminating obstacles to trade in services, thus allowing the development of cross-border operations. It is intended to improve the competitiveness not just of service enterprises, but also of European industry as a whole. It will remove discriminatory barriers, cut red tape, modernize and simplify the legal and administrative framework - also by use of information technology – and make Member State administrations co-operate much more systematically. It will also strengthen the rights of users of services. The abolition of legal and administrative

[5] http://ec.europa.eu/internal_market/services/

[6] Report from the Commission to the Council and the European Parliament on the state of the internal market for services presented under the first stage of the Internal Market Strategy for Services, COM/2002/0441 final, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52002DC0441:EN:HTML

[7] http://ec.europa.eu/internal_market/services/principles_en.htm

obstacles to cross-border trade and investment in the EU has been stepped up following the Directive on Services in the Internal Market together with the liberalization of international trade in business-related services.[8] It has been asserted by OECD and Copenhagen Economics that liberalizing services will generate employment, and will increase growth, productivity and wages.[9]

The Services Directive falls under the framework of the Lisbon Strategy and proposes four main objectives for creating an internal services market:

- to ease freedom of establishment for providers and the freedom of provision of services in the EU;
- to strengthen rights of recipients of services as users of the latter;
- to promote the quality of services;
- to establish effective administrative cooperation among the Member States.

The Directive establishes a general legal framework for any service provided for economic return (with the exception of excluded sectors) while taking the specific nature of certain activities or professions into account. The following services are excluded: non-economic services of general interest; financial services (including those such as banking, credit, insurance and re-insurance, occupational or personal pensions, securities, investment funds and payments); electronic communications services with respect to matters covered by Directives; transport services, including port services; services of temporary work agencies; healthcare services; audiovisual services; gambling; activities which are connected with the exercise of official authority; certain social services (relating to social housing, childcare and aid for persons in need); private security services; services provided by notaries and bailiffs, who are appointed by an official act of government.[10]

It has been stated by the European Commission that there are essentially three reasons for the regulation of professional services:[11] (1) asymmetry of information: the difference in the information available to consumers and service providers; (2) externalities: the provision of a service may have an impact on third parties. Rules are therefore needed to ensure that both service providers and purchasers take proper account of these external effects. (3) the concept of "public goods": certain professional services are deemed to be in the public good since they are of value for society in general, for example, the correct administration of justice or the development of high-quality urban environments.

There are various oppositions against the services directive. ETUC (European workers confederation) claims that the services directive will facilitate the firms to posite in the countries with low social standards and regulations, and thus it will lead to social dumping in the EU. Socialists oppose the directive from the view that it will bring the wages and the social regulations down.[12] Some of the new members are in favour of the services directive and they assert that services directive will support completing the internal market.[13] A

[8] http://ec.europa.eu/internal_market/top_layer/index_19_en.htm
[9] European Commission, Extended impact assessment of proposal for a directive on services in the internal market, http://europa.eu.int/comm/internal_market/services/docs/services-dir/impact/2004-impact-assessment_en.pdf
[10] http://europa.eu/scadplus/leg/en/s70002.htm
[11] http://ec.europa.eu/internal_market
[12] http://www.spectrezine.org/Editorial/servicesdirective.htm
[13] http://news.bbc.co.uk

study shows that services enhance growth in the new member countries. The study claims that there is a positive connection between tertiarization (dominance of services sector in the economy) and per capita income. It has been asserted that the process of tertiarization is compatible with growth in both employment and productivity (Breitenfellner & Hildebrandt, 2006).

Inflows and Outflows of Services in the EU and Turkey

International trade and foreign investment in services have always been important for the world economy since the mid of 19th century. Banking, transportation, distribution of gas and electricity, business services are among to mention of a variety of services.

After 1990s, due to the structural change in the economies, firms have increasingly relocated their industrial activities to countries with lower cost bases, and have outsourced their non-industrial activities to the external service providers either for non-core activities, such as transport or marketing services, or for part of the core activities in order to increase flexibility, through the use of labour recruitment services (Nielsen, 2005). As a consequence, business-related services have become more specialized and has enhanced the competitiveness of the users of these services. The borderline between manufacturing and services has become increasingly blurred and sometimes outdated, as an expanding share of manufacturing companies become service providers due to the growing importance of services in the value added creation of all sectors of the economy.

Services account for over 70% of European GDP and employment but represents only 28% of European external trade.[14] It also constitutes a lower share in Turkey's foreign trade. The world trade in services is 2.8 trillion dollars for exports and 2.7 trillion dollars for imports (2006).[15] EU25's share in world total exports of services is 27% and in total imports is 24%, in 2006.[16]

EU25's international trade volume in services is about 2 trillion Euros, of this 1.17 trillion is credits and 1.08 trillion is debits. EU25 is in net position in services with 90.7 billion Euros.[17] UK, Germany, France, Italy, Spain, Netherlands and Ireland are the countries with the highest export and import values in the services trade. The share of the new members in the international trade of services is very low when compared with the EU15 countries. Table 1 shows the values of export and imports of services of the EU countries.

[14] European Services Forum, www.esf.be
[15] http://www.wto.org/english/res_e/statis_e/its2007_e/section3_e/iii01.xls
[16] http://stat.wto.org/CountryProfile/WSDBCountryPFView.aspx?Language=E&Country=E25,TR
[17] http://epp.eurostat.ec.europa.eu/extraction

Table 1: International Trade of Services by the EU countries

billion dollars, 2006	exports	imports
EU15		
Austria	45.2	32.4
Belgium	59.9	54.9
Denmark	51.8	44.9
Finland	16.9	14.8
France	118.5	107.9
Germany	174.5	195.3
Greece	35.8	14.0
Ireland	69.2	65.4
Italy	98.6	100.4
Luxemburg	51.4	30.6
Netherlands	84.5	78.9
Portugal	17.8	11.6
Spain	106.3	78.3
Sweden	50.4	39.8
UK	229.7	164.6
EU15 Total	*1 210.5*	*1 033.8*
EU10		
Cyprus	7.3	2.9
Czech Rep.	13.3	11.8
Estonia	3.5	2.5
Hungary	13.5	10.6
Latvia	2.7	1.9
Lithuania	3.6	2.5
Malta	1.9	1.5
Poland	20.6	18.4
Slovakia	5.4	4.7
Slovania	4.5	3.3
EU10 Total	*76.3*	*60.1*

Source: UNCTAD Handbook of Statistics, www.unctad.org

In 2006, China remained the EU's second largest trading partner and displaced the United States as the largest source of EU imports. Chinese imports to the EU totaled approximately €191 billion during that period, representing a year-on-year increase of almost 21%. Likewise, EU exports to China increased by 22.5% to approximately €63 billion, accounting for overall bilateral trade of upwards of €254 billion. Whereas the EU enjoyed a trade surplus with China at the beginning of the 1980s, trade relations are now characterized by a sizeable and widening EU deficit with China (approximately €128 billion in 2006). This represents the EU's largest bilateral trade deficit. EU25's exports in services (2006) to China is 11 billion Euros, and imports from China is 8.8 billion Euros. EU25's trade in services (exports and imports) with China accounts for 3.2%. The share of other countries in EU25's trade in services is as follows: USA 34.8%, Switzerland 12.6%,

Japan 4.7 %, Russia 3.1%, Canada 2.6%, ***Turkey 2.4%,*** Australia 2.2%, India 1.6%, South Korea 1.5%, Mexico 1.0%, Taiwan 0.8%, and Israel 0.8%.[18]

One of the challenges facing the European Union is that EU25's international trade in services is more than the trade within the EU. Half of the total trade in services is realized with the non-EU countries. Intratrade of services in the EU is insufficient from the view of importance of services for the EU economy as a whole.

Another important issue is that a substantial amount of total intratrade is carried by the EU15. Though the new members benefit from the intratrade of services, the contribution of EU12 to the value of credits in intratrade of services is 179.6 billion Euros. When this figure is compared with EU15's credits, 420.3 billion Euros, it only constitutes 30% of the credits for intratrade of services.

Table 2: Intratrade of Services, EU countries

	EU27			EU25			EU15		
	credits	debits	net	credits	debits	net	credits	debits	net
EU27, 2006	599 931.6	566 573.9	33 357.6						
EU25, 2006	594 403.6	561 218.9	33 184.6	587 884	554 949.5	32 934.9			
EU15, 2003				440 946	433 494	7452	420 292	416 923	3369

Source: http://epp.eurostat.ec.europa.eu/extraction

Direct investment in services in the European Union realized by the EU27 countries amount to 224.5 billion Euros (2006). EU15 countries made 201.5 billion Euros of investment in the EU. Only 23 billion Euros of direct investment is realized by the EU12. The share of the new members in the direct investment of services within the EU is only 10%.

Over the last decade, the share of intra-trade of services has increased somewhat, namely from 3.3% of GDP in 1995 to 4.5% of GDP in 2004. One might argue that this is an increase of over one third. However, the key point is rather that services trade amounts to less than 5% of GDP whereas the sector contributes to over 60% of GDP. Less than 8% of services output is actually traded within the EU-15 (the number would be very similar for the EU25). Services are to a very large extent still a sheltered sector. Moreover, it seems that in services the ratio of intra-EU exports to extra-EU exports has not increased at all over the last decade, it remains at around 1.2. This implies that the expansion of services trade was thus part of a global phenomenon, not a consequence of EU integration (Gros, 2007).

[18] http://ec.europa.eu/trade/issues/bilateral/countries/

Table 3: Direct Investment in Services, EU countries

million Euros	EU27	EU25	EU15
EU27, 2006	**224 452**	224 236	223 444
EU25, 2006	221 002	**220 789**	220 235
EU15, 2005	201 498	201 278	**201 219**

Source: http://epp.eurostat.ec.europa.eu/extraction.

Turkey's total credits were 26.5 billion dollars and debits were 11.4 billion dollars in 2005. Turkey's net position in the trade of services was positive 14.2 billion dollars.[19] In 2007, Turkey's total exports were 107.2 billion dollars and total imports were 170.1 billion dollars. Credits in services trade amounted to 28.7 billion dollars and debits were 14.6 billion dollars.[20] In two years, from 2005 to 2007, credits increased by 2.2 billion dollars and debits increased by 3.2 billion dollars. This clearly shows that debits are increasing more than credits. Tourism is the dominant subcategory in the trade of services. Transportation, other services, and other business services follow tourism.

Table 4: International Trade in Services, Turkey

million dollars, 2006	Exports	Imports
Transportation	4 052	3 989
Tourism	16 853	2 743
Financial services	277	524
Construction services	879	0
Other business services	289	724
Government services	314	1 034
Other services	1 643	1 754
Total	*24 307*	*10 768*

Source: Turkish Central Bank, Balance of Payments, www.tcmb.gov.tr/ucaylik/ua10/a92.pdf

It has been asserted that Turkey has advantages in tourism, transportation, logistics, construction, consultancy, and engineering services. It has further been stated that the barrier to the competitiveness of Turkey does not depend on Turkey's incapability but is due to the barrier of free establishment in the EU (Derviş et al., 2004).

In 2005, EU25's imports from Turkey in services was 13.1 billion dollars.[21] In 2006, EU25's imports from Turkey in services amounted to 10.5 billion Euros and EU25's exports to Turkey in services were 4.4 billion Euros.[22] Due to the difficulty in obtaining

[19] http://epp.eurostat.ec.europa.eu/extraction
[20] www.dtm.gov.tr
[21] http://www.wto.org/english/res_e/statis_e/its2007_e/its07_world_trade_dev_e.htm
[22] http://ec.europa.eu/trade/issues/bilateral/countries/turkey

data for the subcategories of trade in services between Turkey and the EU, it can broadly be stated that Turkey has an advantage over the EU in the trade of services. A through assessment of services trade by composition is one of the shortcomings of this paper.

Conclusion

The insufficient share of intra-trade of services in the total trade of the EU should constitute a solid basis for further liberalization of services in the EU. Some researchers assert that this figure is due to the regulatory and other barriers among the member countries. Yet some other claim that it is due to the low productivity of labour in services.

It is evident that some European member countries benefit from the trade in services far more than the other member countries. New members, such as Hungary, Poland and Republic of Czech also favour further liberalization of services.

The data clearly depicts that the issue of trade in services is beyond the domain of the internal market due to the globalization process and the technological changes. Therefore, it would be pervasive to treat the trade of services within the scope of single market. Single market was for the goods and it served well for the economies of scale. Now, economies of scope, where the services constitute the main part of it, bypass the geographies and locations. It can be suggested that it would be much more realistic and non-blurring if the European Union institutions treat the trade and liberalization of services within a global perspective.

Turkey has advantages in the trade in services, namely, tourism, transportation, logistics, consulting services and other business services. More promotion and awareness in the importance of services are needed. A unique statistical database for the services would help the scholars and researchers to make further analysis in this respect.

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Short Term Overreaction Effect: Evidence on the Turkish Stock Market

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Abstract

In this paper, we empirically examine the short term overreaction effect in the Istanbul Stock Exchange using daily stock data from January 1999 to December 2003. The study period covers the pre- and post- Turkish financial crisis period. Consistent with other prior studies on other markets, we find evidence of short term overreaction effect in the Istanbul Stock Exchange prior and post financial crisis. Our analysis highlights that stocks that display a large price increase (winners) show an evidence of overreaction in the short run, however, stocks that display a large price decline (losers) indicate no significant evidence. We also find the price reversal for winners in pre-crisis period is more pronounced than in post-crisis period. These results indicate a diminished degree of overreaction after the crisis period which may be attributable to the behaviors of traders.

Introduction

The Efficient Market Hypothesis (EMH) states that all relevant information is completely reflected in the price of financial assets and that change in the prices of financial assets can not be predicted, therefore, failing to provide abnormal profit opportunities. However, in recent studies, EMH has been challenged by the documentation of "Overreaction Hypothesis" which shows that past prices can forecast future movements in prices and those profitable investment strategies can be created to take advantage of overreaction effect. Therefore, further studies of the overreaction phenomena have significant implications not only for financial academics and practitioners but also for the investors.

While the efficiency of stock markets has been studied mostly for developed markets, the analysis of the efficiency on emerging stock markets has begun in recent years. Empirically, the studies have found important differences among markets whether they are classified as either emerging or developed markets which reveal that abnormal returns following the shocks are significantly larger for emerging markets. Some of the reasons behind the significant abnormal returns in those markets are the globalization effects, the removal of trade barriers and the advance in the communication technology. Therefore, domestic and international investors can gain enormous benefits by diversifying their portfolios in these markets.

Istanbul Stock Exchange (ISE), being established in 1986, has become one of the rapidly growing emerging markets. As a leading emerging market, ISE, which is smaller, less liquid and more volatile than developed markets has begun to suggest attractive investment alternatives to investors all around the world. The participation of foreign investors in the ISE has increased from 1.8 % in 1990 to 53.7 % in 1999 and reached to nearly above 75% in 2008.

The main purpose of this paper is to contribute to the short term overreaction literature by using daily return stock data of Istanbul Stock Exchange over the period of 1999-2003. The reason of selecting this time period is to investigate the impact of the February 2001 Turkish financial crisis. As our data extends to the period of Turkish financial crisis, this will provide a better understanding of the trading behaviors of investors before and after the crisis. This paper contributes to the existing literature in some respects. First, this study examines the overreaction hypothesis in an emerging market, ISE, while previous studies generally have focused on developed markets. Second, we investigate individual company stock price performance rather than the portfolio performance regarding pre- and post-crisis reaction.

The rest of the paper is organized as follows. Section II gives brief review in this literature. Then, the data and methodology are discussed in section III. Empirical results are presented in the section IV and final section concludes.

Literature Review

All available information is fully reflected into prices of financial assets in "informationally efficient" markets. Theoretically, abnormal returns cannot be earned by using investment strategies based on available information. One of the potential challenge for the "Efficient Market Hypothesis" is referred to as the 'overreaction phenomena" comes from DeBondt and Thaler (1985). They suggested, using U.S. data, which prior

losers over a long term period outperform prior winner over a subsequent holding period of the same length of time, following the physiological study of Kahneman and Tversky (1982), who argue that investors tend to overweight recent information and underweight prior information.

More specifically, the strategy of buying the losers and short selling the winners will produce abnormal profits in the long run. These profits, called as contrarian profits, are due to the investors' excessive optimist and pessimist reactions to information. Several studies have examined the overreaction hypothesis in financial markets in both short term and long-term horizons. Although the most recent studies have been based on the long-term horizons, the evidence on the cause of long run returns reversals are conflicting. However, there are a number of studies that attempt to reveal the evidence of the short-term return reversals, which are more consistent in favor of overreaction. Moreover, investigating short-term overreaction has advantages over the long-term overreaction tests. Lin (1988), who examined the daily, weekly and monthly returns for Taiwan Stock Market found the existence of overreaction. Brown and Harlow (1988) examined the overreaction issue by using monthly data of CRSP-listed NYSE firms in the period of 1946 and 1983. While the winners do not show any decline after the first month, the losers indicated large price reversals. Zarowin (1989) presented the existence of stock market overreaction in the short run by ranking the common stocks with respect to their performance during a given month and concluded that the market was weak form inefficient in the short run. Atkins and Dyl (1990) investigated the behavior of common stock prices in NYSE after a large price change during a single trading day and provided evidence of overreaction, especially in the case of price declines. Ferri and Chung-ki (1996) illustrated the evidence of overreaction hypothesis in the S&P 500 index from 1962 to 1991 using daily data.

In one of the more recent studies, Larson and Madura (2003) studied NYSE stocks that experienced a one-day price change over the period 1988 to 1998 and found overreaction effect in response to uninformed events for gainers and under-reaction in both informed and uninformed events for losers. Ma et. al. (2005) examined the overreaction hypothesis by studying the price reversal behavior of NYSE and Nasdaq securities between 1996 and 1997. While they provide evidence of overreaction effects for both Nasdaq gainers and losers, no such evidence is found for NYSE gainers and losers.

Overreaction hypothesis is also investigated in some of the international markets, which are Spain (Alonso and Rubio (1990)), Canada (Kryzanowsky and Zhang (1992)), Australia (Brailsford (1992)), UK (Clare and Thomas (1995)), Japan (Chang et al. (1995)), Hong Kong (Akhigbe et al. 1998)), Brazil (DaCosta and Newton (1994), Richards (1997)), New Zealand (Bowman and Iverson (1998)), China (Wang et al. (2004)), Greece (Anthoniou et. al., 2005) and London (Spyrou et.al., 2007).

Data and Methodology

For the empirical analysis, daily closing prices of 190 stocks traded in one of the major Turkish equity indices (ISE) are examined for the 4-year period between January 1999 and December 2003. These sample data were obtained from the IBS. We divide the sample period into two sub-periods. The whole sample period consists of 1216 trading days in which the first consists of 500 trading days from January 5, 1999 through January 31, 2001 and the second period is composed of 716 trading days from February 1, 2001 through

December 31, 2003. We exclude some days in the sample period which have missing price data.

To investigate the short-term overreaction effect, we firstly compute the raw return of stocks on each day t ($r_{i,t}$) as the difference between today's and previous day's closing price (P) as follows:

$$r_{i,t} = \frac{P_{i,t} - P_{i,t-1}}{P_{i,t-1}} \qquad (1)$$

Abnormal return for each stock on the two sub-periods is computed using a market-adjusted model[1]:

$$AR_{i,t} = r_{i,t} - E(r_{i,t}) \qquad (2)$$

where $AR_{i,t}$ is the abnormal return on each stock i for day t; $r_{i,t}$ is the return of each stock i on day t and $E(r_{i,t})$ is the expected return on each stock i for day t. The expected return is assumed to be the return on the market index.

Based on the abnormal returns, winners and losers are selected for the two sub-periods. On each sample day, the stock with the lowest return is called as the "loser" of that day and the stock with the highest return is called as the "winner" of that day. Pre-crisis period sample includes 485 winners and losers and post-crisis period sample includes 701 winners and losers.

Finally, the abnormal returns for each loser and winner on each trading day from t= -7 and t= +7 are computed and then the average abnormal returns for each loser and winner on each trading day from t= -7 and t= +7 are cumulated over different days to calculate the cumulative abnormal return:

$$CAR_{i,t} = \sum_{t=-7}^{+7} AR_{i,t} \qquad (3)$$

Empirical Results

The average daily abnormal returns from t = -7 and t = +7 for the winners and losers in pre- and post-crisis period are reported in Table 1 and 2 respectively. In those tables, day 0 indicates the day where a significant price change of the stocks occurs.

[1] Strong (1992) discussed the strengths of the market-adjusted model.

Table 1: Average Daily Abnormal Returns for ISE-100 Stocks that indicates a large one day price increase or decrease within the period of January 5, 1999 through January 31, 2001

	1999-2001			
Day(t)	**Abnormal Return**	**t-statistics**	**Abnormal Return**	**t-statistics**
	The Winner Sample (N=485)		**The Loser Sample (N=485)**	
-7	0.581797	2.294814**	0.766884	2.784166***
-6	0.341884	1.330598	1.076951	3.781300***
-5	0.182781	0.703928	0.582405	2.126821**
-4	-0.062553	-0.252161	0.532439	1.981085**
-3	0.846486	3.410896***	1.477918	4.722299***
-2	0.717411	2.543642**	1.429111	4.001720***
-1	2.436467	6.466963***	1.052307	2.877353***
0	16.025264	21.803987***	-11.277304	-19.230200***
1	1.727013	4.459111***	-0.708542	-2.174070**
2	-0.136683	-0.415161	-0.382208	-1.393640
3	-0.715141	-2.309653**	-0.194723	-0.803960
4	0.089952	0.301570	-0.112319	-0.456530
5	0.186887	0.651885	-0.601330	-2.515440**
6	-0.158658	-0.558179	-0.244671	-0.976040
7	0.004440	0.016307	-0.360022	-1.543370

***Denotes significance at the 1% level (two-tailed test)
**Denotes significance at the 5% level (two-tailed test)
*Denotes significance at the 10% level (two-tailed test)

The average daily abnormal returns for the winners and losers in period 1999-2001 are shown in Table1. In this table, the average daily abnormal returns obtained by the winners are negative for three of the seven days following the large one day price increase. However, the daily abnormal return on day t = 3 is statistically significant at the 5% level even though on day t = 2 and t =6 not statistically significant. After the large price increase which denotes day 0, the price reversal does not occur on the first day. However, the reversals take place on day 3 as the market is not able to correct its previous information in a timely manner. Moreover, significant positive abnormal returns obtained on days t = -3, t = -2 and t =-1 are due to the information leakage.

The large negative return that occurs on day t = 0 is the result of the large decline in price. As opposed to the winners, price reversals for losers can not be obtained in the pre-crisis period which can be interpreted as no evidence of overreaction.

Table 2: Average Daily Abnormal Returns for ISE-100 Stocks that indicates a large one day price increase or decrease within the period of February 1, 2001 through December 31, 2003

	2001-2003			
Day(t)	**Abnormal Return**	**t-statistics**	**Abnormal Return**	**t-statistics**
	The Winner Sample (N=701)		**The Loser Sample (N=701)**	
-7	0.618897	3.400242***	1.041148	5.228637***
-6	0.437705	2.376956**	1.027202	5.013088***
-5	0.592522	3.346280***	1.183094	5.374692***
-4	0.598463	3.160672***	1.424188	6.336834***
-3	0.673227	3.369772***	1.895305	7.339178***
-2	1.055852	4.978101***	1.714117	6.311741***
-1	2.451450	9.040694***	1.443817	4.760019***
0	14.660618	26.308445***	-10.326258	-20.474300***
1	1.510407	4.823650***	-0.783581	-3.047420***
2	-0.256768	-0.982589	-0.548478	-2.523280**
3	-0.354136	-1.464886	-0.408084	-2.015040**
4	-0.538773	-1.658767*	-0.232604	-1.283380
5	-0.157455	-0.750889	-0.538020	-2.821920***
6	-0.265152	-1.313957	-0.435337	-2.366300**
7	-0.246704	-1.255414	-0.227266	-1.373060

***Denotes significance at the 1% level (two-tailed test)
**Denotes significance at the 5% level (two-tailed test)
*Denotes significance at the 10% level (two-tailed test)

The average daily abnormal returns for the winners and losers in period 2001-2003 are shown in Table 2. Consistent with the results in the pre-crisis period, we document the evidence of overreaction for the winners but not for the losers in the post-crisis period. After a large price increase for winners, a significant price reversals occur on day t = 4 at 10% level while the average daily abnormal returns are negative but not statistically significant for six of the seven days following the day t = 0.

In both tables, we observed that positive daily abnormal returns during seven days preceding the day of the large price decline are statistically significant at the % 1 and % 5 levels. This indicates that there is no information leakage in pre-event period for losers.

It is also interesting to note, from Figure 1 and 3, that cumulative abnormal returns earned by stocks indicated a large increase in price during a single trading day for the period surrounding the day of the price increase both in pre- and post-crisis period.

Figure 1: Cumulative Abnormal Returns for 190 stocks that exhibited a large price increase on day t = 0 within the period of January 5, 1999 through January 31, 2001

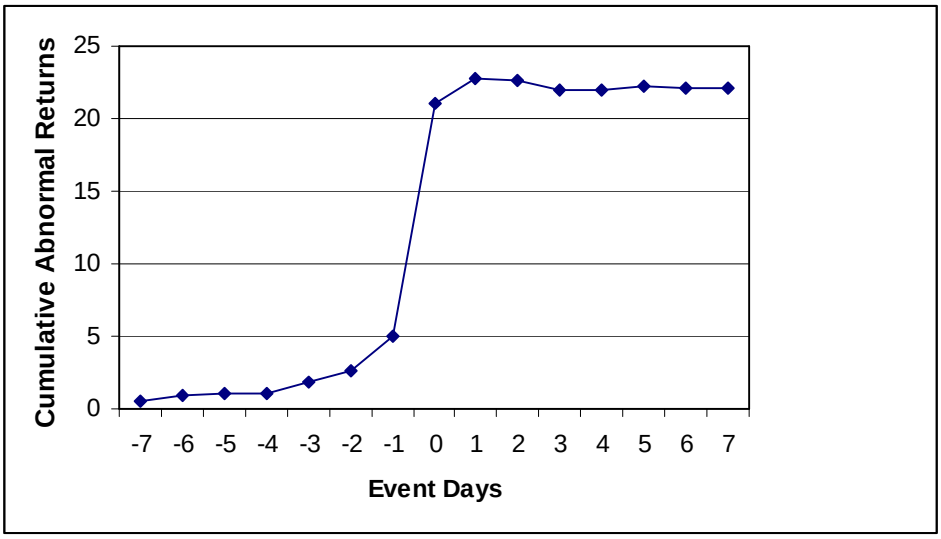


Figure 2: Cumulative Abnormal Returns for 190 stocks that exhibited a large price decrease on day t = 0 within the period of January 5, 1999 through January 31, 2001

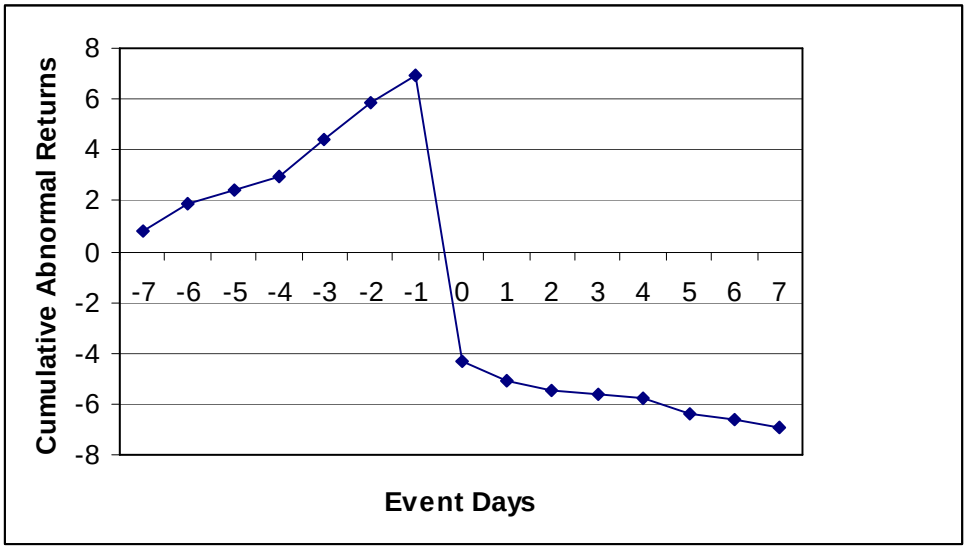


Figure 2 and 4 exhibits cumulative abnormal returns earned by stocks indicated a large price decline during a single trading day for the period surrounding the day of the price decline both in pre- and post-crisis period.

Figure 3: Cumulative Abnormal Returns for 190 stocks that exhibited a large price increase on day t = 0 within the period of February 1, 2001 through December 31, 2003

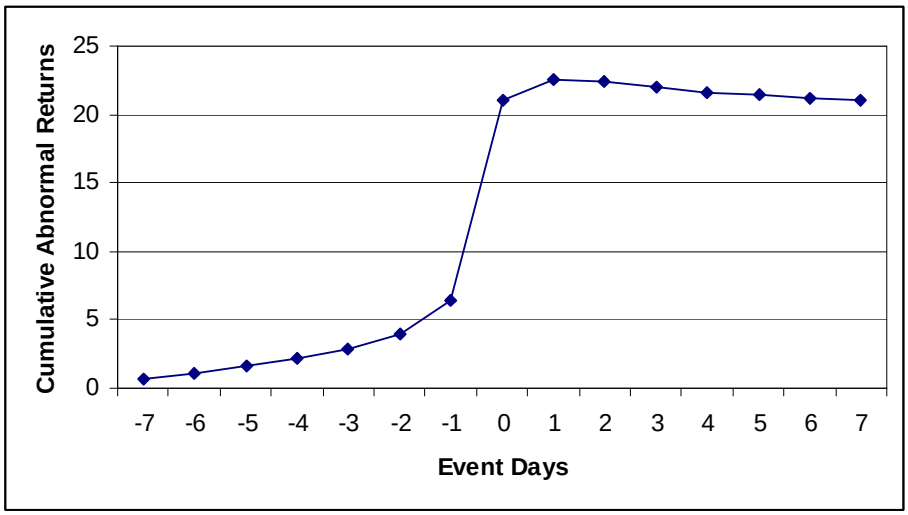
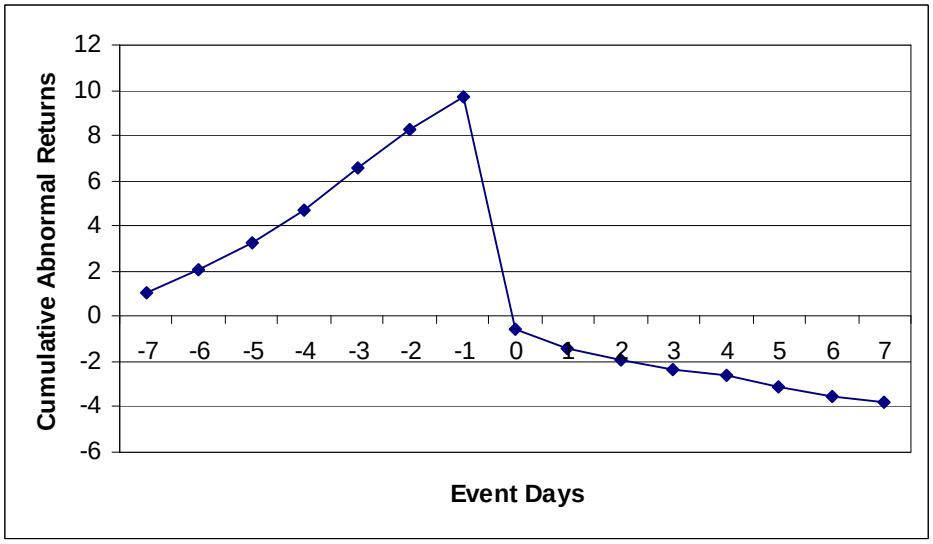


Figure 4: Cumulative Abnormal Returns for 190 stocks that exhibited a large price decrease on day t = 0 within the period of February 1, 2001 through December 31, 2003



The results obtained for the winners in pre- and post-crisis period indicates a significant evidence of overreaction. (See Figure 1 and 3) However, as seen from the results in Figures 2 and 4, the overreaction is not induced for losers both in pre- and post-crisis period.

The analysis of the pre- and post-crisis period results reveals the impact of the Turkish financial crisis, which caused a more volatile market. In this crisis period, the market is expected to be less efficient and heavily overreact to bad news. Yet, the findings of this study are rather surprising since the overreaction of the winners is more obvious in pre-crisis period than the post-crisis period. Moreover, the losers do not overreact significantly to information before and after the crisis. These results indicate that the stock market is more efficient than expected after the crisis, meaning that exhibiting less overreaction. To avoid the risk during the crisis period, investors become more conservative toward bad news and information. With the decrease of noise traders in the crisis, the importance of overreaction also decreases. However, when investors receive good news and information, the initial price increases in stocks encourage the noise traders to invest which leads to an increase the magnitude of overreaction.

Conclusion

This paper highlights the empirical evidence of short term overreaction in the Turkish stock market. It differs from the previous studies in that this study considers the impact of the Turkish financial crisis by decomposing the whole sample into two sub periods, pre- and post-crisis period. We find that stocks that display a large price increase (winners) show an evidence of overreaction in the shot run, however, stocks that display a large price decline (losers) indicate no significant evidence. We also find the price reversal for winners in pre-crisis period is more pronounced than in post-crisis period. These results indicate a diminished degree of overreaction after the crisis period which may be attributable to the behaviors of traders.

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Statistic Study of Banking Efficiency Ratios

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Objectives

In order for a more relevant financial-economic analysis, we realized a statistic processing of data resulted from financial statements for the period 2001-2006. Essentially, the statistic study has concentrated around "RETURN ON EQUITY" (ROE) indicator, which in our opinion, is the main financial efficiency criterion. The number of values registered for each statistic variable is relevant, taking into consideration that the data from the six annual balance sheets are highlighted at quarterly level.

Data and methods

Due to presentation reasons, which correspond to statistic links, we shall use the following symbols for the financial-economic indicators from the annual financial statements:

ROE - Financial Profitability Ratio;

RACADEPA - Assets Covering with Attracted Deposits Ratio;

DOBACTIV - Active Interest;

DOBPASIV - Passive Interest;

GAP - Gap between Active and Passive Interest;

FDCLNEBA - Funds attracted from non-banking customers;

DATORII – Total Attracted Funds;

FLUXNUM - Total Cash-Flow;

PROVR_CH - Provisions;

CREANTE - Receivables;

DATORII - Debts;

RACTLICH - Current Assets Ratio;

LUXFIN - Financing Cash-Flow;

GESTRLIC - Liquidity Risk Financial Administration;

FLUXINV - Investment Cash-Flow;

INDSOLV1 - Solvency 1Indicator;

CAPNIV1 - Level 1 Equity;

CAPNIV2 - Level 2 Equity;

CAPNIV3 - Level 3 Equity.

In the following, we shall analyze some of the most significant statistic links which have been identified at many Romanian banks level, based on the data from the annual financial statements, during the period 2001-2006.

Results

Another factor which influences ROE variance by almost 50% is the ratio of assets covering with attracted deposits (RACADEPA). The following information is significant in this issue:

The regression result for the dependent variable: ROE

$R = 0.7228$; $R^2 = 0.5224$; R^2adjusted = 0.4985;

$F(1.20) = 21.883$; $p < 0.00014$; standard estimation error: 1.5493

	coef. a_i	St. ERR		
		For a_i	t(20)	p-level
a_0	37.03123	7.499546	4.93720	0.000079
RACADEPA	-0.42407	0.090655	-4.67790	0.000145

CORRELATIONS

	RACADEPA	ROE
RACADEPA	1.00	-0.72
ROE	-0.72	1.00

COVARIANCE

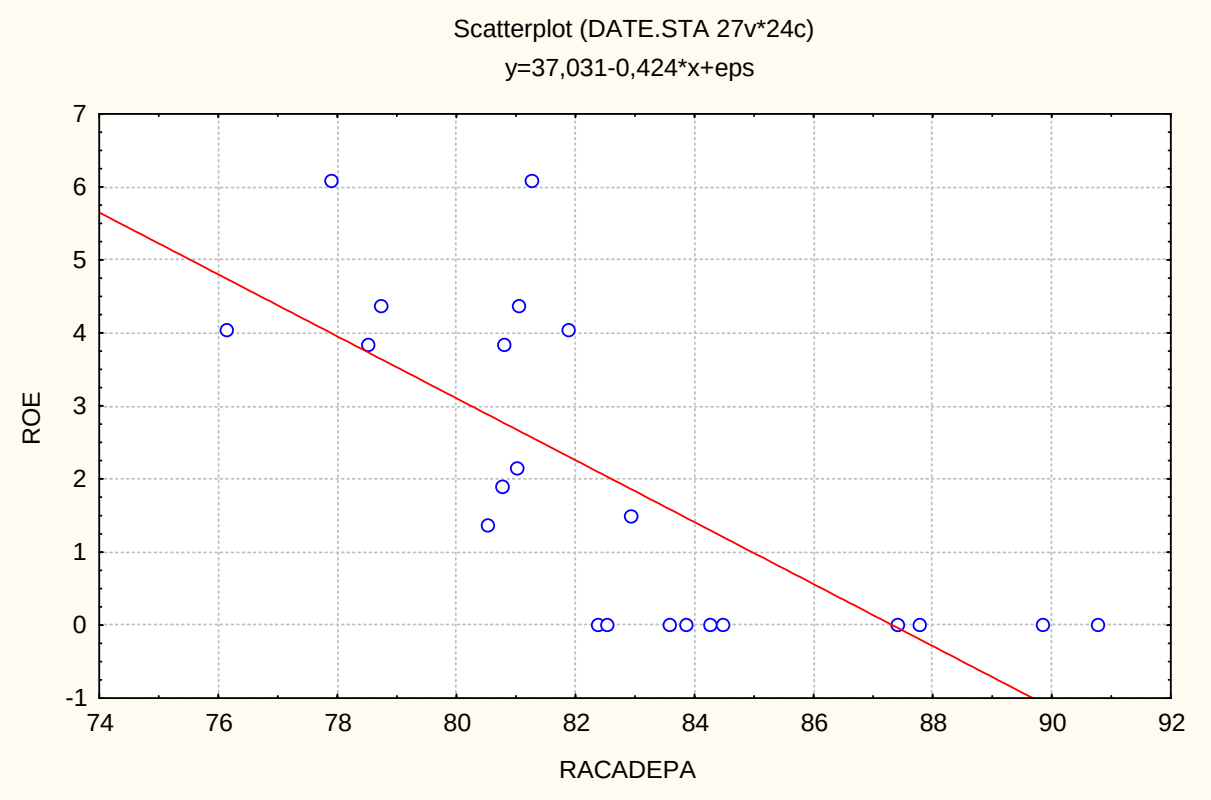
	RACADEPA	ROE
RACADEPA	13.9	-5.9
ROE	-5.9	4.8

The econometric model between ROE and RACADEPA is:

$$\mathbf{ROE_t = 37.03 - 0.42 \,.\, RACADEPA_t + \varepsilon_t}$$

Which means that for an increase by one percent of RACADEPA, ROE decreases by 0.42 %.

Figure1: ROE and RACADEPA Correlation



The statistic links between the ROE variance and the following elements are interesting: active interest, passive interest, and the difference between them (GAP). In the following, we present information which resulted from data processing, in order to analyze their significance.

The regression result for the dependent variable: ROE

R = 0.9108; R^2 = 0.8296; R^2adjusted = 0.8211;

F (1.20) = 97.419; p < 0.0000; standard estimation error: 0.9853

	coef. a_i	St. ERR		
		For a_i	t(20)	p-level
a_0	-2.63217	0.507519	-5.18635	0.000045
DOBACTIV	0.14873	0.015069	9.87013	0.000000

CORRELATIONS:

	DOBACTIV	ROE
DOBACTIV	1.00	0.91
ROE	0.91	1.00

There is a direct link between ROE and DOBACTIV, meaning that with an increase by one percent of active interest, ROE will increase by an average 0.14 %. DOBACTIV influences ROE variance by 82%. Moreover, there is a high level of correlation between the two indicators.

In order to analyze the link between ROE and passive interest we use the information below.

The regression result for the dependent variable: ROE

$R = 0.9066$; $R^2 = 0.8219$; R^2adjusted = 0.8180

$F(1.20) = 92.349$; $p < 0.0000$; standard estimation error: 0.94596

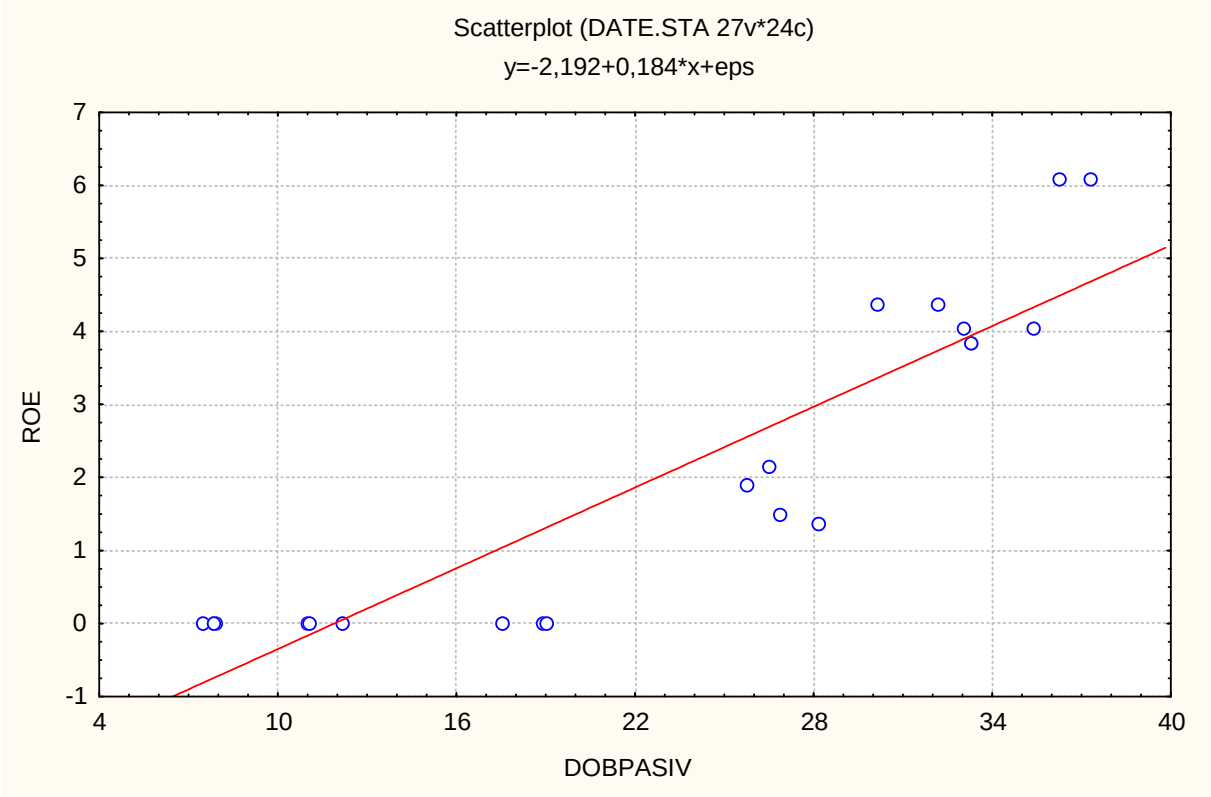
	coef. a_i	St. ERR		
		For a_i	t(20)	p-level
a_0	-2.19204	0.479001	-4.57628	0.000183
DOBPASIV	0.18426	0.019174	9.60985	0.000000

The link between ROE and DOBPASIV is almost equivalent to that previously studied, between ROE and DOBACTIV. In the last case, the model is the following:

$$\mathbf{ROE_t = -2.19 + 0.18.\ DOBPASIV_t + \varepsilon_t}$$

This means that ROE variance is slightly sensitive to DOBPASIV variance ($a_1 = 0.18$ %). Beside this, both the correlation level and the percent through which the factor explains ROE variance are almost the same.

Figure2: ROE and DOBPASIV Correlation



ROE variance in correspondence with GAP can be analyzed as following:

The regression result for the dependent variable: ROE

$R = 0.7313$; $R^2 = 0.5349$; R^2adjusted = 0.5116;

$F(1.20) = 23.002$; $p < 0.00011$; standard estimation error: 1.5290

	coef. a_i	St. ERR For a_i	t(20)	p-level
a_0	-2.02471	0.897001	-2.25720	0.035337
GAP	0.47868	0.099808	4.79603	0.000110

CORRELATIONS

	GAP	ROE
GAP	1.00	0.73
ROE	0.73	1.00

COVARIANCES

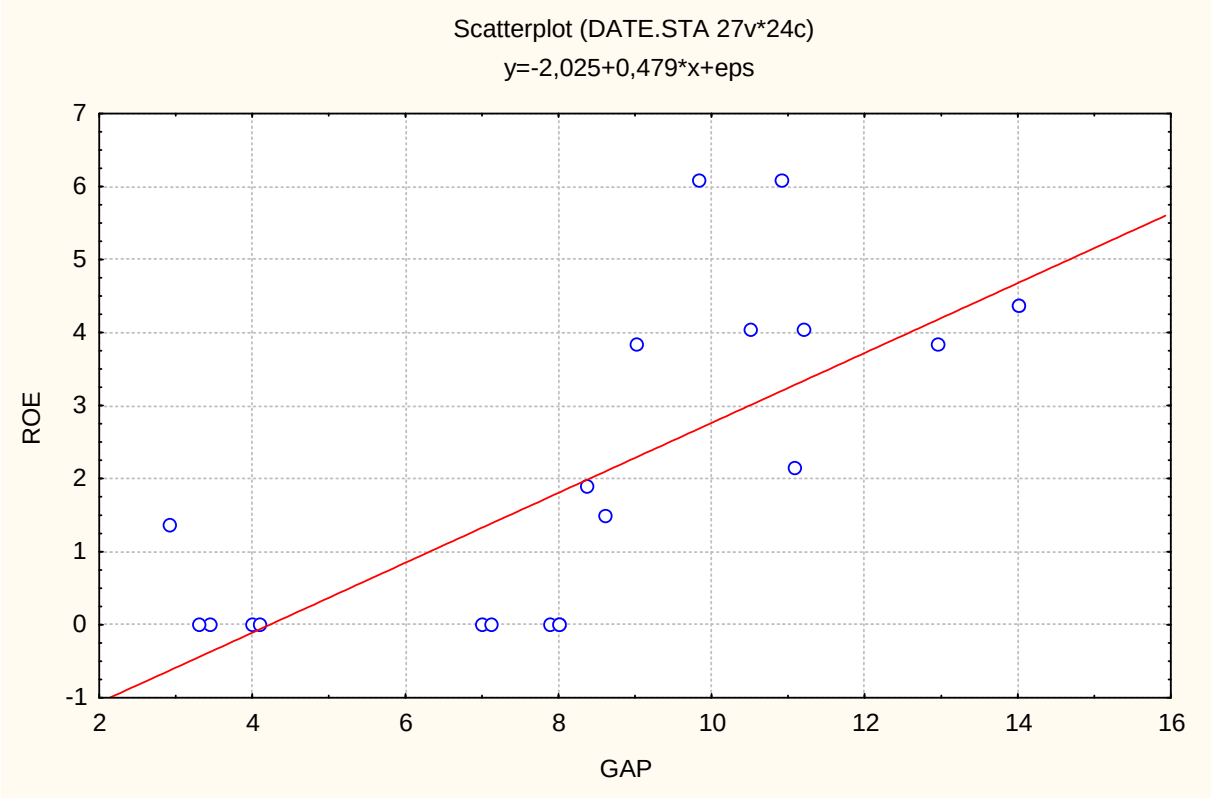
	GAP	ROE
GAP	11.2	5.85
ROE	5.5	4.79

The difference between active and passive interest explains by 51% ROE variance. Although there is a strong correlation between the two indicators, the link between them is the following:

$$\mathbf{ROE_t = -2.02 + 0.47 \cdot GAP_t + \varepsilon_t}$$

With an increase by one percent of the gap between the two interests, the financial profitability ratio increases by 0.47 %.

Figure 3: ROE and GAP Correlation



Another factor which influences ROE variance is represented by the funds attracted from non-banking customers. The effect analysis is conducted based upon the following information:

The regression result for the dependent variable: ROE

R = 0.7167; R^2 = 0.5137; R^2adjusted = 0.4849;

F(1.20) = 21.233; p < 0.00017; standard estimation error: 1.5634

	coef. a_i	St. ERR For a_i	t(20)	p-level
a_0	6.481126	1.033644	6.27017	0.000004
FDCLNEBA	-0.000405	0.000088	-4.59711	0.000175

CORRELATIONS

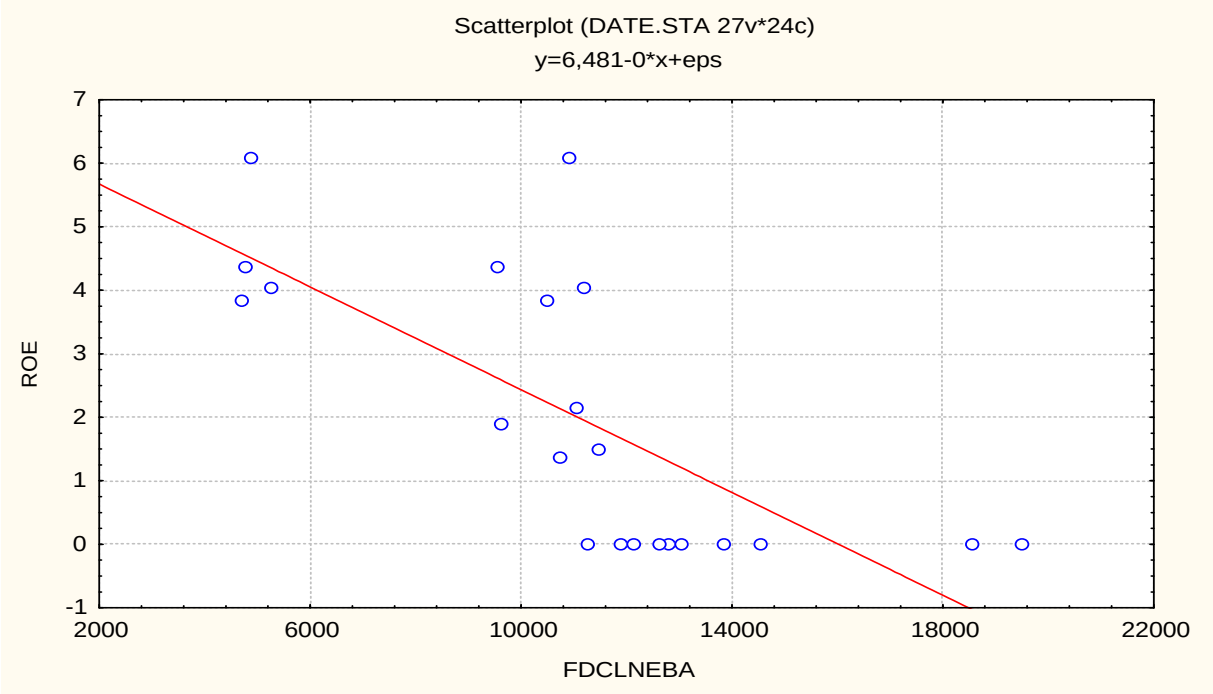
	FDCLNEBA	ROE
FDCLNEBA	1.00	-0.72
ROE	-0.72	1.00

The model which relates the two variables has the following structure:

$$\mathbf{ROE_t = 6.48 - 0.000405.\ FDCLNEBA_t + \varepsilon_t}$$

It is observed that for an increase by a million lei of the funds attracted from non-banking customers, the financial profitability ratio decreases by an average 0.00405 %. There is a high enough correlation between the two indicators (ρ = -0.72). Based upon the data above, it is observed that FDCLNEBA factor influences ROE variance by 49%. Obviously, there are also many other factors which influence ROE variance.

Figure 4: ROE and FDCLNEBA Correlation



The total funds attracted by the bank (DATORII) represent another factor which influences ROE variance. For the analysis we take into consideration the following information:

The regression result for the dependent variable: ROE

R = 0.6363; R^2 = 0.4049; R^2adjusted = 0.3751;

F(1.20) = 13.609; p < 0.00145; standard estimation error: 1.7295

	coef. a_i	St. ERR For a_i	t(20)	p-level
a_0	6.831070	1.364906	5.00479	0.000068
DATORII	-0.000338	0.000092	-3.68898	0.001454

CORRELATIONS

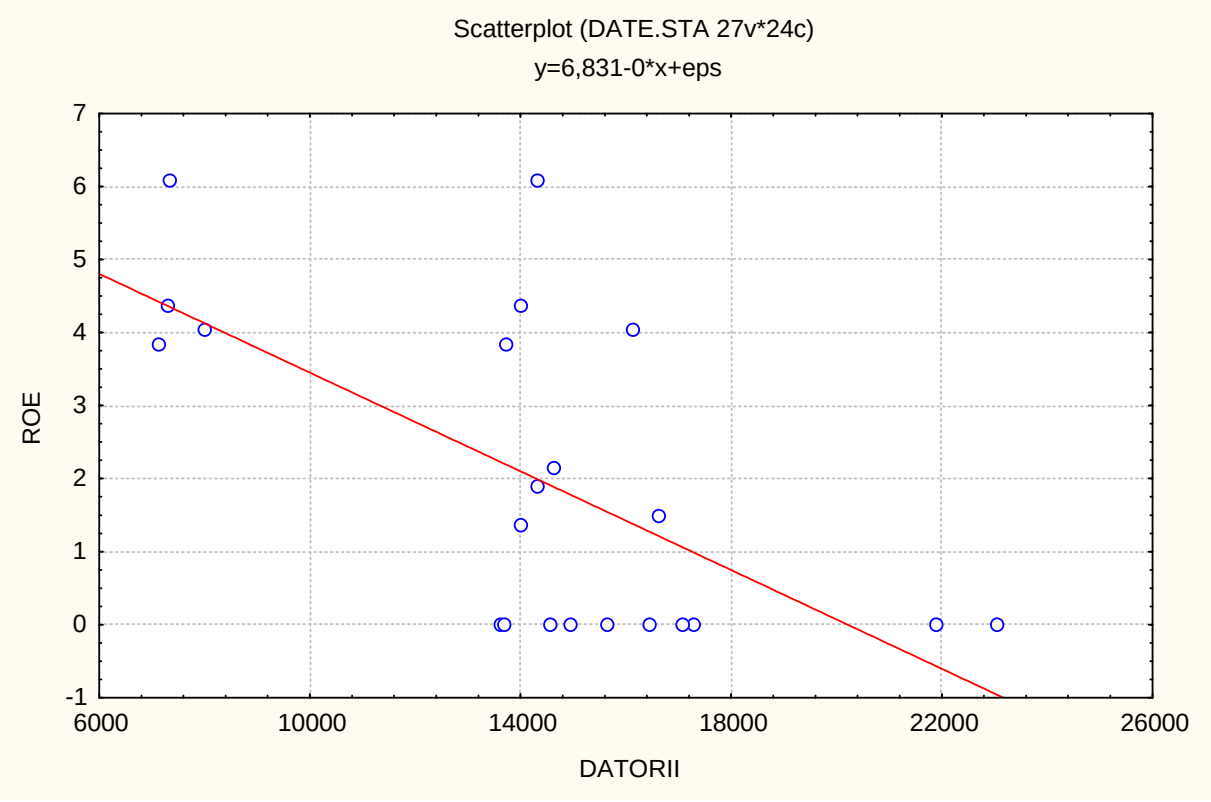
	DATORII	ROE
DATORII	1.00	-0.64
ROE	-0.64	1.00

The link between the two variables is:

$$\mathbf{ROE_t = 6.\ 83 - 0.000338.\ DATORII_t + \varepsilon_t}$$

It is observed that the DATORII influence effect upon ROE is almost the same as in the case of the FDCLNEBA factor. For an increase by one million lei of DATORII factor, profitability ratio decreases by 0.000338 %. The accounting effect can be converted to a more convenient form, if DATORII factor is transformed in billion lei. Only 37% of ROE variance is explained through DATORII. Between the two indicators, the correlation level is above average, ρ = -0.64.

Figure 5: ROE and DATORII Correlation



Possible influences of factors which can influence ROE variance are also important for study. In this way, we analyzed the following correlations which allow us to quantify one factor variance effect upon others. In order to study the correlation between DATORII and FDCLNEBA we use the following information:

The regression result for the dependent variable: DATORII

$R = 0.9688$; $R^2 = 0.9385$; R^2adjusted $= 0.9358$;

$F(1.22) = 336.27$; $p < 0.0000$; standard estimation error: 1047.8

	coef. a_i	St. ERR For a_i	t(20)	p-level
a_0	2834.793	680.9076	4.16326	0.000405
FDCLNEBA	1.036	0.0565	18.33759	0.000000

CORRELATIONS

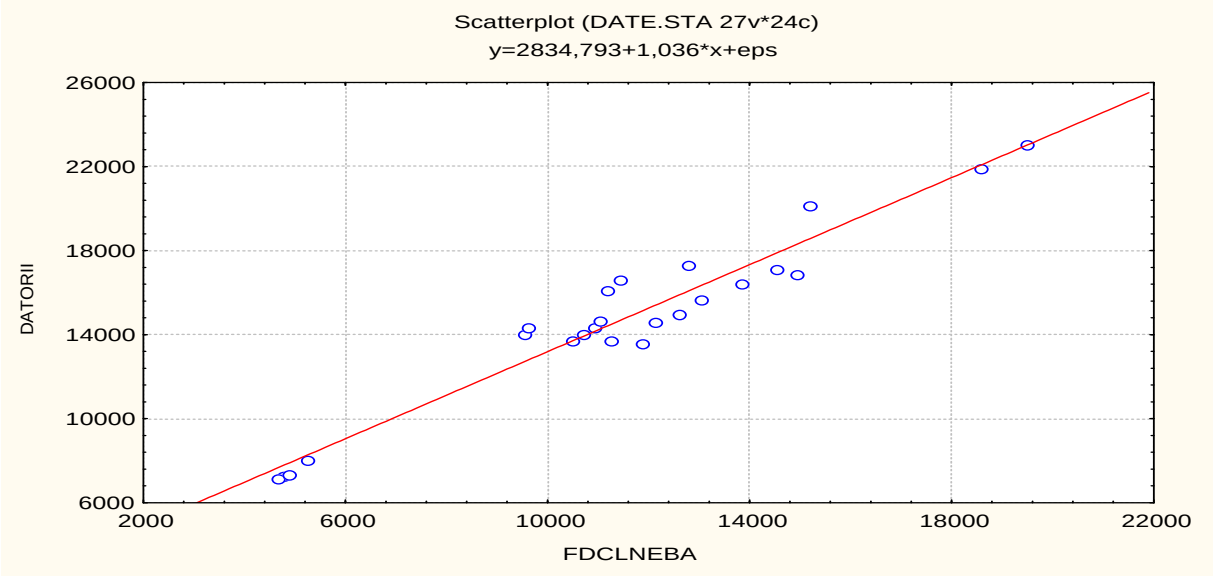
	FDCLNEBA	DATORII
FDCLNEBA	1.00	0.97
DATORII	0.97	1.00

The interaction between the two variables can be studied with the help of the model:

$$\mathbf{DATORII_t = 2834.793 + 1.036 \ . FDCLNEBA_t + \varepsilon_t}$$

This means that if funds which are attracted from non-banking customers increase by one million, then debts increase by 1.036 millions. FDCLNEBA explain DATORII variance by 53%. It is observed that there is a high correlation level between the two indicators, $\rho = 0.97$.

Figure 6: DATORII and FDCLNEBA Correlation



The analysis of the link between active (passive) interest and funds which are attracted from non-banking customers makes the object of an interesting study. The dependence between DOBACTIV and FDCLNEBA is based on the following:

The regression result for the dependent variable: FDCLNEBA

R = 0.6524; R^2 = 0.4257; R^2adjusted = 0.3996;

F(1.22) = 16.310; p < 0.00055; standard estimation error: 2997.6

	coef. a_i	St. ERR For a_i	t(20)	p-level
a_0	17330.79	1580.083	10.96828	0.000000
DOBACTIV	-193.69	47.960	-4.03855	0.000549

CORRELATIONS

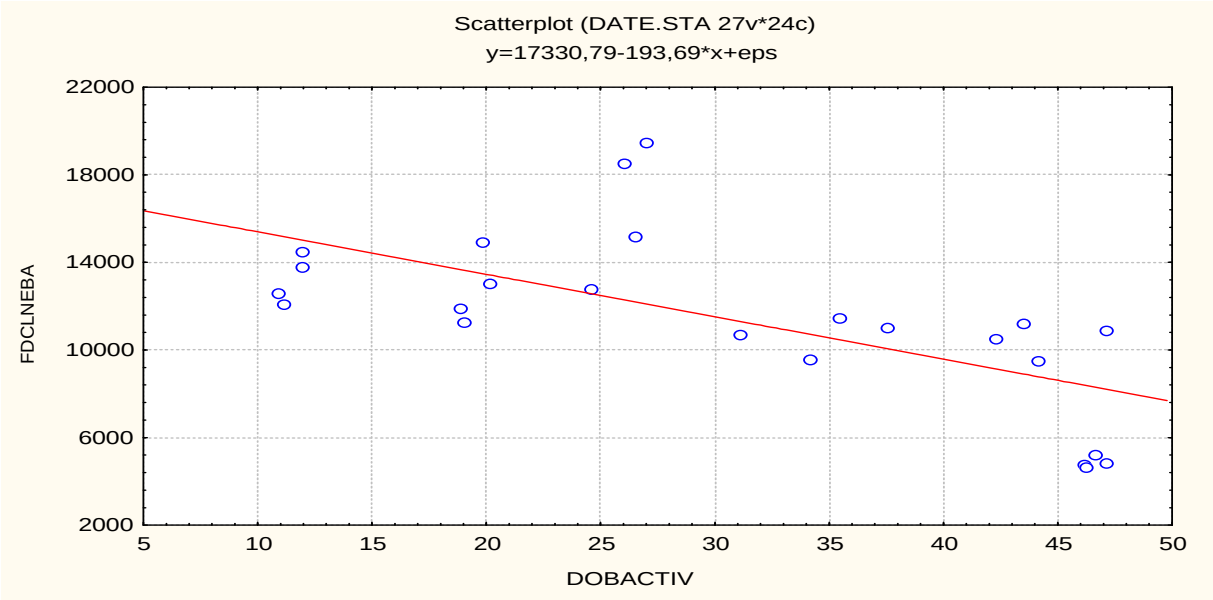
	DOBACTIV	FDCLNEBA
DOBACTIV	1.00	-0.065
FDCLNEBA	-0.65	1.00

DOBACTIV influence upon FDCLNEBA can be summarized in the following model:

$$\mathbf{FDCLNEBA_t = 17330.79 - 193.69 \cdot DOBACTIV_t + \varepsilon_t}$$

If the active interest increases by 1%, then the funds attracted from the non-banking customers decrease by 193.69 million lei. FDCLNEBA variance is explained through the DOBACTIV variance by 40%. The correlation level between the two indicators is: ρ = -0.65.

Figure 7: FDCLNEBA and DOBACTIV Correlation



The correlation between FDCLNEBA and DOBPASIV is studied based on the information below.

The regression result for the dependent variable: FDCLNEBA

R = 0.6389; R^2 = 0.4082; R^2adjusted = 0.3813;

F(1.22) = 15.178; p < 0.00078; standard estimation error: 3042.9

	coef. a_i	St. ERR For a_i	t(20)	p-level
a_0	16597.,30	1460.525	11.36392	0.000000
DOBPASIV	-233.82	60.017	-3.89590	0.000777

CORRELATIONS

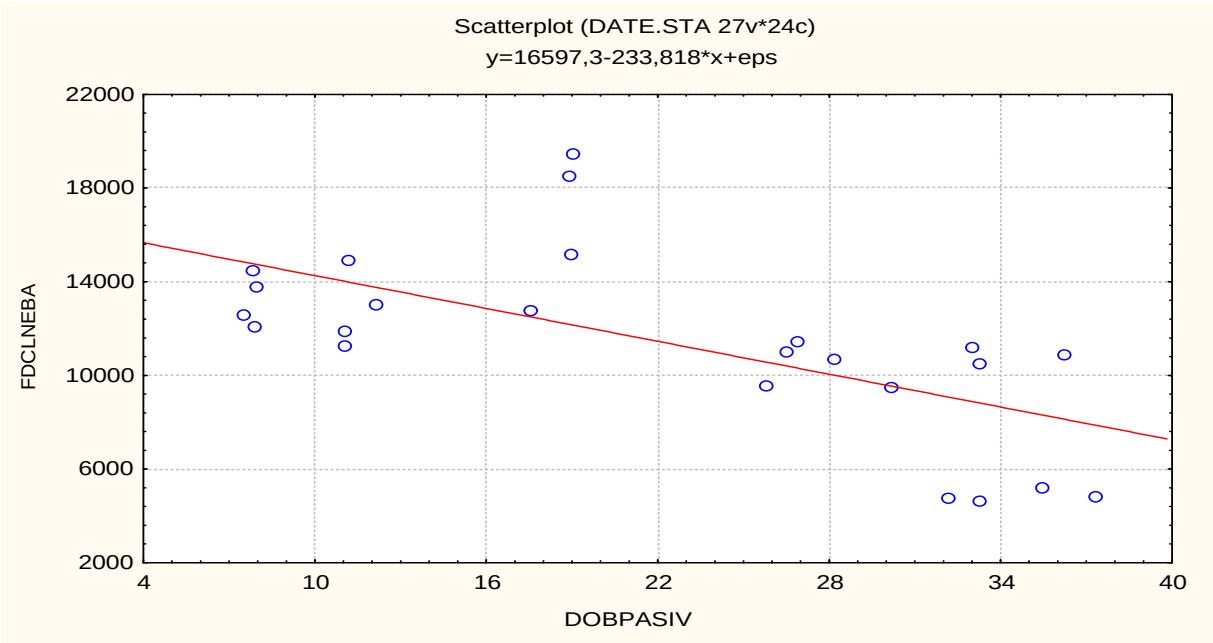
	DOBPASIV	FDCLNEBA
DOBPASIV	1.00	-0.64
FDCLNEBA	-0.64	1.00

The econometric model which links the two variables is the following:

$$\mathbf{FDCLNEBA_t = 16597.30 - 233.82 \cdot DOBPASIV_t + \varepsilon_t}$$

which means that, for an increase by one percent of the passive interest, an average decrease by 233.82 million lei of funds which are attracted from non-banking customers is registered. Passive interest explains the variance of these funds by 38%. Correlation level between the two indicators is of -0.64.

Figure 8: FDCLNEBA and DOBPASIV Correlation



Conclusions

Although ROE is influenced by many factors, a study concerning ROE variance regarding various factors, in the same time, cannot be conducted. This is also observed from the independent analysis of influence factors which emphasize a strong co linearity phenomenon.

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The Determinants of Exchange Rate Regimes in Emerging Market Economies

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Abstract

The choice of exchange rate regime has become one of the most important issues one more time in many economies after the financial crises in recent years. In the wake of the financial crises, many countries, especially emerging market economies, opted for floating exchange rate regimes by forsaking the pegged regimes. Consequently, an old debate on the choice and determinants of exchange rate regimes has been triggered. Economists have started to debate what appropriate exchange rate regime for an economy is. When the tendency in recent years is taken into consideration, the choice of exchange rate regime of countries, especially emerging economies, needs to be analyzed. To do this, in this paper, we attempt to uncover how emerging market economies choose their exchange rate regimes. In other words, we try to find the economic and political factors underlying the choice of exchange rate regimes. The study includes 25 emerging market economies over the period 1970-2006. We use random effect ordered probit model in order to find the long run economic and political determinants of exchange rate regimes for emerging economies. The determinants of both the *de jure* and *de facto* exchange regimes are empirically analyzed in the paper.

Introduction

Following the financial crises in recent decade, many countries switched from one exchange rate regime to another (mostly rigid one to more flexible one). It has fueled the old debate on the choices and determinants of exchange rate regimes. Economists have started to argue what appropriate exchange regime for an economy is once more. Over the past 40 years, economists have developed various answers to this question. The first contribution to the debate came from optimum currency area (OCA) theory. It explains that how some macroeconomic aggregates of a country affect flexibility of an exchange rate regime to be adopted by that country. In the meanwhile, regime choices have also been discussed in terms of optimal stabilization policy, monetary policy credibility and currency crises. Since the second half of 1990s, the empirical literature (Edwards, 1996; Breger et al., 2000) has tended to explain the role of political and institutional variables in regime choices. The empirical studies using political variables generally say that there is a negative correlation between political instability and exchange rate flexibility. The last contribution to the debate was made by Calvo and Reinhart with fear of floating in 2000. It has brought about to realize that there is a serious difference between *de jure* and *de facto* exchange rate regimes. The economists say that owing to fear of floating, some macroeconomic variables affect choices of regimes in an opposite direction to what the previous theories say. Besides, fear of floating creates a difference between what countries say and what countries do. Because of the difference between the *de jure* and *de facto* exchange regimes, the de facto regimes are also taken into account in this paper.

In order to explain the determinants of exchange rate regimes, empirical researchers have applied theoretical guidelines to the observed choices of exchange rate regimes. In doing this, most studies have employed the *de jure* regimes that the governments announce, while few studies have used the *de facto* regimes that they actually pursue. Until recently, the distinction between *de jure* and *de facto* regimes has mostly been ignored in the literature. The studies by Gosh et al. (1997), and Levy-Yeyati and Sturzenegger (1999, 2005), and Clavo and Reinhart (2000) developed some classification methods to determine type of exchange rate regime of a country in a specific year or period. They have reached that there was a serious difference between the *de jure* and *de facto* exchange rate regimes. Although why countries put into effect exchange rate regimes different from their official announcements remains a puzzle in the literature, it appears that the *de facto* classifications are more reliable than the *de jure* classifications.

Although there are many studies on the determinants of exchange rate regimes, there are no studies analyzing especially emerging market economies at least as far as we know. With this motivation, we analyze emerging market economies in this paper. Since most of the papers haven't used panel estimation method and / or disregarded the panel characteristics of data, their results may be misleading. In order to overcome this problem, we use random effect panel probit model in analyzing emerging market economies. The rest of paper is organized as fallows. Section 2 presents the literature review. In section 3 and 4, the data and estimation method are explained respectively. The empirical results are presented in the next section. The paper results in conclusion in section 6.

Literature Review

The empirical findings on the determinants of exchange rate regimes are numerous and controversial. The reason for the differences among the findings mostly depends on the

country samples taken into consideration, time periods, regime classifications used in the analyses, estimation methods and assumptions of econometric models.

As stated before, the econometric methods and regime classifications used in the papers are different from each other. Thus, it creates different results. For instance, some of the studies (Edwards, 1998; Berger et. al; 2000; and Meon and Rizzo, 2002) used a simple binary structure to classify exchange rate regimes into either fixed or flexible ones while the others (Poirson, 2001; Zhou, 2003; and Von Hagen and Zhou, 2007) used an ordered-choice or multinomial-choice structure in order to classify the regimes. Besides, the studies also differs form each other in terms of estimation methods. A commonly used estimation method in the papers (Heller, 1978; Holden et el., 1979; Melvin, 1985; Edwards, 1998; Rizzo, 1998; Poirson, 2001; and Juhn and Mauro, 2002) is cross section analysis. Due to technical difficulties in the estimation of panel data models, especially due to the heavy computational burden of numerical integrations, panel data models are rarely implemented in the literature. Few of the studies in the literature (Zhou, 2003; Kato and Uctum, 2005, Von Hagen and Zhou 2007) employed panel data models in order to empirically analyze the determinants of exchange rate regimes.

The studies on the determinants of exchange rate regimes largely consist of the papers including the developing countries (Rizzo, 1998; Breger et. al, 2000; Poirson, 2001; Zhou 2003; Von Hagen and Zhou, 2005, Bleaney and Francisco, 2005); or both the developing and developed countries (Meon and Rizzo, 2002; Juhn and Mauro 2002; Kato and Uctum, 2005, Levy-Yeyati and Sturzenegger, 2007). A few of the paper (Collins, 1996; Papaioannou, 2003; Markiewic, 2006) considered specific country groups such as Latin American countries, Central American countries, transition economies and etc. In the existing literature, as far as we know, there are no studies focused on emerging market economies. This motivates us to analyze emerging economies.

Most studies considered some of the optimum currency area variables, such as trade openness, size of economy, degree of economic development and geographical concentration of trade. In addition, some studies also included such macroeconomic variables as inflation, foreign exchange reserves, domestic credit, real exchange rate, and terms of trade. Also, a few studies contained political or institutional variables.

When the results of previous studies are considered, no results appear to be reasonably robust to changes in country coverage, sample period, estimation method, and exchange rate regime classification. For instance, trade openness is positively associated with the probability of adopting a flexible regime in the papers by Dreyer, 1978; Bernard and Leblang, 1999; Poirson, 2001; Juhn and Mauro, 2002; Von Hagen and Zhou, 2005), whereas it is negatively associated with the probability of adopting a flexible regime in the papers by Melvin, 1985; Rizzo, 1998; Berger et. al., 2000; and Meon, and Rizzo, 2002). Likewise, size of economy (Gross Domestic Product) is found to be positively associated with floating regimes in almost all studies, but not always significantly. Economic development (GDP per capita) is found to be significantly associated with floating regimes by four studies (Holden et. al.,1979; Savvides, 1990; Edwards, 1996, and Von Hagen and Zhou, 2005) significantly associated with fixed regimes by three studies (Honkapojha and Pikkarainen, 1994; Edwards, 1999; Rizzo, 1998) and not significantly associated with any particular regime by another two studies (Collins, 1996, and Poirson, 2001). Inflation is always positively and significantly associated with floating except for one study (Von Hagen and Zhou, 2005). The similar results are valid for the other variables (the other

macroeconomic, political and institutional variables). This suggests that the macroeconomic, political and institutional variables are not robust predictors of exchange rate regime choice. On the other hand, it doesn't mean this denies the potential importance certain variables for specific groups of countries, in certain time periods, or across some of the regime categories.

Data Description

All series are annual and cover the years 1970 to 2006. Our analysis takes into consideration 25 emerging market economies[1]. The World Development indicators and International Financial Statistic are main sources for most of the independent variables. All the political variables come from Database of Political Institution-2006. The variable representing capital account restriction (CAR) is taken the paper by Prasad, et. al. (2003). Based on theoretical suggestions and empirical findings, we take into consideration three groups of potential exchange rate regime determinants: OCA fundamentals, macroeconomic aggregates, and political and institutional features. The exact construction of data and data sources are reported in the Appendix I. The descriptive statistics of data and correlation matrix of explanatory variables are presented in the Appendix II and III respectively. The explanatory variables, their symbols and definitions are as follows:

For OCA fundamentals, we include trade openness (OPENNESS, measured as imports plus exports as a share of GDP), geographical trade concentration (GEOGTRADE, measured by the share of the largest trade partner in total trade), inflation differential (INFLATION, measured as USA inflation minus domestic inflation), size of economy (GPD, measured by gross domestic product in logarithm), and level of economic development (GDPpercapita, measured by log of GDP per capita). The OCA theory says that more open economies want to adopt less flexible regimes while larger economies and economies with higher level of GDP per capita want to adopt more flexible regimes.

For macroeconomic aggregates, we employ current account deficit or surplus (CA, measured as current account deficit/surplus as a share of GDP), de facto capital account openness (CAOPENNESS; measured as sum of the absolute value of inward and outward gross capital as a ratio of GDP) , reserves (RESERVES, measured as total reserves as a ratio of Imports) , rate of growth of M2 (M2GROWTH, measured as annual growth rate of money plus quasi money), and terms of trade (TOT, measured as standard deviation of annual percentage change of terms of trade). The economic theory suggests that high reserves are associated with a fixed regime.

In an attempt to reflect the political and institutional features, we consider capital account restriction (CAR), period of duration of chief executive in office (YRSOFFC), a variable showing that executive parties have an absolute majority in assembly (MAJORITY), and a variable representing whether executive party is nationalist (NATINALIST) or not. All the OCA and macroeconomic variables are lagged one period to avoid potential endogeneity problems. Most of the previous studies imply that there is a negative relationship between political stability and flexibility of an exchange rate regime.

[1] While determining emerging market economies, we use Morgan Stanley Emerging Index. This index includes 26 emerging economies. Owing to lack of data on Thailand, we exclude this country. The countries considered in this paper are Argentina, Brazil, Chile, China, Colombia, Czech Republic, Egypt, Hungary, India, Indonesia, Israel, Jordan, Korea, Malaysia, Mexico, Morocco, Pakistan, Peru, Philippines, Poland, Russia, South Africa, Sri Lanka, Thailand, and Turkey.

As a dependent variable, the *de facto* classification called natural classification by Reinhart and Rogoff (2003) and the *de jure* classification based on the IMF's classification are used. Natural classification is coded as follows[2]: 1 for pegged regimes, 2 for limited flexibility arrangements, 3 for managed floating, 4 for freely floating, and 5 freely falling. Freely falling is a new category introduced by the authors that indicates high inflation period in which annual inflation rate is higher than 40 %. We also use the more detailed version of natural classification including the fifteen different regimes. Since natural classification classifies the regimes until the year 2001, the *de facto* classification is used in the estimated for the period 1970-2001. As a dependent variable, the new IMF exchange rate classification (*the de jure* classification) that has been in use since 1999 is employed in the analysis for the years 1999-2006, too. The *de jure* exchange rate regimes of countries are taken from the various IMF Annual Reports. In this classification the least flexible regime takes the lowest value while the most flexible regime takes the highest value: 1 for no separate legal tender, 2 for currency board, 3 other conventional fixed peg, 4 for pegged exchange rates within horizontal bands, 5 crawling bands, 6 for exchange rates within crawling bands, 7 for managed floating, and 8 for independently floating. In addition, we combine the IMF classifications before and after 1999 and construct a new dependent variable over the period 1996 to 2006[3].

Estimation Strategy

In this section, we present the econometric model which is applied to test the determinants of exchange rate regimes in emerging economies for the period 1970-2006. We use a random effect ordered probit model for an unbalanced panel of 25 emerging market economies. We describe the choices of exchange rate regimes in our sample using a discrete variable y_{it}, which takes a value of $y_{it} = 1$ if the least flexible regime selected by country i in year t, and $y_{it} = J$ for the most flexible regime. This choice based on the latent variable y^*_{it}, which is a function of the variables discussed above. A larger value of the latent variable indicates that a more flexible regime is desirable for the country and period under consideration. Given the discrete nature of regime choices, we assume that a country chooses the least flexible regime, $y_{it} = 1$, if latent variable is below a certain threshold, $y^*_{it} \leq m_0$. Similarly, the most flexible regime is chosen, $y_{it} = J$, if the latent variable is above another threshold, $m_{j-1} < y^*_{it}$, with $m_0 < m_{j-1}$.

[2] Reinhart and Rogoff (2003) classify exchange rate regimes into 15 and 6 subcategories. The last categories both in 15-way and 6-way classifications don't represent a exchange rate regime, and denote missing data category. So we exclude these categories from the classifications and regard them as 14-way and 5-way classifications in this paper.

[3] The old IMF exchange rate classification before 1999 divides the exchange rate regimes into four categories: (1) pegged to single currency or currency basket, (2) limited flexibility, (3) managed floating, and (4) independent float. When we combine the old and new IMF classifications, categories 1 and 2 in the old classification are regarded as other conventional fixed pegs and exchange rates within crawling bands in the new classification respectively. Similarly, category 3 and 4 are received as managed floating, and independently floating in the new classification respectively.

$$y_{it} = \begin{cases} 1 & \text{if } y^*_{it} \le m_0 \\ 2 & \text{if } m_0 < y^*_{it} \le m_1 \\ 3 & \text{if } m_1 < y^*_{it} \le m_2 \\ . & . \\ . & . \\ j & \text{if } m_{j-1} < y^*_{it} \end{cases}$$

where the m_s is unknown cut point parameters (thresholds).

The estimated equation for the model is equation below.

$$y^*_{it} = \beta' X_{it} + \varepsilon_{it} \quad \text{for } i = 1, 2, 3, \ldots\ldots N, \text{ and } t = 0, 1, \ldots.. T_i$$

where X_{it}, β, t and i represent are a vector of explanatory variables, a vector of coefficients, country and time respectively[4]. The estimates of the coefficients of the vector X_{it} and of the thresholds, i.e, $m_1 < m_2 < m_3 \ldots < m_{j-1}$ are obtained by maximizing the likelihood function by using the quadratic hill climbing algorithm.

Empirical Results

In this section, we present the results of random effect ordered probit analyses, conducted by using the unbalanced panel data sets. We estimate several specifications both for the *de jure* and *de facto* classifications. The results of estimations are presented in Table 1. We estimate the four regressions varying across regime classifications and time periods. The results of the first and the second regression are obtained for the period 1970-2001 by using the 5-way classification (RR 5), and the 14-way classification (RR 14) developed by Reinhart and Rogoff (2003) as a dependent variable. The third and fourth regressions are estimated by using the new IMF classification and the combined IMF classification constructed by us respectively.

[4] Note that the panel is unbalanced as T_i varies across *i*.

Table 1: Random Effect Ordered Regression Results For Emerging Economies

	1970–2001	1970–2001	1999–2006	1996–2006
Variable	**RR 5**	**RR 14**	**IMF1**[a]	**IMF2**[b]
GDP	0.0555	0.2176 ***	0.1810	0.6285 ***
	(0.0838)	(0.0797)	(0.3624)	(0.2021)
GDPpercapita	0.9409 ***	0.5272 ***	0.9347 ***	-0.7449 ***
	(0.1154)	(0.1066)	(0.3514)	(0.2040)
OPENNESS	0.0094 ***	0.0011	0.0054	0.0002
	(0.0032)	(0.0027)	(0.0076)	(0.0045)
INFLATION	-0.0014 ***	-0.0013 ***	0.0338	0.0171
	(0.0005)	(0.0005)	(0.0223)	(0.0142)
GEOGTRADE	-0.0104 *	-0.0082	0.0898 ***	0.0612 ***
	(0.0059)	(0.0055)	(0.0272)	(0.0177)
CAGDP	0.0128	0.0061	0.0503	-0.0174
	(0.0163)	(0.0152)	(0.0537)	(0.0299)
CAOPENNESS	0.0016	0.0017	0.1045 *	0.1044 ***
	(0.0129)	(0.0119)	(0.0554)	(0.0299)
RESERVES	-0.2864 ***	-0.1922 ***	-0.0474	-0.0376
	(0.0394)	(0.0352)	(0.1218)	(0.0781)
M2GROWTH	0.0044 ***	0.0042 ***	-0.0343 *	-0.0202
	(0.0011)	(0.0010)	(0.0196)	(0.0129)
TOT	0.1629 ***	0.0514 *	0.2489 ***	0.1397 ***
	(0.0287)	(0.0294)	(0.0721)	(0.0417)
CAR	0.7105 ***	0.4632 ***	-0.3131	0.0775
	(0.1967)	(0.1784)	(0.4675)	(0.3056)
YRSOFFC	.-0.044516 ***	-0.0307 ***	0.0038	-0.0084
	(0.0082)	(0.0070)	(0.0421)	(0.0185)
NATIONALIST	-2.4600 ***	-2.8011 ***	-0.3529	-0.5481
	(0.6286)	(0.5783)	(1.1684)	(0.7083)
MAJORITY	0.0298	0.0044	-0.7600	0.3492
	(0.1812)	(0.1896)	(0.4642)	(0.3594)
Observations	448	448	112	154
Log-likelihood	-632.0558	-361.4228	-84.1975	-152.9535
LR $\chi^2(14)$ [c]	18.125	23.304	43.0722	39.7188

Notes: The figures in parentheses are standard deviations.

* z statistics are significant at the 10 % level; ** significant at the 5 % level; *** significant at the 1 % level.

[a] : The IMF1 represents the IMF classification since 1999.

[b] : The IMF2 is constructed by combining the IMF classifications before and after 1999.

[c] : The χ^2 value is defined as 2 (L_1-L_0), where the L_0 is the value of log-likelihood function with only the constant term, and L_1 is the value of the log-likelihood function when all the explanatory variables are included.

A positive sign of a coefficient means that an increase in the associated variable raises the probability of adopting a flexible exchange rate regime. Most of the signs of optimum currency variables in the first and the second regressions are found as expected. For example, the size of economy, level of development (geographical concentration of trade) are expected to have a positive (negative) sign and their signs are found to be positive (negative). Although the sign of openness is expected to be negative, it is found to be

positive. In contrast to the variables mentioned above, inflation affects negatively the probability of selecting a flexible exchange rate regime. Although most of the signs are as expected, the size of economy in the regression I and, OPENNESS and GEOGTRADE in the regression II are statistically insignificant. MAJORITY is positive, but insignificant in both the two regressions.

RESERVES, YRSOFFC and NATIONALIST are negatively and significantly associated with a flexible regime while M2GROWTH, TOT, CAR are positively and significantly associated with a flexible regime. The result related to YRSOFFC says that political stability is in favor of adopting a fixed regime. Like YRSOFFC, the sign of NATIONALIST implies that nationalist governments want to adopt more fixed regimes. In the three regressions, the current account deficit /surplus and de facto capital account openness are statistically insignificant.

Most of the variables in the regressions III and IV used the *de jure* classification are statistically insignificant. In contrast to the expected sign, it is found that the level of development decreases the probability of adopting a flexible regime in both the regressions. Similarly, contrary to the expected sign, the geographic concentration of trade is significantly and positively associated with a flexible regime.

When the four regressions are taken into consideration, the only two variables (level of development and TOT) are statistically significant. Nevertheless, the level of economy has a positive sign in the regressions I and II, whereas it has a negative in the regressions III and IV. When the *de facto* and *de jure* classifications are compared to each other, it appears that the relationship between the *de facto* classifications and the determinants of exchange rate regimes are stronger than the relationship between the *de jure* classifications and the determinants of regimes.

Conclusion

In this paper, we apply a random effect ordered probit model to estimate the determinants of exchange rate regimes in 25 emerging market economies. We consider a wide range of potential regime determinants including the OCA fundamentals, macroeconomic aggregates, and political and institutional features. To avoid potentially misleading classification, we use two different measures of the dependent variable, namely de jure (official) and de facto (actual) choice of exchange rate regimes. The estimations of the de jure and de facto specifications generate different results for the variables. The de facto models produce a better fit. This is consistent with the notion that official regime changes carry a cost that exceeds the cost of changing the de facto regime, and that country use this as a policy instrument to adjust their exchange rate policy to macroeconomic developments earlier and faster than they respond with their official regime. Therefore, it can be said that the *de facto* classifications should be preferred in order to classify the exchange rate regimes in emerging economies. It is found that the de jure regimes are not enough to explain the relationship between the exchange rate policies and the variables. Almost all the macroeconomic and political variables in the *de jure* models are found to be statistically insignificant.

Based on the findings obtained from the de facto regressions, we may conclude that the choice of exchange rate regime adopted by 25 emerging economies for the periods under discussion have been influenced by the level of economic development, inflation differential and political factors, and not influenced by the current account deficit/surplus, (de facto) capital account openness.

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Appendix I

Table 2: Definition of Variables and Sources

Variable	Explanation	Database
GDP	Log of GDP (constant 2000 US$), lagged one period	WDI online
GDPpercapita	Log of GDP per capita (constant 2000 US$), lagged one period	WDI Online
OPENNES	(Exports + Imports) / 2, lagged one period	IFS Online
INFLATION	inflation differential: domestic inflation minus USA inflation, lagged one period	IFS Online
GEOGTRADE	Share of Export to the largest Trade Partner in total Exports, lagged one period	DOT Online
CAOPENNESS	Sum of the absolute value of inward and outward gross capital as a ratio of GDP, lagged one period	IFS Online
CA	Current account deficit or surplus as a share of GDP, lagged one period	WDI online
RESERVES	Total reserves in months of imports, lagged one period	WDI online
M2GROWTH	Annual Growth Rate of Money plus Quasi money, lagged one period	IFS Online
TOT	Standard deviation of annual percentage change of terms of trade	WDI online
CAR	Existence of Capital Account Restrictions, lagged one period	Prasad, et. al. (2003).
YRSOFFC	How many years has the chief executive been in office?	DPI 2006
NATIONALIST	Nationalist (1 if yes)	DPI 2006
MAJORITY	Does the party of the executive have an absolute majority in the houses that have lawmaking powers?	DPI 2006

Appendix II

Table 3: Summary Statistics of Variables Used in the Analysis (the period 1970-2006)

Variable	Obs	Mean	Std. Dev.	Min	Max
CA	715	-1.95	4.55	-18.18	18.04
OPENNESS	858	45.18	29.64	4.98	199.50
GDP	857	25.02	1.19	21.43	28.27
GDPpercapita	857	7.48	1.05	4.66	9.82
RESERVES	731	4.36	2.50	0.31	13.76
M2GROWTH	836	62.94	307.45	-43.74	6384.95
INFLATION	839	53.99	353.34	-13.37	7476.26
CAOPENNESS	714	7.68	5.80	0.06	51.24
TOT	564	8.18	3.84	1.67	17.15
CAR	730	0.84	0.37	0	1
GEOGTRADE	607	27.06	14.38	6	89
YRSOFFC	701	7.39	8.84	1	46
NATIONALIST	697	0.08	0.27	0	1
MAJORITY	626	0.60	0.49	0	1

Appendix III

Table 4: Correlation Matrix

Variable	CA	OPENNESS	GDP	GDP percapita	RESERVES	M2GROWTH	INFLATION	CAOPENNESS	TOT	CAR	GEOGTRADE	YRSOFFC	NATIONALIST
CA	1												
OPENNESS	0.058	1											
GDP	0.229	-0.408	1										
GDPpercapita	0.043	0.150	0.241	1									
RESERVES	0.230	-0.188	0.150	0.069	1								
M2GROWTH	0.027	-0.149	0.123	0.095	0.065	1							
INFLATION	0.027	-0.145	0.095	0.082	0.052	0.897	1						
CAOPENNESS	-0.109	0.415	-0.253	0.262	0.042	-0.042	-0.028	1					
TOT	0.040	-0.365	0.271	-0.442	0.104	0.146	0.110	-0.325	1				
CAR	0.025	-0.138	-0.061	-0.012	-0.163	0.087	0.086	-0.041	-0.217	1			
GEOGTRADE	-0.034	0.020	0.233	0.296	-0.283	-0.055	-0.057	-0.111	0.091	-0.153	1		
YRSOFFC	-0.008	0.234	-0.437	-0.134	-0.104	-0.107	-0.104	0.030	0.071	-0.129	-0.053	1	
NATIONALIST	0.024	-0.170	0.175	0.253	0.109	0.084	0.130	0.107	-0.189	-0.126	-0.055	-0.061	1
MAJORITY	-0.065	0.146	-0.319	-0.209	-0.162	-0.035	0.005	-0.009	0.075	-0.221	0.105	0.470	0.095

Relative Price Variability and the Philips Curve: Evidence from Turkey

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Abstract

We argue that relative price changes are a key component of the Phillips curve relationship between inflation and output. Building on work by Ball and Mankiw, we propose including measures of the variances and skewness of relative price adjustment in an otherwise standard model of the Phillips curve. We examine the case of Turkey, where distribution of price changes is especially skewed and where the existence of a Phillips curve has been questioned. We have two main findings: (i) inclusion of measures of the distribution of relative price changes improves our understanding of the Phillips curve trade-off; (ii) there is no evidence of such a trade-off if these measures are not included.

Introduction

Many studies have shown that consideration of the distribution of relative price adjustments can improve our understanding of the inflation rate. Early studies found a clear relationship between the level of inflation and the variance of relative prices (e.g. Vining and Elwertowski, 1976, Fischer, 1981, and Domberger, 1987). Following work by Ball and Mankiw (1994, 1995), more recent studies have also found a relationship between inflation and the skewness of relative price changes (e.g. Debelle and Lamont, 1997, Aucremanne et al., 2002 and Caraballo and Usabiaga, 2005). Although the relative size of the variance and skewness effects is controversial (e.g. Hall and Yates, 1988), the fact that the skewness effect appears quite strong for low inflation rates but much weaker when inflation is higher is consistent with the menu cost foundations of Ball and Mankiw's analysis.

In this paper we use these insights to improve our understanding of a key macroeconomic relationship, the Phillips Curve. We propose including measures of the distribution of relative price adjustment in an otherwise standard model of the Phillips curve. In doing so, we will combine two related but distinct literatures. The literature on the Phillips curve relates inflation to output or unemployment gaps. The literature on relative price variability relates inflation to the second and third moments of relative price changes. In this paper, we relate inflation to both factors.

We present empirical evidence for the case of Turkey. We do this for two reasons. First, the impact of the distribution of relative price changes on the Phillips curve may be more apparent in Turkey, where the distribution of relative price changes is markedly skewed. Second, there is some debate on whether the Phillips curve trade-off exists in Turkey (e.g. Kuştepeli, 2005; Önder, 2004 and Önder 2008). We hypothesise that this debate may reflect the difficulty in establishing a Phillips Curve if strong distributional effects from relative price changes are omitted from the model.

Beginning with a standard model of the hybrid Phillips curve similar to that derived by Gali and Gertler (1999), we first develop an empirical model in which inflation is determined by lagged values of inflation and current and lagged values of the output gap. We investigate the relationship between inflation, the output gap and the variance and skewness of relative price changes in Turkey, using monthly data for 1996:01 and 2007:05, for which we have information on prices of 75 sub-components of the consumer price index. We calculate standard measures of the standard deviation and skewness of changes in these disaggregated price indices, finding evidence of substantial skewness and variance and of marked changes in these distributional measures over time.

Our econometric approach is also a novelty in this literature. Since tests of the order of integration of our variables produced mixed results, we cannot be certain that all variables share the same order of integration. We therefore used the estimation procedure of Pesaran, Shin and Smith (1996, 2001) (hereafter, PSS). To do this, we estimated ARDL models in first differences, augmented by the lagged level values of our variables, with the differenced rate of inflation as the dependent variable. The bounds test procedure of PSS on the significance of these lagged terms was then used to assess whether the relationship is cointegrated. Estimates of any cointegrating relationships were then obtained by re-estimating this model expressed in terms of levels, with short-run dynamics being obtained by estimating the model in error-correction form.

Using this procedure, we find that the estimated relationship between inflation and the output gap is not cointegrated but that the relationship between inflation, the output gap and the variance and skewness of relative price changes is cointegrated. From this we conclude that there is a Phillips curve relationship in Turkey, but that omission of measures of the distribution of relative price changes can create the misleading impression that it does not.

The remainder of the paper is structured as follows. Section 2 provides an overview of past literature on relative price changes, inflation and the Turkish Phillips Curve and derives our empirical model. Section 3 describes our data. Section 4 presents our econometric estimates and discusses their implications. Section 5 concludes.

Methodology

The literature on the relationship between inflation and the distribution of relative price changes typically estimates models of the form

$$(1) \qquad \pi_t = \beta_\pi(L)\pi_{t-1} + \beta_{sd}(L)sdrp_t + \beta_{sk}(L)skrp_t + \varepsilon_t$$

where π is the inflation rate, *sdrp* is the standard deviation of relative price changes, *skrp* is the skewness of relative price changes, ε is an iid error term, β_π, β_{sd} and β_{sk}, are polynomials of length n_π, n_{sd} and n_{sk} respectively in the lag operator L, where $\beta_\pi(L) = \beta_1^\pi + \beta_2^\pi L + ... + \beta_{n_\pi}^\pi L^{n_\pi - 1}$, $\beta_{sd}(L) = \beta_0^{sd} + \beta_1^{sd} L + ... + \beta_{n_{sd}-1}^{sd} L^{n_{sd}-1}$ and $\beta_{sk}(L) = \beta_0^{sk} + \beta_1^{sk} L + ... + \beta_{n_{sk}-1}^{sk} L^{n_{sk}-1}$.

Early studies (e.g. Vining and Elwertowski, 1976, Parks, 1978, Fischer, 1981, Domberger, 1987 and Hartman, 1991) examined the empirical relationships between inflation and relative price variability. Theoretical support for these relationships was provided Fischer (1981, 1982) and Cuckierman (1983). Following work by Ball and Mankiw (1994, 1995), who argued that, in the context of a menu cost model, an asymmetric pattern of relative price changes at the microeconomic level had implication for the behaviour of the aggregate inflation rate, the third moment of relative price changes was also considered (Balke and Wynne, 2000, argue that these effects can also arise in a model without price rigidities). This more recent literature has continued to find a strong association between inflation and the distribution relative price changes, although there is debate about the relative strength of the effect of the second and third moments. Some studies find that the effect of skewness is stronger (e.g. Ball and Mankiw, 1995, Debelle and Lamont, 1997, for the US; Aucremanne *et al.*, 2002, for Belgium; Caraballo and Usabiaga, 2005, for Spain), while De Abreu *et al.* (1995) for Australia; Bonnet *et al.* (1999) for France; Dopke and Pierdzioch (2003) for Germany and Assorson (2004) for Sweden, found the effects to be of roughly equal size. However some studies have found more ambiguous effects (see, for example, Hall and Yates (1998), for the UK; Ratfai (2004) for Hungary and Pou and Dabus (2005) for Spain and Argentina). More skeptical commentators include Holly (1997), who uses Japanese data to argue that causation runs from aggregate inflation to the

distribution of relative price changes, and not vice-versa and Bryan and Cecchetti (1999), who argue that the relationships estimated in the literature reflect measurement error (but see, the rejoinder by Ball and Mankiw, 1999). It has also been suggested that a relationship based on menu-cost arguments will not be applicable in a context of a higher inflation rate where menu costs are less relevant.

Studies on Turkish data include Alper and Ucer (1998), who used a measure of relative price variability based on 21 subcomponents of the wholesale price index (WPI) for the 1985-97 period. The effect of relative price variability was not significant and there was no evidence that relative price variability has a Granger-causal relationship with the aggregate inflation rate. By contrast, Caglayan and Filiztekin (2001), using annual data from 1948 to 1997 found a strong relationship between relative price variability and the inflation rate, as did Kucuk and Tuger (2004) using monthly data for 1994-2002. To our best knowledge there appears no study which has examined the relationship between inflation and the third moment of relative price changes.

In this paper, we investigate whether the distribution of relative price changes affects the Phillips curve. This is not entirely novel, as some papers have included measures of unemployment or the output gap in equation similar to (1). However they are included as additional control variables and to check on the robustness of the relationship between inflation and the distribution of relative price changes (Dopke and Pierzdioch, 2001, include the unemployment rate in a model similar to (1), while Assarsson, 2004, includes unemployment relative to the natural rate of unemployment as one of eight control variables). To our knowledge, ours is the first paper systematically to investigate this issue.

We begin with the "hybrid" model of the Phillips curve, proposed by Gali and Gertler (1999), given by

$$\pi_t = (1-\theta)\pi_{t-1} + \theta\delta E_t\pi_{t+1} + \gamma mc_t \tag{2}$$

where mc is the proportional deviation of marginal cost from it's steady-state value, δ is the discount rate and θ captures the relative weight on forward-looking price-setting. Gali and Gertler (1999) derive (2) using the Calvo (1983) model of nominal price adjustment but assuming that not all firms that are able to change price do so optimally, the other following a simple rule-of-thumb. The parameter θ reflects both the probability of being able to adjust price and the proportion of firms who reset prices optimally. Recent work has attempted to derive Phillips curves similar to (2) in the context of menu cost models (Gertler and Leahy, 2005) and information cost models (Mankiw and Reis, 2002), although models based around the Calvo model remain dominant (Dennis, 2007).

Since this paper uses time series techniques, it is convenient to express this model as

$$\Delta\pi_t = -\frac{\theta(1-\delta)}{1-\theta\delta}\pi_{t-1} + \frac{\theta\delta}{1-\theta\delta}E_t\Delta\pi_{t+1} + \frac{\gamma}{1-\theta\delta}mc_t \quad (3)$$

We assume that expected future changes in the inflation rate can be expressed as a function of current and lagged inflation rates, $E_t\Delta\pi_{t+1} = \lambda_\pi(L)\Delta\pi_t$, where $\lambda_\pi(L) = \lambda_\pi^1 + \lambda_\pi^2 L + ... + \lambda_\pi^{n_\pi} L^{n_\pi - 1}$. We also assume that marginal cost can be expressed as a function of the output gap, $mc_t = \lambda_y(L)y_t$, where $\lambda_y(L) = \lambda_y^1 L + \lambda_y^2 L^2 + ... + \lambda_y^{n_y} L^{n_y}$. Substituting these into (3) yields

$$\Delta\pi_t = -\bar{\lambda}_\pi\pi_{t-1} + \bar{\lambda}_{\Delta\pi}(L)\Delta\pi_{t-1} + \bar{\lambda}_y y_{t-1} + \bar{\lambda}_{\Delta y}(L)\Delta y_{t-1} + \varepsilon_t^s \quad (4)$$

where $\bar{\lambda}_\pi(L) = \frac{\theta(1-\delta)}{1-\theta\delta(1+\lambda_1^\pi)}$, $\bar{\lambda}_y(L) = \frac{\gamma}{1-\theta\delta(1+\lambda_1^\pi)}(\lambda_y^1 + \lambda_y^2 + ... + \lambda_y^{n_y})$,

$$\bar{\lambda}_{\Delta\pi}(L) = \bar{\lambda}_{\Delta\pi}^1 + \bar{\lambda}_{\Delta\pi}^2 L + .. + \bar{\lambda}_{\Delta\pi}^{n_\pi} L^{n_\pi - 1} = \frac{\theta\delta}{1-\theta\delta(1+\lambda_1^\pi)}(\lambda_2^\pi + \lambda_3^\pi L + ... + \lambda_{n_\pi}^\pi L^{n_\pi - 1}),$$

$$\bar{\lambda}_{\Delta y}(L) = \bar{\lambda}_{\Delta y}^1 + \bar{\lambda}_{\Delta y}^2 L + .. + \bar{\lambda}_{\Delta y}^{n_y} L^{n_y - 1} = -\frac{\gamma\lambda_y^1}{1-\theta\delta(1+\lambda_1^\pi)}\left(\sum_{i=1}^{n_y}\lambda_i^y + \sum_{i=2}^{n_y}\lambda_i^y L + \sum_{i=3}^{n_y}\lambda_i^y L^2 + ...\right)$$

and ε^s is an iid error term reflecting expectational errors. This model is the empirical counterpart of the hybrid Phillips curve in (2).

We next add measures of the second and third moments of relative price changes[1], giving the augmented Phillips curve

$$\begin{aligned}\Delta\pi_t = &-\bar{\lambda}_\pi\pi_{t-1} + \bar{\lambda}_{\Delta\pi}(L)\Delta\pi_{t-1} + \bar{\lambda}_y y_{t-1} + \bar{\lambda}_{\Delta y}(L)\Delta y_{t-1} + \\ &\bar{\lambda}_{sd}sdrp_{t-1} + \bar{\lambda}_{\Delta sdrp\pi}(L)\Delta sdrp_{t-1} + \bar{\lambda}_{sk}skrp_{t-1} + \bar{\lambda}_{\Delta skrp}(L)\Delta skrp_{t-1} + \varepsilon_t^s\end{aligned} \quad (5)$$

where $\beta_{sd}(L) = \lambda_{sd}^1 + \lambda_{sd}^2 L + ... + \lambda_{sd}^{n_{sd}} L^{n_{sd}-1}$ and $\beta_{sk}(L) = \lambda_{sk}^1 + \lambda_{sk}^2 L + ... + \lambda_{sk}^{n_{sk}} L^{n_{sk}-1}$. Our empirical strategy will be to estimate the ARDL models in (4) and (5) and test whether the augmented model in (5) is superior. As with other models in the literature, there are no formal micro-foundations for (4). This is beyond the scope of this paper, but we would

[1] We did not include the cross product of $skrp$ and $sdrp$, as in Ball and Mankiw (1995), because of multicollinearity.

speculate that these will emerge once the literature has produced menu cost models that can generate Phillips curve models similar to (4). Drawing on the more heuristic microfoundations provided by the work of Ball and Mankiw (1994, 1995), we expect $\overline{\lambda}_{\pi} > 0$, $\overline{\lambda}_{y} > 0$ $\overline{\lambda}_{sd} > 0$ and $\overline{\lambda}_{sk} > 0$.

Data

We use monthly Turkish data for the period 1996:01 and 2007:05. The inflation rate is the proportional month-on-month change in the Index of Consumer Prices (HICP) (taken from the Eurostat database). The output gap is the proportional difference of de-seasonalised real GDP (made available by the Central Bank of the Republic of Turkey) from its' underlying Hodrick-Prescott (1992) trend.

Figure 1 depicts the inflation rate and output gap over the sample period. As can be seen from the figure Turkey has experienced high inflation accompanied by volatile growth until the end of 2002. In an attempt to end a long sequence of high inflation rates, an IMF-directed disinflation program, based on nominal exchange rate stability, was adopted in the beginning of the 2000. Eleven months later, this program was abandoned in the face of an economic crisis triggered by banking sector fragility and accumulating current account deficits, in favour of floating exchange rate regime (see, Alper, 2001, and Akyurek, 2006 for details). A rapid and depreciation of the Lira followed (the currency lost 51 percent of its value against major currencies), which led to a monthly inflation rate of 11.8 percent by April 2001 and an annual inflation rate of 75.1 percent in 2001. Following these traumas, the Central Bank of Turkey adopted a policy of monetary base targeting in early 2002, with an explicit focus on lowering and then stabilizing the future inflation; this was in effect a regime of implicit inflation targeting but where the main policy instrument was the monetary base. This policy has proved successful. Inflation gradually decreased throughout 2002 and has remained largely low and stable since.

We use data on 75 sub-components of the price index[2]**.** The individual rate of inflation of each of these sub-components is calculated as

$$\pi_{i,t} = p_{it} - p_{it-1} \tag{6}$$

where p_{it} is the natural logarithm of the price of sub-component *i* at time *t* and where the aggregate price is defined as $\pi_t = \sum_{i=1}^{N} w_i \pi_{i,t}$, where w_i is the weight on sub-component *i, where i*=1,…,75[3] . We use standard measures of the distribution of relative price changes. The second moment is defined as

[2] Some of the sub-components were not available for the whole sample period, therefore we used main components for these items and hence reduced the data to 75 subcomponents.

[3] The data related to 1996-2007 weights of the CPI was not fully available; therefore we used 1996 weights in this study.

$$(7) \qquad sdrp_t = \sqrt{\sum_{i=1}^{N} w_i \left(\pi_{i,t} - \pi_t\right)^2}$$

while the third moment is defined as

$$(8) \qquad skrp_t = \frac{\sum_{i=1}^{N} w_i \left(\pi_{i,t} - \pi_t\right)^3}{sdrp_t^{\,3}}$$

Figure 2 and Figure 3 depicts second and third moments of relative price changes with monthly inflation. Relative price changes are clearly highly volatile. Movements in the second moment are move with changes in the inflation rate. This closely relationship has been widely documented in previous studies (see, for example, Ball and Mankiw (1995), Debelle and Lamont (1997), Aucremanne *et al.* (2002), Caraballo and Usabiaga (2005), De Abreu *et al.* (1995), Bonnet *et al.* (1999), Dopke and Pierdzioch (2003) and Assorson (2004), Hall and Yates (1998), Ratfai (2004), Pou and Dabus (2005)). However we note that the reduced inflation rate in recent years has only partially been reflected in lower volatility**.** The skewness of relative price changes is most marked in periods of macroeconomic stress, when larger negative values are apparent. Overall, skewness has reduced in recent years.

Econometric Estimates

We begin by examining the stationarity properties of our data. As Table 1 shows, application of a variety of tests produces mixed results. We therefore use the bounds testing procedure proposed by Pesaran, Shin and Smith (1996, 2001) which allows us to test for the existence of a linear long run relationship with variable which may be of differing orders of integration.

To do this, we first estimate the ARDL models in (4) and (5) using ordinary least squares. We then test the restriction that all estimated coefficients of lagged variables equal zero by means of an F-test. In the case of (4), the null hypothesis of no cointegration corresponds to $H_0 : \overline{\lambda}_\pi = \overline{\lambda}_y = 0$**.** For (5) the null is $H_0 : \overline{\lambda}_\pi = \overline{\lambda}_y = \overline{\lambda}_{sd} = \overline{\lambda}_{sk} = 0$. This test has a non-standard asymptotic distribution, for which PSS provide two sets of critical values, corresponding to the cases where all variables are I(0) and where all variables are I(1). These upper and lower bounds constitute a range that includes all possible combinations of I(1), I(0) (or even fractionally integrated) variables. If the F-statistic lies above the upper critical bound, the null of no cointegration is rejected, while the test is inconclusive if the F-statistic lies between the upper and lower bounds. Any long run relationship that is detected can then be estimated using an ARDL model similar to (4) and (5) above but which includes lags of the levels rather than the first differences of the variables of interest.

Short-run dynamics can then be obtained by estimating an error correction version of this model, where the estimated long-run relationship forms the error-correction term.

We estimated the conditional ARDL models using up to 13 lags, (although we only included one lag of $sdrp_t$; further lags were not significant and were omitted to prevent over-parameterisation). We also included a dummy variable for April 2001, which was interacted with the output gap to correct for a sharp and anomalous drop in output in that month (at the height of the crisis of early-mid 2001). For each model, we calculated tests of serial correlation, since, as PSS point out, the validity of these tests for cointegration requires serially uncorrelated residuals.

Cointegration tests for the model in (4) are presented in Table 2. As column (v) of that table shows, the test statistic exceeds the upper critical value in the case where 3 lags are used. However, as column (iv) shows, that model suffers from serial correlation. The test statistic is in the inconclusive zone when 1 or 2 lags are used, but these models also fail the test for serial correlation. In all other cases, the test statistic for cointegration is less than the lower critical value. Therefore the null hypothesis of no cointegration in estimates of (4) is never rejected. In other words the Phillips curve relation is not valid for Turkey, casting doubt on this fundamental macroeconomic relationship. There is some debate on the existence of the Turkish Phillips Curve in the literature. While Kustepeli (2005) finds no evidence of a Phillips curve in Turkey, Önder (2004) founds a linear relationship by using output gap instead of unemployment gap. On the other hand, Önder (2008) investigates instability of the Phillips curve and she finds weaker support for the curve by taking nonlinearities into account

Tests for the model in (5) are presented in Table 3. The results in this case are very different as there is strong evidence that the augmented Phillips curve model in (5) is cointegrated. The null hypothesis of no cointegration is rejected in every model that does not from serial correlation. Inclusion of the higher moments of the distribution of relative price changes has allowed the Phillips curve relationship to be established.

Having established that (5) is cointegrated, we estimated a levels version of (5), as discussed above[4], to extract estimates of this relationship. They are

$$\pi_t = \underset{(0.007)}{-0.02} + \underset{(0.079)}{0.228}\, y_t + \underset{(0.149)}{0.822}\, sdrp_t + \underset{(0.037)}{0.174}\, skrp_t \qquad (8)$$

where standard errors are in parentheses. All estimated coefficients are significantly different from zero and have expected signs. The coefficients above do not represent elasticities and standard deviation and skewness differ in terms of magnitude (See Figure 1 and 2). Therefore we have calculated average elasticity of inflation with respect to skewness and standard deviation and found as 3.45 and 1.30 respectively[5]. That means the

[4] We included a full lag structure for $skrp$, as suggested by PSS. The specification of our ARDL was determined by the AIC criteria, by which measure an ARDL(11,3,4,11) model performed best.

[5] Elasticities are calculated by using the following formula $\varepsilon_{y,x} = \frac{\Delta y}{\Delta x} \cdot \frac{\bar{x}}{\bar{y}}$.

effect of third moment of relative price variability is higher than that of standard deviation. This result is also consistent with Ball and Mankiw's result.

Finally, Table 4 presents estimates of the ARDL model expressed as an error-correction model and using the estimated cointegrating relationship as the error-correction term. The model passes diagnostic checks for normality, autocorrelation, misspecification and heteroscedasticity. Furthermore, Cumulative Sum of Residuals (CUSUM) and Cumulative Sum of Squared Residuals (CUSUMSQ) tests (these are not reported, but are available upon request) find no evidence of instability in the estimated coefficients. The error correction coefficient is large (-0.398) and highly significant. We estimate that 40% of the deviation from the long-run equilibrium level of inflation is corrected within a month. Although the dynamic structure is quite complex, it is apparent that almost all lags of skewness are very significant and the skewness of the underlying distribution of prices is a more persistent determiner of movements in variables at the macroeconomic level than is relative price variability. This suggests that the relative importance of skewness, first established by Ball and Mankiw (1995) in the context of (1), also applies in the case of the Phillips curve.

Conclusions

This paper has argued that relative price changes are a key component of the Phillips curve relationship between inflation and output. We have combined the literature on the relationship between inflation and the distribution of relative price changes with the literature on the Phillips curve by including the variance and skewness of relative price adjustment in an otherwise standard model of the Phillips curve. We examine the case of Turkey, where distribution of price changes is especially skewed and where the existence of a Phillips curve has been questioned.

We find that measures of the distribution of relative price changes do indeed improve our understanding of the Phillips curve trade-off. Using monthly data from 1996-2007, we find no evidence of a trade-off between inflation and output in a conventional model of the Phillips curve. By contrast, a well-determined trade-off is obtained when the variance and skewness of relative price changes is included in the model.

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Appendix

Figure 1: Consumer Price Inflation and Output Gap in Turkey: 1996:2-2007:5

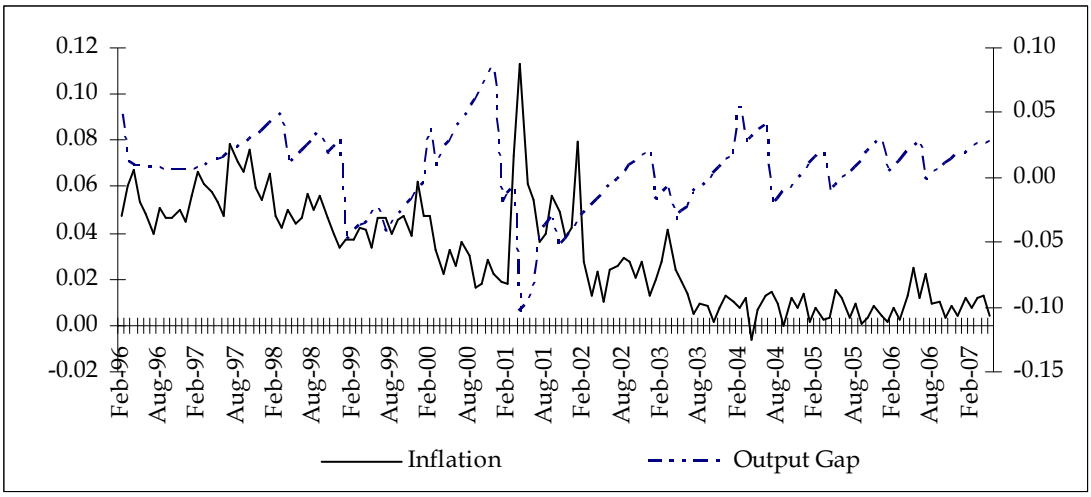

Figure 2: Standard Deviation of Relative Price Changes and Inflation in Turkey: 1996:2-2007:5

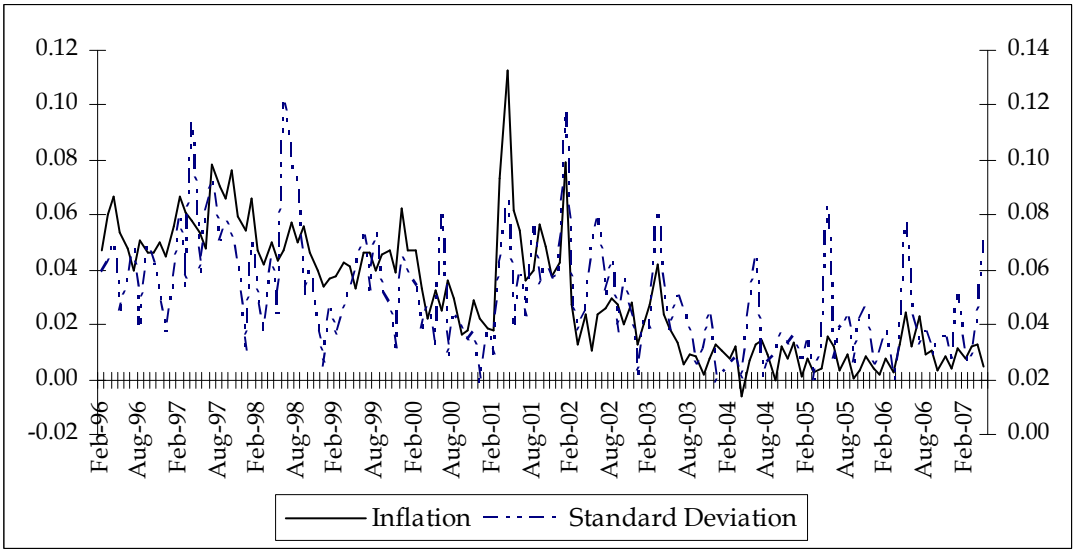

Figure 3: Skewness of Relative Price Changes and Inflation in Turkey: 1996:2-2007:5

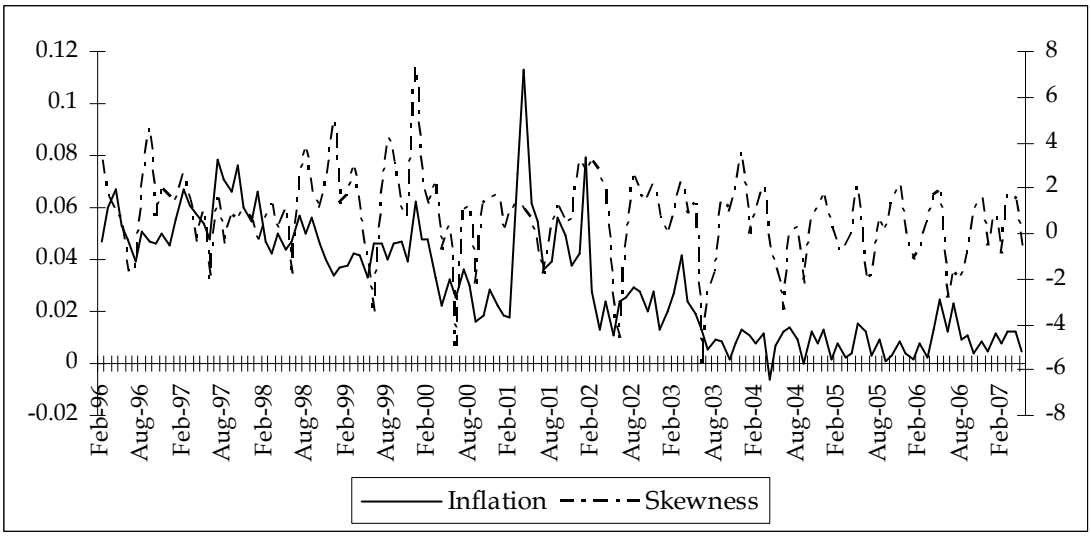

Table 1: Unit Root Tests

	ADF	PP	KPSS	DFGLS	$NGP_{(MZ\alpha)}$
π	-6.175***	-6.105***	1.252***	-2.356	-14.49*
$\Delta\pi$	-	-	0.220	-13.648***	-
y	-3.544***	-3.986***	0.115*	-3.389	-20.336
Δy	-	-	-	-0.822*	-0.525*
sdrp	-1.38	-9.262***	0.065	-1.00*	-2.579*
Δ*sdrp*	-5.47***	-	-	-	-
skrp	-2.963	-8.184***	0.561	-0.100 *	0.235*
Δ*skrp*	-9.728***	-	-	-	-

Note: *, ** and *** indicate significant at 10, 5 and 1% respectively. The lag length for ADF test is chosen based on the AIC criterion. Contrary to other unit root tests null hypothesis of KPSS test is stationary. Bandwiths in the PP and KPSS unit root tests are determined by the Newey-West statistic using the Barlett-Kernel. The lag length of the DF-GLS and Ng-Perron tests are selected by the Modified Akaike Information Criterion (MAIC).

Table 2: Bounded F-tests for Phillips Curve for model (4)

Lag	AIC	SBC	$\chi^2_{sc}(12)$	F-statistics
1	397.623	388.908	39.4574(.000)	4.764 (i)
2	402.094	391.952	25.9915(.011)	4.615 (i)
3	398.269	385.262	29.6960(.003)	4.900 (r)
4	398.843	382.987	25.4362(.013)	3.278
5	393.697	375.008	29.2646(.004)	2.647
6	388.885	367.378	25.8388(.011)	2.689
7	384.689	360.381	29.4465(.003)	2.519
8	382.468	355.373	25.9342(.011)	1.811
9	378.866	349.002	27.7414(.006)	2.301
10	374.798	342.181	30.6840(.002)	1.323
11	376.043	340.689	27.2604(.007)	0.446
12	373.018	334.944	20.9068(.052)	0.480
13	371.121	330.344	21.1679(.048)	0.669

Note: Asymptotic critical values for bounded F-test are 3.79 and 4.85 for I(0) and I(1) respectively 5% significance level. $\chi^2_{sc}(12)$ is LM test statistics for testing no serial correlation, p-values are in parenthesis. In column (v), (i) indicates a test statistic in the inconclusive range, while (r) indicates rejection of the null

Table 3: Bounded F-Tests For Phillips for model in (5)

Lag	AIC	SBC	$\chi^2_{sc}(12)$	F-statistics
1	388.558	371.685	26.2965(.010)	2.895 (i)
2	392.511	370.013	19.5594(.076)	3.568 (i)
3	391.396	367.493	17.1983(.142)	5.890 (r)
4	390.665	362.543	21.3265(.046)	4.9011 (r)
5	390.870	358.530	20.9821(.051)	5.738 (r)
6	389.252	352.6932	22.1253(.036)	4.250 (r)
7	387.110	346.333	23.3544(.025)	4.369 (r)
8	385.870	340.875	23.0645(.027)	4.745 (r)
9	389.814	340.601	20.9203(.052)	6.333 (r)
10	390.936	337.505	16.094(.207)	5.792 (r)
11	389.178	331.528	17.9594(.117)	4.396 (r)
12	388.812	326.944	14.0916(.295)	4.724 (r)
13	390.785	324.699	20.3149(.061)	4.922 (r)

Note: Asymptotic critical values for bounded F-test are 2.86 and 4.01 for I(0) and I(1) respectively at 5% significance level. $\chi^2_{sc}(12)$ is LM test statistics for testing no serial correlation, p-values are in parenthesis. In column (v), (i) indicates a test statistic in the inconclusive range, while (r) indicates rejection of the null hypothesis.

Table 4: Error Correction Form of the ARDL(11,2,11,12) Phillips Curve Model

Regressor	Coefficient	Standard Error	p-value
Δπ(-1)	-0.212	0.101	0.039
Δπ(-2)	-0.165	0.099	0.099
Δπ(-3)	-0.023	0.093	0.807
Δπ(-4)	0.031	0.088	0.723
Δπ (-5)	0.175	0.086	0.044
Δπ (-6)	0.213	0.086	0.015
Δπ (-7)	0.181	0.080	0.027
Δπ(-8)	0.144	0.079	0.071
Δπ(-9)	0.312	0.072	0.000
Δπ(-10)	0.173	0.070	0.015
Δy	0.005	0.045	0.916
Δy(-1)	-0.120	0.045	0.009
Δy(-2)	-0.183	0.043	0.000
Δsdrp	0.315	0.043	0.000
Δsdrp(-1)	0.072	0.074	0.335
Δsdrp(-2)	0.072	0.064	0.263
Δsdrp(-3)	0.105	0.048	0.032
Δskrp	0.002	0.000	0.000
Δskrp (-1)	-0.005	0.001	0.002
Δskrp(- 2)	-0.004	0.001	0.003
Δskrp (-3)	-0.004	0.001	0.001
Δskrp (-4)	-0.003	0.001	0.003
Δskrp (-5)	-0.003	0.001	0.006
Δskrp(-6)	-0.003	0.001	0.000
Δskrp(-7)	-0.003	0.001	0.000
Δskrp (-8)	-0.002	0.001	0.002
Δskrp (-9)	-0.003	0.001	0.000
Δskrp(-10)	-0.001	0.000	0.012
Constant	-0.009	0.003	0.004
Dummy	-0.633	0.098	0.000
Ecm(-1)	-0.398	0.082	0.000
R-Bar-Squared	0.765		
F-stat. F(36, 88)	13.356(.000)		
$\chi^2_{SC}(12)$	.10446(.747)	$\chi^2_{H}(12)$	8.8177[.718]
$\chi^2_{FF}(1)$	1.9868(.159)	$\chi^2_{N}(12)$	

Notes: $\chi^2_{SC}(12)$, $\chi^2_{H}(12)$, $\chi^2_{FF}(1)$ and $\chi^2_{N}(12)$ denote chi-squared statistics for residuals, to test the null hypothesis of no serial correlation, no functional form misspecification, normality and homoscedasticity respectively. p values are in parenthesis.

Competitive Industrial Performance Index and It's Drivers: Case of Turkey and Selected Countries

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Abstract

Competitiveness of manufacturing industry is regarded as one of the basic determinants of long run sustainable growth of a country. Therefore it is important to have an understanding of relative positions of countries in terms of competitiveness and determinants of competitive ability. This study aims to reveal the standing of Turkey in a group of countries and analyze determinants of competitive ability. The competitive industrial performance (CIP) index, taken to be an indicator of relative competitive ability, has been calculated for a sample of 33 countries for years 1985, 1990, 1998 and 2002. Panel data methods then have been employed to reveal sources of competitive ability. Conducted analysis reveals Turkish manufacturing industry to be lagging behind many of the sample countries and presents a grim picture for sustainable development in medium and long run.

Introduction

Competitiveness is regarded as the main condition for existence in the new global market and competitive environment which are shaped by knowledge economies. Success of a country in the process of competition is closely related to the degree at which it can simultaneously increase the real incomes of it's citizens and produce internationally demanded goods and services in accordance with free and fair market conditions. In addition, a country's or a region's competitiveness includes the provision of high living standards and employment opportunities. Definition of competitiveness also includes evasion of unsustainable foreign deficits and risking the welfare of future generations (European Competitiveness Report, 2004). Within this framework, the components of macro competitiveness are revealed as a successful economic performance, increasing living standards, existence of goods and services that are capable of competing in open economies and evasion of unsustainable deficits. Competitive success also includes realization of certain social and environmental targets. These dimensions of the concept present that the definition of competitiveness is through the output of competitiveness, like life quality, rather than its inputs.

The question of where competitiveness of a country is actually embedded has little room for debate. The common understanding is that competitive ability of a country originates in the manufacturing industry for manufacturing industry is the real part of the economy and is the prime creator of value added and jobs in many economies. And higher is the technical complexity of processes and products in manufacturing industry, higher is the value added created. At this point manufacturing industry becomes the focus of policy and research for sustainable development.

Manufacturing industry is regarded as one of the most important economic activities that enable sustainable competitiveness and economic growth (UNIDO 2002- 2003:11). Therefore identification of relative standings of countries in terms of competitiveness arises as an important research question. The aim of this paper is to analyze the relative standings of a sample of countries by using the CIP (Competitive Industrial Performance) index and examine drivers of competitiveness, as measured by CIP, making use of panel data analysis methods.

The study progresses as follows: second part explains the calculation of CIP (Competitive Industrial Performance) index and the drivers behind the index. A brief description of the data used for calculation of CIP index is also provided. Section 3 presents the calculated performance indicators fro the sample countries and CIP index results. Section 4 presents an overview of the drivers data collected to create a panel data set and addresses the related econometric concerns on estimation. Section 5 presents the econometric results. Conclusions and comments on policy implications are presented in Section 6.

CIP Index and Drivers

The analysis conducted in this study actually consists of two layers. The first part is related to the calculation of CIP index and the picture provided by the index rankings. Second part consists of econometric analysis and makes use of available panel data. Forming the core of sections 2 and 3, Competitive Industrial Performance Index **(**CIP) shows the performances of the countries on producing and exporting manufactured goods in a competitively. It is an amalgam of four basic indicators. The first two of these indicators

are about industrial capacity whereas the other two provide intuitions on technological complexity of manufacturing industry (UNIDO, 2002).

CIP index is frequently used by international institutions and its applications focus on international comparison of manufacturing industry. The index is derived by transforming four data items in to performance indicators and then by taking their average. The four indicators mentioned before are as follows:

- **Performance indicator 1:** This indicator is composed of manufacturing industry value added per capita statistics. This indicator helps to observe the contribution of the manufacturing sector to the development, rather than growth, of a country by focusing on a limited measure of individuals' gains from manufacturing industry.
- **Performance indicator 2:** This indicator consists of manufacturing industry exports per capita statistics. This indicator is related to the competitiveness of the industry in international markets.
- **Performance indicator 3:** The ratio of medium and high technology industries' value added to the aggregate manufacturing industry value added is the basis of this indicator. The higher rates of medium and high - tech industries' value added in whole manufacturing value added mean that the country's technological development level and industrial competitiveness are high. Technological intensity of an industry is very important in terms of creation and dissemination of innovations and future competitiveness, for it carries the potential for feedbacks that may trigger further technical improvements.
- **Performance indicator 4:** The last indicator is based on the ratio of medium and high – tech industries' exports to the total manufacturing industry exports. This indicator provides information about the competitive power of technologically complex goods produced by a country's manufacturing industry in international markets.

These four performance indicators are calculated by using the formula below:

$$I_{j,i} = \frac{X_{j,i} - Min\,(X_{j,i})}{Max\,(X_{j,i}) - Min\,(X_{j,i})} \qquad (1)$$

Here, $X_{j,i}$ represents the j^{th} statistical value of i^{th} country for the related index. The values of calculated indicators range between 0 and 1 where 0 represents the worst case and 1 stands for the case where the relevant data is highest. The logic of the indicator can be viewed as forming a line segment with length equal to the distance between best and worst case countries. Then, all the countries are placed along the line segment to reveal their relative standings.

CIP index is then calculated as the average of the four performance indicators, presenting an overall view of a country's manufacturing industry's relative standing. The CIP index is capable of taking into account competitiveness not only in terms of technological content of manufacturing industry but also is capable to account for how beneficial it is for the country's citizens, for it takes in to account per capita value added values as well. Given

that success in competitiveness is defined to include improvements in the well being of citizens, the index is ideal for the study's aim. It not only enables uncovering relative standings of countries but also does a good job of embracing the concept of competitiveness as defined above.

Moreover a number of drivers of CIP index are identified by UNIDO Industrial Development reports for years 2005 and 2002/2003. These drivers are assumed to contribute to competitiveness of a country and thus can be taken as determinants of the index. Among those drivers are skills, foreign direct investment (FDI) and modern infrastructure.

Skills have always been important for industrial performance. But they have become even more crucial because of the explosive growth of the weightless economy and the high information content of industrial activities. It is difficult to quantify a country's stock of industrial skills. Few countries publish data on people's skills by discipline. And even if such data existed, it would be impossible to estimate levels of relevant, up-to-date skills. A common method in existing literature is to approximate existing human capital by education data. The logical connection runs causality from education to skills; a better educated population will be more capable of displaying advanced skills and would be more capable of complex production methods. This would lead to ease of creation of high value added goods.

However, it should be kept in mind that measures like current education enrollments at the primary, secondary and tertiary levels have two main drawbacks. First, they ignore on-the-job learning—experience and training—which in many countries is a major source of skill formation. Second, enrolment data do not take into account the significant differences across countries in education quality, completion rates and relevance to industrial needs. Given the lack of sources for appropriate data, education figures are used despite the stated shortcomings. Such an approach will also be adopted here.

As a second driver, foreign direct investment (FDI) is an important way of transmitting skills, knowledge and technology to developing countries. Transnational corporations, generally the leading innovators in their industries, are engaging in more and more technology transfer. This can be taken to be reflecting the rising cost and pace of technical progress and the reluctance of innovators to sell valuable technologies to independent firms. Transnational corporations also provide capital, skills, managerial know-how and access to diverge markets.

Countries can accelerate their industrial development by plugging into integrated global production systems— governed by transnational corporations—and becoming global or regional supply centers, particularly in high-tech activities. Independent firms in developing countries can participate in these systems, but few have the capabilities to meet the extremely high technical standards. Most countries that have entered these systems in recent years have done so through FDI.

The ideal FDI measure for assessing industrial performance would be inflows into manufacturing (and within that, into domestic and export production). But this kind of disaggregation is generally not possible: for most countries the only available measures are inward FDI flows and stocks.

The final driver considered here is the modern infrastructure. Compared to traditional infrastructure, which includes items like roads, railways, power lines etc, modern infrastructure is defined to include a more knowledge and communication oriented structure. Any item that enables creation and transfer of knowledge can be considered within modern infrastructure. The point is choosing the data to represent such knowledge. Some examples would include number of internet users, number of PCs or internet serves and existing telecommunication lines.

The ease of communication presented by such an infrastructure enables transfer of knowledge and raises possibility to spread information, know-how and innovations at a faster rate. It would be easier to acquire information and the difficulty of creating new knowledge would decrease significantly. This would enable not only production but also design of goods with high technology. Hence, value added creation will increase and the country will become capable of not only selling successfully at the international market but also be able to maintain high living standards for citizens.

Data issues regarding drivers will be discussed in more detail under the econometric model section. For the sole purpose of calculation of CIP index, necessary data have been collected from UNIDO Industrial Development Report 2002/2003 (for the years of 1985 and 1998) and UNIDO Industrial Development Report 2005 (for the years of 1990 and 2002). The data have been used firstly to form the performance indicators and secondly to calculate the CIP index. The sample includes 33 countries; namely, Argentina, Australia, Austria, Belgium-Luxembourg, Brazil, Canada, Czechoslovakia, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Singapore, Spain, Sweden, Switzerland, Taiwan, Thailand, Turkey, UK and US. Due to lack of data, it has been necessary to merge Belgium with Luxembourg and Czech Republic with Slovakia.

Performance Indicator Results

This section provides rankings of countries in terms of performance indicators. Presented below as Table 1 are the country ranks according to the first performance indicator calculated by using manufacturing value added of the selected countries. Japan and Switzerland are consistently leading in terms the first indicator. The high places are occupied by the rich OECD members. The notable exception is Ireland, a common example for growth practices. It has risen to 5th place in 2002 from 19th place in 1985.

Similar dynamics are presented by Singapore and Taiwan, albeit with less success. Korea arises as an other success story, rising from 24th place to 13th place in about 20 years. Latin America countries occupy low ranks and share low ranks with East European countries like Czechoslovakia, Hungary and Poland. Outlook is grim for Turkey for it has not been possible to rise above rank 30 in the considered time period.

Table 1: Performance Indicator 1 Rankings

	1985	1990	1998	2002
Argentina	22	27	25	28
Australia	15	22	22	23
Austria	9	5	9	7
Bel-Lux	13	4	12	6
Brazil	28	28	28	31
Canada	7	17	17	16
Czech-Slov.	NA	25	24	27
Denmark	11	7	10	10
Finland	6	6	6	3
France	8	10	11	12
Germany	5	3	5	8
Greece	27	26	27	26
Hungary	25	29	26	25
Iceland	NA	16	NA	19
Ireland	19	18	3	5
Italy	12	15	14	17
Japan	3	1	2	2
Korea	24	23	23	13
Mexico	29	30	29	32
Netherlands	17	12	15	14
New Zealand	18	21	21	22
Norway	10	14	16	18
Poland	26	32	30	30
Portugal	23	24	19	24
Singapore	16	9	4	9
Spain	21	20	20	21
Sweden	4	8	8	4
Switzerland	1	2	1	1
Taiwan	20	19	18	15
Thailand	31	31	32	29
Turkey	30	33	31	33
United Kingdom	14	13	13	20
United States	2	11	7	11

Source: Authors' calculations

Presented next on Table 2 are performance indicator ranks of indicator 2 which is based on exports per capita for manufacturing industry. Ireland once more displays a striking performance but Singapore consistently occupies the first place for all considered years. Belgium-Luxembourg also consistently occupies the top ranks. These countries are followed by other OECD countries that are known for their high income levels. Latin America countries once more occupy the low ranks. One interesting point is that Mexico has risen to rank 25 in 1998, a jump of 7 ranks from year 1990. This can be due to the North America Free Trade Agreement, signed in 1992 by USA, Canada and Mexico. It is possible that reallocation of production processes to Mexico has triggered an increase in the country's export capability.

Table 2: Performance Indicator 2 Rankings

	1985	1990	1998	2002
Argentina	28	30	29	32
Australia	24	25	24	26
Austria	12	7	9	9
Bel-Lux	2	2	3	3
Brazil	27	33	31	33
Canada	9	12	11	10
Czech-Slov.	NA	20	18	20
Denmark	8	9	8	8
Finland	7	8	7	7
France	16	13	13	14
Germany	11	10	10	12
Greece	25	27	26	30
Hungary	13	24	32	19
Iceland	NA	26	NA	27
Ireland	10	6	2	2
Italy	17	15	15	15
Japan	6	17	23	17
Korea	19	21	17	18
Mexico	30	32	25	25
Netherlands	4	4	5	5
New Zealand	21	19	22	23
Norway	14	11	16	13
Poland	26	29	28	29
Portugal	23	18	20	22
Singapore	1	1	1	1
Spain	22	22	19	21
Sweden	5	5	6	6
Switzerland	3	3	4	4
Taiwan	15	14	12	11
Thailand	31	28	27	28
Turkey	29	31	30	31
United Kingdom	18	16	14	16
United States	20	23	21	24

Source: Authors' calculations.

South East Asian countries in the sample do not display increases in per capita exports but on average do slightly better than East European Countries. Turkish case is once more discouraging, occupying the 29th place in 1985 but falling to 31st place in 2002. Doing worse than Turkey are Brazil and Argentina with ranks 33 and 32 respectively. Greece, Poland and Thailand perform slightly better than Turkey in year 2002 and occupy ranks 30, 29 and 28. Faring unexpectedly poorly according to this indicator is the USA. It is possible that the low ranks of USA are due to relatively large population, leading to a low per capita export value, and domestic market oriented production.

Table 3: Performance Indicator 3 Rankings

	1985	1990	1998	2002
Argentina	27	27	29	25
Australia	21	20	16	23
Austria	16	21	20	19
Bel-Lux	14	14	17	16
Brazil	11	19	11	18
Canada	17	18	18	13
Czech-Slov.	18	11	23	14
Denmark	19	23	19	17
Finland	22	25	13	15
France	15	15	14	21
Germany	2	2	4	8
Greece	31	30	31	31
Hungary	5	16	24	20
Iceland	NA	32	NA	33
Ireland	12	9	3	2
Italy	9	7	15	24
Japan	3	3	2	3
Korea	20	13	9	6
Mexico	26	26	30	27
Netherlands	10	8	10	9
New Zealand	28	29	26	26
Norway	13	12	21	12
Poland	23	24	25	30
Portugal	29	31	32	32
Singapore	1	1	1	1
Spain	24	22	22	22
Sweden	7	10	8	4
Switzerland	8	6	5	10
Taiwan	25	17	12	11
Thailand	32	33	27	28
Turkey	30	28	28	29
United Kingdom	6	5	7	5
United States	4	4	6	7

Source: Authors' calculations.

Presented on Table 3 are rankings of countries according to the third performance indicator based on the ratio of medium and high technology sectors in total manufacturing value added. The consistent success of Ireland and Singapore is once more observed. Japan is also a winner in terms of the third indicator. The OECD countries once more occupy most of the high ranks. However, some interesting dynamics can be observed. Italy displays a considerable worsening in terms of technology content in production, falling to 24th position in 2002 from 9th position in 1985. Korea, on the other hand, displays considerable rank increase from 1985 to 2002, moving up to 6th position. Hungary is another country that suffers serious rank losses and moves to 20th position in 2002 from 4th position in 1985. Argentina and Mexico perform blow average but Brazil displays above average performance. Turkey once more occupies some of the lowest

The volatilities in Table 3 imply that in the last 20 years, the world has experienced considerable shifts in allocation of medium and high technology across countries. It is unfortunate that Turkey has not moved to higher ranks during this process. It is possible that Turkey has not managed to benefit from shifts in global reallocation of production processes and has not been able to attract or create the ability to produce medium and high technology goods. The situation bodes ill for the country, implying that a gap between sample countries and Turkey is now in existence and efforts are needed to close this gap.

Based on share of medium and high technology sectors in manufacturing industry exports, the 4th performance indicator gives rise to the rankings presented in Table 4. It is interesting to note that Ireland is not a success story in this case; actually, Ireland falls to 19th position in 2002 from 13th in 1985. One other interesting point is that some of the relatively more developed countries display losses in ranks. Within the considered time period, Austria falls from 9th position to 16th, Norway falls all the way to 30th position, and Switzerland falls to 10th position after losing 6 ranks. Relatively milder falls are observed for other well developed countries as well.

Table 4: Performance Indicator 4 Rankings

	1985	**1990**	**1998**	**2002**
Argentina	28	29	28	29
Australia	30	27	31	28
Austria	9	12	19	16
Bel-Lux	15	15	21	25
Brazil	23	25	26	24
Canada	11	9	20	18
Czech-Slov.	NA	NA	14	23
Denmark	19	17	24	20
Finland	20	23	18	21
France	7	8	11	11
Germany	2	3	5	5
Greece	27	31	30	32
Hungary	31	24	10	7
Iceland	NA	21	NA	14
Ireland	13	14	15	19
Italy	12	18	16	22
Japan	1	1	1	1
Korea	8	13	8	9
Mexico	6	5	3	3
Netherlands	21	20	17	17
New Zealand	29	32	32	33
Norway	24	22	29	30
Poland	16	19	25	26
Portugal	22	28	23	27
Singapore	14	7	2	2
Spain	17	11	13	13
Sweden	5	10	12	12
Switzerland	4	6	6	10
Taiwan	18	16	9	8
Thailand	26	26	22	15

Turkey	25	30	27	31
United Kingdom	10	4	7	6
United States	3	2	4	4

Source: Authors' calculations.

On the other side of the coin are position gains by other countries. Hungary rises to 7th place whereas Mexico displays a surprising rise to 3rd position. From the 14th position in 1985, Singapore rises to 2nd position in 2002. Taiwan also follows a similar path. It is possible that as production of relatively high technology goods re-allocates to less developed countries, probably due to lower labor costs, these countries become exporters of such goods. This may appear to be a contradiction for these countries are not among the countries that have very high shares of medium and high technology sectors in manufacturing value added. Such a contradiction may be explained away as follows:

Consider a developing country that does not produce very complex goods and thus has low shares of medium and high technologies in manufacturing value added and exports. Now consider a reallocation of production processes to similar developing countries. These countries will now be producing relatively more complex goods, but such production may account for a small portion of total value added created in the economy. If the country is initially exporting simple goods that have low value added, introduction of medium and high technology goods which have more value added would distort the export structure in favor of complex goods. This would be even truer if the country had previously been producing for mostly the local market and had relatively low exports to begin with. Such a dynamic would be even more logical if one assumes or believes that such reallocation of production processes aims to use developing countries as production base for goods to be sold in developed countries.

However, such analysis would not curtail Turkey's lagging position; even though Turkey occupies the 25th place in year 1985, the rank has fallen to 31 in year 2002. This can be taken to mean that Turkey has not been able to benefit from a reallocation of production processes and the opportunity to gain from the technology transfers provided by such reallocations appear to have been missed.

Having obtained the performance indicator values, it is now possible to calculate the CIP index values for the selected countries. The rankings implied by the calculated index values are available on Table 5. It should be noted that the rows of this table are ordered according to rank in year 2002.

Singapore, Switzerland and Japan share the top places in the CIP index rankings. Ireland rises from 15th place to 2nd in the time period under focus. Finland, Korea and Taiwan are other examples of improvement. Latin America countries display below average performance whereas Southeast Asian countries display at least slight improvements in rank, as in the case of Thailand, or are consistent leaders, as is Singapore. The rankings also imply that France, Canada, Italy and Norway have become slightly less competitive during the last 20 years. Hungary is one of the countries that slightly improve in rank, but Poland and Czechoslovakia have recessed to lower ranks. Finally, Turkey has one of the lowest ranks for all the four years and has slowly, but steadily fallen to the 32nd position in 2002.

Table 5: CIP Rankings of Countries

CIP	1985	1990	1998	2002
Singapore	3	1	1	1
Ireland	15	13	4	2
Switzerland	2	3	2	3
Japan	1	2	3	4
Sweden	6	6	6	5
Germany	4	4	5	6
Bel-Lux	7	5	10	7
United States	5	7	7	8
Finland	14	14	9	9
Korea	19	19	15	10
United Kingdom	10	8	8	11
Taiwan	18	18	13	12
Netherlands	9	9	11	13
Austria	12	10	14	14
Denmark	16	12	17	15
France	11	11	12	16
Canada	8	15	18	17
Hungary	21	22	21	18
Italy	13	16	16	19
Spain	20	20	19	20
Norway	17	17	22	21
Mexico	22	21	23	22
Czech-Slov.	NA	NA	20	23
Brazil	24	25	24	24
Australia	25	23	26	25
Thailand	31	32	28	26
Iceland	NA	26	NA	27
Portugal	26	27	25	28
Argentina	28	29	30	29
Poland	23	24	27	30
New Zealand	27	28	29	31
Turkey	29	31	31	32
Greece	30	30	32	33

Source: Authors' calculations.

Drivers' Data and Econometric Model

Country coverage of the collected driver data is 32 countries; specifically Argentina, Australia, Austria, Belgium-Luxembourg, Brazil, Canada, Czechoslovakia, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Singapore, Spain, Sweden, Switzerland, Thailand, Turkey, United Kingdom and United States. Due to lack of data, Belgium and Luxembourg have been treated as a single entity. Same situation holds for Czech Republic and Slovakia as well.

The econometric part of this study makes heavy use of data obtained from International Measures of Schooling Years and Schooling Quality Dataset (Barro and Lee, 2000: 24–32) and World Bank's WDI (World Development Indicators) Database. Foreign direct investment is taken to be one of the drivers of CIP and is generally regarded to be a vehicle of technology transfer to manufacturing industry. To account for such transfers, net FDI inflow as percentage of GDP and net current FDI inflow have been obtained from WDI. The net current FDI inflow has been turned to real units by making use of United States GDP deflator series that takes year 2000 as the base year. The deflator is from WDI as well. The data related to FDI is generally available for all sample countries between years 1975 and 2005. The noticeable exceptions are Argentina for years 1975 and 1976, Czechoslovakia for 1975 to 1989, Poland for 1975 to 1984 and Switzerland for 1975 to 1982.

One other item to be considered as a driver of CIP is the existing modern infrastructure. Upon defining modern infrastructure to include technological components, it becomes necessary to include items like number of internet users or availability of personal computers. However, data on such items is not available for past decades, simply because such items did not exist back then. In order to account for relatively technical infrastructure differences across countries, two items of data have been chosen: fixed line and mobile phone subscribers per 100 people and telephone mainlines per 100 people. These two items are available through WDI dataset for all countries in the sample with 13 missing observations for various in the case of fixed and mobile line subscribers' data.

The last major item concerns education as a representative of capabilities of the labor force. To account for skills of the labor force, a human capital line of thought has been adopted. Thus education variables have been the focus as the last driver of CIP. Percentage of primary school attained, percentage of primary school completed, percentage of secondary school attained, percentage of secondary school completed, percentage of higher school attained and percentage of higher school completed have been taken from Barro-Lee dataset. The mentioned percentages are of the total population, where total population consists of people aged 25 and above. Average schooling years, average years of primary schooling, average years of secondary schooling and average years of higher schooling in total population are also taken from the same dataset. The data covers all countries except Belgium-Luxembourg, forcing the country out of the econometric considerations. The coverage of the data is also lacking in time dimension; it is available for years 1975, 1980, 1985 and 1990 only.

Finally, the dependent variable is the CIP with data available for years 1985, 1990, 1998, and 2002. Thus the existing dataset of the study is actually a panel that focuses on 4 time periods and 32 countries, if one includes Belgium-Luxembourg.

The existing panel dataset raises the need for appropriate estimation techniques. Consider a panel dataset of N cross section units and T time dimensions, be it years or any other unit. In most general terms, the estimation of a linear equation making use of a panel dataset can be summarized by the following:

$$Y = \beta_0 + X\beta + e \qquad (2)$$

where Y is the NTx1 vector of independent variable and X is the NTxk matrix of k independent variables. The β is the kx1 vector of slope coefficients to be estimated; β_0 is the intercept term that is assumed to be common for all cross section units and time periods. Regarding the NTx1 error term, e, it is assumed that $E(e_{it}) = 0$, $E(e_{it}^2) = \sigma^2$ (i.e. variance is constant) and $E(e_{it}e_{js}) = 0$ for all i,j and $t \neq s$ and $E(e_{it} \mid X) = 0$ for all i,t. These assumptions imply that the stated model can be estimated by ordinary least squares (OLS) technique (Erlat, 2008).

One interesting possibility in panel data is to assume that each cross section unit has unique properties that can be introduced into the model separately. This approach introduces different intercepts for each cross section unit through use of dummy variables. Such a model is called a one way model and can be summarized as

$$Y = \beta_0 + D_\delta\delta + \beta X + e \qquad (3)$$

where D_δ is a NTxN matrix of stacked dummy variables. Above formulation assumes that each cross section will have an intercept that varies from a common intercept, β_0, by the amount δ_i. These variations or effects can take two forms; they can be fixed or random.

In case of fixed effects, direct estimation of the model by OLS is not possible due to the perfect collinearity introduced by the D_δ dummies. The estimation procedure in this case includes a transformation that wipes out the individual effects to obtain an estimator of β vector (Baltagi, 1995:10-11). One candidate transformation turns the data into deviation from cross section means and thus leads to the within estimator of β (Johnston and DiNardo, 1997: 398). Identification of the common intercept and the deviations is relatively easy, given the between estimator (Erlat, 2008: 12), and a joint significance test can be conducted to determine the significance of the fixed effects. If the fixed effects are found to be insignificant, one can simply use pooled OLS approach.

Alternative specification assumes that the effects summarized by δ are random variables. This formulation leads to the random effects model where δ effects are now part of the error term. Therefore, assumptions on their distribution are in order. Firstly, $E(\delta_i) = 0$ and $E(\delta_i^2) = \sigma^2_\delta$ for all i; also, $E(\delta_i\ \delta_j) = 0$ for all $i \neq j$ whereas $E(\delta_i\ e_{jt}) = 0$ for all i, j and t (Hsiao, 2003: 34). And last, but certainly not the least, $E(\delta_i \mid X) = 0$ for all i (Erlat, 2008: 13).

We can think of the random effects model to have a composite error term, $\varepsilon_{it} = \delta_i + e_{it}$. Given the distribution properties of e and δ, it can be shown that the composite error term has the following properties: $E(u_{it}) = 0$, $E(u_{it}^2) = \sigma^2_\delta + \sigma^2$ and $E(u_{it}|X) = 0$ while $E(u_{it}u_{js}) = 0$ for all i=j and $t \neq s$(Erlat, 2008:13; Greene, 2003:294). It should be noted that the δ term introduces a correlation among error terms of the same cross section unit but error terms are not correlated across cross section units (Hsiao, 2003: 35). Such correlations inspire use of generalized least squares (GLS) approach to estimate the random effects model. The construction of appropriate transformation is based on the estimation of variances σ^2_δ and σ^2; the method is due Swamy and Arora (1972).

Ignoring the differing intercepts of different cross section units would lead to biased OLS estimation. As compared to pooled OLS, fixed effects estimator would be immune to such bias. However, significant cross section specific effects may be correlated to the composite error term and may lead to biased GLS estimates (Kennedy, 2003: 305-306). Thus it is

necessary to test if the assumption $E(u|X) = 0$ holds. A most common procedure to test this is by Hausman (1978). The test is based on the idea that when the stated assumption does not hold, within estimator of the fixed effect model is consistent whereas GLS estimator of the random effect model becomes inconsistent. The proposed test makes use of the difference between these two estimators (Baltagi, 1995: 68).

Econometric Results

Since current competitiveness should be determined by previous occurrences in the economy, the considered model includes lagged values of independent variables. However, it is necessary to reconcile the CIP data and education data available. The education data is available for years 1975, 1980, 1985 and 1990. CIP is available for years 1985, 1990, 1998 and 2002. These dates imply two lags practically applicable; a 5-year lag or a 10-year lag for education related data.

If a lag of 5 years is selected, CIP for 1985 will match education data for 1980 and CIP data for 1990 will match the education data for year 1985. However, the education data for 1990 will have to be used for the 1998 CIP data, assuming that 1990 data is a good indicator for education in 1993. Also, there will not be matching education data for the year 2002. This would lead to a loss in time dimension of the panel data. In order to avoid this loss, a lag of 10 years has been adopted. Therefore, 1985, 1990, 1998 and 2002 CIP data are matched with 1975, 1980, 1985 and 1990 education data respectively. Implicit here is the assumption that education data for 1985 and 1990 are good proxies for corresponding education data for 1988 and 1992.

Basically, the model is planned to include three independent variables; one of them an indicator of education and hence human capital, the second an indicator of modern infrastructure and the last a representative of FDI flows. The data, as explained above, exists. Actually, there is a surplus of variables to pick from. Therefore, two points are of concern at this point: which independent variables will be used and which lags will be chosen for these independent variables?

The last problem is actually partially solved by data restrictions: education related data have to have a lag of 10 years. Trial and error by estimation of a considerable number of models has led to the complete solution and the important result that all the trials point to significant cross-section specific effects. The process also has eliminated the data on fixed line and mobile phone subscribers per 100 people and real FDI flow as determinants of CIP by identifying them as statistically insignificant at all lags. The fine tuning of the adopted methodology will be presented here. The following table of data and related abbreviations has been provided to make the discussion more comprehensible.

Table 6: Variables and Abbreviated Names

Average schooling years in the total population	sch_aver
Average years of higher schooling in the total population.	sch_aver_hgh
Average years of primary schooling in the total population	sch_aver_pr
Average years of secondary schooling in the total population.	sch_aver_sec
CIP	cip
Foreign direct investment, net inflows (% of GDP)	fdi_gdp
Percentage of "higher school attained" in the total pop	sch_hgh_a
Percentage of "higher school complete" in the total pop.	sch_hgh_c
Percentage of "no schooling" in the total population	sch_no
Percentage of "primary school attained" in the total pop.	sch_pr_a
Percentage of "primary school complete" in the total pop	sch_pr_c
Percentage of "secondary school attained" in the total pop	sch_scnd_a
Percentage of "secondary school complete" in the total pop	sch_scnd_c
Telephone mainlines (per 100 people)	telep_main_100

The most generic form of the model that is the basis of the analysis is as follows:

$$cip_{it} = \beta_0 + \beta_1 \, fdi\_gdp_{t-4} + telep\_main\_100_{t-3} + EDUCATION_{t-10} \quad (4)$$

Regarding sign expectations, foreign direct investment inflows are expected to enable technological transfers and contribute to the competitiveness of manufacturing industry; thus a positive sign is expected for the related coefficient. Telephone mainlines per 100 people is taken as an indicator of technical complexity of the relevant country. A higher complexity is expected to contribute to higher competitiveness, leading to a positive sign expectation. Higher education of the population would enable use of more complex production techniques and enable production of goods with higher value added. Thus a higher education level is expected to contribute to competitiveness and this should be revealed by a positive sign.

Table 7: Models List with Relevant Education Variable

Model Name	Education Variable
Model 1	sch_aver(t-10)
Model 2	sch_aver_hgh(t-10)
Model 3	sch_aver_pr(t-10)
Model 4	sch_aver_sec(t-10)
Model 5	sch_hgh_a(t-10)
Model 6	sch_hgh_c(t-10)
Model 7	sch_pr_a(t-10)
Model 8	sch_pr_c(t-10)
Model 9	sch_scnd_a(t-10)
Model 10	sch_scnd_c(t-10)
Model 11	sch_no

By adopting various education related variables from the above table, it is possible to introduce a number of models. These models are listed in Table 7 above. The pooled OLS, fixed effects and random effects estimation results of these models are presented in Table 8 below.

Presented on the second column from the right on Table 8, the F-test rejects the null hypothesis that fixed effects coefficients are jointly insignificant. The Hausman test, on the other hand, leads to the rejection of the null hypothesis that GLS estimator of random effects model is consistent. A fixed effects model is more preferable for it is not only consistent but also takes into account the existence of cross section specific intercepts. Note that this analysis holds for all the considered models.

Regarding significance of coefficients; FDI inflow coefficients are found to be positive and statistically significant for all models and the three estimation methods. Telephone mainlines per 100 people is statistically significant with positive sign for all models in case of pooled OLS. However, once cross section specific effects are taken into account, this variable turns insignificant for all but two of the models. The coefficient sign also turns negative as well.

The situation is much more complicated in the case of education variables. The case of model 11 should be considered separately for it uses percentage of no schooling in total population. As more people receive no education, the competitiveness of the country should decrease, creating a negative coefficient. The education coefficient expectation for model 11 is negative.

Returning to the evaluation of models; in the case of pooled OLS, models 2, 5 and 6 display statistically significant results regarding education but with negative coefficients. These models use average years of high schooling, percentage of high school attainment and high school completion in total population, respectively. These results imply that higher school education leads to a decrease in competitiveness, a situation contrary to expectations. Leaving significance considerations aside, models 4, 7, 8, 9 and 10 display expected signs on education variables. These models use secondary and primary education. In the case of model 11, where education variable measures no education in total population, the coefficient is negative.

These results imply dynamics contradictory with our expectations. As education level decreases from higher levels to primary level, sign on education variable turns positive but loses significance. This is emphasized by model 11 where the sign on education variable is negative, implying that as the portion of population without education increases, competitiveness falls.

Given such confusing results, it is fortunate that the F-test points to a fixed effects model. In fixed effects estimation, FDI is statistically significant with the expected positive sign. Telephone mainlines per 100 people has a negative effect in 10 of the considered models. These negative coefficients are significant only in the case of models 3 and 11.

Regarding education, models 3, 7, 8 and 11 have statistically significant education coefficients with expected signs. These models correspond to the cases of average primary schooling years, primary school attainment ratio, primary school completion ratio and no schooling ratio. This can be taken to indicate that lower education levels correspond to

higher competitiveness. Whenever the education coefficients are not significant, they are negative contrary to sign expectations.

Consider the random effects estimations as the final case. Foreign direct investment has the expected sign for all models. The coefficients for telephone mainlines are concentrated around the value zero for all the models and are all insignificant except for model 11. Education coefficients are no insignificant for all models other than model 7, 8 and 11. First two of these models refer to primary school attainment and completion. The last model refers to the case of no schooling and has a negative sign.

Table 8: Estimation Results

		OLS			Fixed Effects			Random Effects			
	fdi_gdp(-4)	**telep_main_100(-3)**	**EDUC**	**fdi_gdp(-4)**	**telep_main_100(-3)**	**EDUC**	**fdi_gdp(-4)**	**telep_main_100(-3)**	**EDUC**	**Fixed Effects Test**	**Hausman Test**
Model 1	0.0142	0.0051	-0.0065	0.0073	-0.0013	0.0045	0.0061	-0.0006	0.0072	0.0000	0.0000
	2.4535	4.7355	-0.7869	2.4596	-1.5199	0.3568	2.1407	-0.7747	0.7871		
	(0.0157)	(0.0000)	(0.4330)	(0.0160)	(0.1323)	(0.7221)	(0.0344)	(0.4401)	(0.4328)		
Model 2	0.0137	0.0059	-0.1762	0.0077	-0.0007	-0.0681	0.0064	0.0002	-0.0746	0.0000	0.0000
	2.4183	6.0058	-2.3139	2.6189	-1.0104	-1.1053	2.2696	0.3646	-1.3219		
	(0.0172)	(0.0000)	(0.0225)	(0.0105)	(0.3152)	(0.2722)	(0.0251)	(0.7160)	(0.1888)		
Model 3	0.0144	0.0049	-0.0086	0.0070	-0.0018	0.0555	0.0060	-0.0006	0.0204	0.0000	0.0000
	2.5080	5.4891	-0.8931	2.4662	-2.6805	2.3761	2.2140	-0.9650	1.5457		
	(0.0136)	(0.0000)	(0.3737)	(0.0157)	(0.0089)	(0.0198)	(0.0288)	(0.3366)	(0.1250)		
Model 4	0.0149	0.0041	0.0108	0.0072	-0.0004	-0.0246	0.0061	-0.0002	-0.0010	0.0000	0.0000
	2.5615	3.4550	0.5277	2.4537	-0.4709	-1.1003	2.1446	0.7933	-0.0535		
	(0.0117)	(0.0008)	(0.5987)	(0.0162)	(0.6389)	(0.2744)	(0.0341)	(0.9574)	(0.9574)		
Model 5	0.0134	0.0060	-0.0054	0.0077	-0.0007	-0.0019	0.0062	0.0001	-0.0020	0.0000	0.0000
	2.3739	6.0801	-2.4355	2.60007	-1.1011	-1.1152	2.2233	0.2930	-1.2310		
	(0.0193)	(0.0000)	(0.0164)	(0.0110)	(0.2740)	(0.2680)	(0.0282)	(0.7700)	(0.2209)		
Model 6	0.0141	0.0055	-0.0080	0.0077	-0.0007	-0.0036	0.0066	0.0003	-0.0046	0.0000	0.0001
	2.4867	5.7969	-1.8349	2.6112	-0.9373	-0.9742	2.3201	0.4154	-1.3683		
	(0.0144)	(0.0000)	(0.0692)	(0.0107)	(0.3513)	(0.3328)	(0.0221)	(0.6786)	(0.1739)		
Model 7	0.0153	0.004946	0.0009	0.0088	5.16E-5	0.0032	0.0074	0.0006	0.0025	0.0000	0.0000
	2.6310	5.4516	0.8826	3.1389	0.0764	3.3813	2.7614	0.9469	3.0164		
	(0.0097)	(0.0000)	(0.3793)	(0.0023)	(0.9393)	(0.0011)	(0.0067)	(0.3457)	(0.0032)		
Model 8	0.0145	0.0046	0.0001	0.0075	-0.0003	0.0037	0.0066	0.0003	0.0032	0.0000	0.0000
	2.4812	5.5451	0.0715	2.7019	-0.4687	3.3916	2.4741	0.4952	3.1670		
	(0.0146)	(0.0000)	(0.9431)	(0.0084)	(0.6405)	(0.0011)	(0.0148)	(0.6214)	(0.0020)		
Model 9	0.0144	0.0041	0.0008	0.0073	-0.0008	-0.0008	0.0060	-0.0002	-0.0001	0.0000	0.0000
	2.5019	3.8030	0.6157	2.4937	-1.1359	-0.7919	2.1446	-0.2866	-0.1222		
	(0.0138)	(0.0002)	(0.5393)	(0.0146)	(0.2593)	(0.4307)	(0.0341)	(0.7749)	(0.9029)		
Model 10	0.0151	0.0039	0.0019	0.0073	-0.0011	0.0002	0.0063	-0.0005	0.0011	0.0000	0.0001
	2.6036	3.5595	0.8704	2.4731	-1.6394	0.1382	2.2073	-0.7226	0.7976		
	(0.0105)	(0.0005)	(0.3859)	(0.0154)	(0.1049)	(0.8904)	(0.0293)	(0.4714)	(0.4267)		
Model 11	0.0151	0.0044	-0.0005	0.0085	-0.0012	-0.0049	0.0076	-0.0011	-0.0043	0.0000	0.0001
	2.5231	4.2303	-0.3702	2.9922	-2.9390	-3.1162	2.7963	-1.9266	-3.2808		
	(0.0130)	(0.0000)	(0.7119)	(0.0036)	(0.0043)	(0.0025)	(0.0061)	(0.0565)	(0.0014)		

Notes: Authors' calculations. Presented below model coefficients are t-values, with p-values in parenthesis. Regarding significance; (*) denotes a significant coefficient at 10% level whereas (**) and (***) denote 5% and 1% respectively. The three EDUC columns stand for the relevant education variables of models and report the coefficients and related statistics of relevanrt education data. Fixed effects test is the F-test for the joint significance of cross-section specific intercepts. Last column is the Hausman test explained above. Both columns report only the p-values.

It is possible to use fixed effects estimation results to obtain a relative standing of Turkey. Since the dummy variable coefficient estimates in a fixed effect model point to how different one country's intercept is from the others, checking the dummy coefficients on Turkey may be informative. Turkey's dummy variable coefficient values for all 11 models are presented in Table 9 below.

Table 9: Turkey's Dummy Variable Coefficient for Considered Models	
Model 1	-0.2744
Model 2	-0.2981
Model 3	-0.138
Model 4	-0.3087
Model 5	-0.2982
Model 6	-0.2972
Model 7	-0.2279
Model 8	-0.2478
Model 9	-0.3011
Model 10	-0.2894
Model 11	-0.1084

It can be seen that the dummy has a negative coefficient for all considered models. This can be taken to imply that Turkey's intercept is lower than the average; specifically, Turkey's competitiveness is less than the group average.

The general impression obtained from econometric considerations is that FDI has a positive and significant effect on international competitiveness as measured by CIP. Even though pooled OLS results support the view that a technical infrastructure as measured by telephone mainlines per 100 people has a positive and significant effect on competitiveness of a country's manufacturing industry, this view is questioned by fixed effects and random effects estimation results.

It can be argued that a better measurement of modern infrastructure should be developed in order to measure this effect better. Such a measure could include available data on number of PCs per 100 people, number of internet users, secure internet server figures etc. However, these data items are available for only recent years. A regression relating these variables with competitiveness would raise a causality question. Does a country have a modern infrastructure now because it is competitive or is it competitive because it has a modern infrastructure? Such questions have already been eliminated by the current study with the assumption that current competitiveness is determined by past values of variables. An analysis that connects current competitiveness and current infrastructure (or any other variable) should first be subject to causality tests. The moral of this discussion is that it is not possible to have a better idea on whether technical / technological development as indicated by a modern infrastructure is currently not possible to measure due to data limitations. As more data becomes available on the technological development level of a large group of countries, empirical research on the issue may flourish.

The conclusion is quite unclear in the case of education. The lack of a strong relationship between education and competitiveness is against theoretical literature but apparently is not an exception for a body of literature. Taking growth literature as the one closest to the current study's vision, it can be confirmed that the current study's education relation findings are not an exception but simply another drop in an ocean of debate.

Despite established theoretical relation between human capital and economic growth, Barro and Sala-i-Martin (1995: 537) find it difficult to empirically connect the two. One other study admits that "… the channel from schooling to growth is too weak" and this situation "remains true even when we take into consideration the effect of schooling on technology adoption" (Bils and Klenov, 2000: 1177). Temple (2001) also concludes that "the aggregate evidence on education and growth, for large samples of countries, continues to be clouded with uncertainty". A recent study, on the other hand, mentions that even if education has the effect of accelerating growth, the lag may be many decades rather than simply 10 years as is the case adopted above (Szirmai, 2008: 21-22).

As a result, what can be firmly concluded is that FDI inflows have a positive impact on competitiveness. Modern infrastructure may contribute to competitiveness, but existing measures are lacking in detail and the available data on a relatively lower technology like existing telephone mainlines is simply inadequate to reflect the exact dynamics. Impact of education is also questionable but this can be a reflection of an existing uncertainty in the literature. Apparently, better measures of education or longer datasets are needed for more detailed research. Dummy coefficients from fixed effects estimation show that Turkey's competitive standing is less than average and confirm the ranking lists of CIP.

Conclusions

It's well known from the related literature that manufacturing industry is one of the major components of countries' competitiveness. It is the main source of innovations, a field for application of technological development to production, creates positive externalities for the rest of the economy and enables attainment of dynamic comparative advantage in international trade.

From this viewpoint in this study, the competitive industrial performance (CIP) index, taken to be an indicator of relative competitive ability, has been calculated for a sample of 33 countries for years 1985, 1990, 1998 and 2002. Panel data methods then have been employed to reveal sources of competitive ability. The insights obtained from the conducted analysis can be summarized as follows.

Indicator results imply a spatial shift of production of medium and high technology goods from developed countries to *some* of the developing countries. This is confirmed by CIP results where a small number of relatively less developed countries are catching up with developed countries in terms competitive ability. Turkey does not appear to be part of this process and displays poor competitive standing compared to other countries in the sample.

Econometric results confirm that Turkey is lagging behind other countries in terms of competitive ability. The negative coefficient on Turkey's dummy in fixed effects model signifies the situation. It is also observed that FDI is a major determinant of competitive ability; attempts to attract FDI would contribute to future well being of a country.

Moreover education proves to be an elusive variable in determining competitive ability. It is possible that education is not a good instrument to represent skills. Such elusive behavior of education, however, is not an uncommon occurrence and has been encountered many times in the empirical part of growth literature. One other interesting note is that econometric results imply that too much schooling may be unnecessary for development of competitive abilities. It is possible that on-the-job training or development of skills through practice is a better determinant of competitiveness than formal education.

Telephone mainlines per 100 people, as a variable, either contributes negatively to competitiveness of a country or has no effect at all. The statistical significance of negative effect is also in doubt. Two conclusions are possible: either modern infrastructure is not related to competitiveness or a better modern infrastructure measurement is necessary. A better measure is currently not possible due to unavailability of datasets with long time dimension.

Lastly, as a policy recommendation, Turkey should focus on attracting more FDI and focus on technical training of the workforce rather than concentrate on providing higher and higher levels of education.

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Use of e-commerce in Small and Medium Size Enterprises: An Application in Ankara

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Abstract

A great deal of efficiency and productivity increase has been achieved in the production process through the use of information and communication technologies (ICTs) in recent years. These developments have created remarkable opportunities for the small and medium size enterprises (SMEs) whose advertising and marketing budgets are relatively limited.

A comprehensive survey and interviews are carried out with a sample of SMEs in OSTIM and Sincan Industrial Districts in Ankara in order to find out the present use of e-commerce in the SMEs, its perceived advantages, potential problems and the future expectations.

The ordered logit models are estimated to investigate the factors affecting the use of e-commerce in the firms, potential advantages of e-commerce use and the main obstacles in implementing the ICTs.

The results reveal that the firms are aware of the fact that e-commerce would increase the speed of business, lower the cost of production, give competitive advantage, enable to reach the customers easily and expand the markets and that B2B and B2C e-commerce and the use of ICTs are more common in relatively bigger firms (in terms of capital, sales revenue and employment).

The main reasons why the SMEs are not able to use ICTs are found as the lack of information and specialized personnel, security and legal framework.

Introduction

A great deal of efficiency and productivity increase has been achieved in the production process through the use of information and communication technologies (ICTs) in recent years. These developments have created remarkable opportunities for the small and medium size enterprises (SMEs) whose advertising and marketing budgets are relatively limited. Implementation of e-commerce by the SMEs, the most dynamic components of an economy, is expected to have significant impacts on the future of the country.

Invention of Internet probably one of the most important developments in the history of mankind. When the project called ARPANET which was designed as a defense system was opened to the civil use after the end of cold war, many changes has happened in the relations between citizen-to-citizen, citizen-to-government, citizen-to-business and business-to-business.

Internet covers almost all communication tools such as fax, telephone and TV, it is interactive, it removes the geographical barriers, it enables economic transactions as well as cultural and social relations in only seconds. Such a rapidly developing technology will make the world smaller in the information age. A remarkable increase has been achieved in efficiency and productivity in many areas by means of the ICTs.

From 2000, fiber-optics with 160 channels were able to transmit 1.6 trillion byte information. By this way, the whole American Library which contains 110 million documents can be transferred to somewhere else within 14 seconds (Schiesel, 1999)

Business life has also benefited significantly from the Internet technologies. Almost all commercial activities (except delivery) to sell or purchase a product can be done via Internet: Orders, advertising, marketing, payment, follow up of delivery and so on. This new type of trade is called as *e-commerce*.

ICTs has brought remarkable advantages particularly for the SMEs. It has become possible for the SME's to compete with the giant competitors at least in the cyber-world

Internet in Turkey

The use of Internet started in the universities in 1980s as a part of European Academic and Research Network (EARN), however, Internet service providers started in 1992. There were 600.000 pc with Internet connection in 1999, it has reached to 5.5 million pc in 2003. Business-to-Business (B2B) and Business-to-Customer (B2C) commerce have started in 1997, but spread after 2001. The pioneers of B2C e-commerce are Migros and TEBA. The supermarket chain Migros started cyber market in 1997, while TEBA has sold electronic kitchen equipments (Arıcı, 2000:26). In 2002 9,2 % of the firms use B2B and 8.7% of the firms use B2C commerce (Bilişim, 2002:65). E-commerce activities are still low when compared to the Europe. It is widely used in banking and financial sectors, travel and tourism sectors and now in goods markets. Table 1 presents some figures about the use of computers and Internet in Turkey.

The most comprehensive surveys on the use of Internet in business in Turkey are done by Turkish Institute of Statistics in 2005 and KOSGEB in 2005. 68% of SMEs are connected to Internet, 37 % have web site and 7% does e-commerce (TUIK, 2005, KOSGEB 2006).

Table 1: Use of information technologies in Turkey

	1995	2001
Telephone lines (unit per 100 people)	211	295
Mobile phones (unit per 1000 people)	7	302
Personal computer (unit per 1000 people)	14,7	40,7
Internet users (1000 people)	50	2.500
Expenditures of ICTs (million $)	2777	9.333
Share in GDP (%)	1, 6	3, 6

Source: OECD, 2004

Turkey has recorded a significant increase in the use of ICT's and Internet, it is still low when compared to the EU, USA, Japan and OECD. Table 2 shows a comparison of basic figures.

Table 2: Information and communication technologies

	Turkey	EU	USA	Japan	OECD
Internet access per 100 people (2001)	27,55	44,33	53,03	40,09	45,58
Internet channels per 100 people (2001)	27,5	58,9	62,5	58,4	54,5
Mobile subscribers per 100 people (2001)	26,8	74,3	49,1	58,8	8,9
Broad band subscribers per 100 people (2003)	0,06	4,95	8,25	8,6	6,05
Telecom investment per capita (US$ 2001)	42	129,67	330	190,04	109,23
Public telephone investment per access channels (US$, 2001)	152	212,68	493,97	331,94	310,61
PC per 100 people (2001)	2,65	27,5	81,77	38,79	39,48
Internet users over fixed service providers per 100 people (2001)	5	16,8	27,2	18,9	13,7

Source: OECD, 2004

Use of Information Technologies In Small And Medium Size Enterprises

The coverage of Internet use in businesses change from simply having a website to using ICTs in all production process. In order to exploit the potential benefits of ICTs, the companies should have good management organization, technical capacity and innovative skills. The United Nations e-commerce report draws attention to particularly three issues in using Internet in businesses:

1. Broad band Internet access should be expanded to cover rural areas.

2. Legal and regulatory framework should be settled to proceed to e-businesses.

3. If we want the SMEs to use Internet not only for mail and research but also for an integrated e-business, additional investment should be done and e-business strategies should be developed (UN, 2004:XXIV).

A statistical survey in the UK reveals that half of the big firms, 20% of the medium size firms (50–249 employees) and 8% of small size firms use e-business systems (Goodridge and Clayton, 2004). Another research on 2000 firms in Canada finds that e-business increases remarkable productivity, increases revenues by 7%, decreases sales and management costs by 7,5% and decreases general costs by 9,5 % (CeBI, 2002).

Data and Methodology

There are 4074 small and medium size enterprises in Ankara and total employment is 57414 in 2005. A comprehensive survey is carried out with a sample of SMEs in OSTIM and Sincan Industrial Districts in Ankara in order to find out the present use of e-commerce in the SMEs, its perceived advantages, potential problems and the future expectations. A questionnaire with 21 questions is designed for that purpose. 250 of them are filled by face-to-face interviews and 50 questionnaires are filled by electronic survey on the Internet.

Empirical Analyses

Initially, the data obtained are analyzed by correlations and cross tabulations. Then ordered logit models are estimated to investigate the factors affecting the use of e-commerce in the firms, potential advantages of e-commerce use and the main obstacles in implementing the ICTs.

Descriptive statistics

Before testing the hypotheses, Table 3 present information about the respondents. About 90 % of the respondents are secondary and high school graduates. 36 % of the firms employ between 50 to 100 people. Sectoral composition of the firms are varied thus 60 % of the firms indicated as the other sectors than the listed.

Table 3: Descriptive statistics about the respondents

	Factors	**Numbers**	%
Education levels	Primary school	4	1,3
	Secondary school	125	41,7
	High school	146	48,7
	University	18	6,0
	Graduate	7	2,3
	TOTAL	**300**	**100,0**
Number of employees	1-9	84	28,0
	10-24	40	13,3
	25-49	65	21,7
	50-99	108	36,0
	100 +	3	1,0
	TOTAL	**300**	**100,0**
Sectors	Textiles	24	8,0
	Furnitures	34	11,3
	Industrial products	50	16,7
	Food	13	4,3
	Others	179	59,7
	TOTAL	**300**	**100,0**
Average age of the employees	18-25	27	9,0
	26-35	231	77,0
	36-40	32	10,7
	41-50	10	3,3
	TOTAL	**300**	**100,0**
Annual sales revenues (YTL)	Less than 20.000	16	5,3
	20.000-50.000	63	21,0
	51.000-100.000	21	7,0
	100.000-250.000	31	10,3
	More than 250.000	169	56,3
	TOTAL	**300**	**100,0**

77 % of the employees are the age of between 26-35 years. Finally annual sales revenues are 250.000 YTL for 56 percent of the companies. One of the critical questions asked to the firms is whether they use e-commerce in their businesses. More than half of the sample use e-commerce as indicated in Table 4.

Table 4: Use of e-commerce

	Frequency	%
Yes	156	52,0
No	144	48,0
TOTAL	300	100,0

In addition to the descriptive question about the respondents, 21 questions are asked in five points scale of Lickert type as:

Fully agree : 1
Agree : 2
Non decided : 3
Disagree : 4
Fully disagree : 5

The answers and their averages are shown in Table 5. As can bee seen from the table, many of the managers agree with the advantages of e-commerce such as speeding up the commercial transactions, lowering costs, facilitating to reach to the customers, expanding the markets. They are worried about the security and legal framework. Moreover, lack of government support and skilled personnel are specified as the other barriers to do e-commerce.

Table 5: Dependent variables (answers) for e-commerce user companies

	1	**2**	**3**	**4**	**5**	Average
1-We have retail / wholesale sales over Internet	33	20	80	13	11	2,6752
2-We use Internet in business with our agents	38	112	4	2	1	1,8280
3-E-commerce is the trade model of the future	119	28	5	0	5	1,3694
4-E-commerce speeds up the commercial transactions	115	27	2	6	7	1,4904
5-E-commerce enables to reach to customer with lower cost	99	32	5	10	11	1,7389
6-E-commerce facilitates to reach the potential customers	39	101	4	6	7	1,9873
7-E-commerce facilitates to reach world markets by lowering costs	37	102	6	4	8	2,0064
8-E-commerce expands the market and solves marketing problem	41	91	9	11	5	2,0318
9-E-commerce gives a competitive advantage to my firm	114	17	8	9	9	1,6115
10-Having a website in Internet makes the firms' image stronger in the market	122	18	2	9	6	1,4650
11-Internet is necessary for R and D	126	14	4	5	8	1,4395
12- My company will be more dependent on e-commerce in the next 5 years	29	93	21	9	5	2,1592
13-We can decide to invest on e-commerce after seeing successful examples	39	26	79	6	7	2,4650
14-E-commerce is not secure	10	22	23	94	9	3,4430
15- Government's support e-commerce is not sufficient	22	105	14	9	8	2,2152
16-There is no sufficient legal framework for e-commerce	23	105	15	12	3	2,1582
17-We have lack of information and personnel for e-commerce	26	103	5	13	11	2,2405

Several questions are asked for those companies who do not use e-commerce about the causes, as presented in Table 6. Financial difficulties and inappropriateness of the products for the Internet sales are stated as main reasons why they do not have e-commerce. However, they all agree that they will use it in the near future.

Table 6: Dependent variables (answers) for non-e-commerce users

	1	**2**	**3**	**4**	**5**	Average
18-We do not use e-commerce due to financial problems	34	48	10	27	23	2,6972
19-We do not use e-commerce because our products are not appropriate for Internet sales	60	18	29	18	17	2,3944
20- We want to have a web site in the future	98	25	7	3	9	1,5915
21- We will connect to the Internet soon	111	18	6	1	6	1,4014

Test of hypotheses through correlations and cross-tabulations

Several hypotheses related to the use of e-commerce will be tested by cross-tabulations and bilateral correlations. Some noticeable results are reported in Tables 7 to 12.

Hypothesis 1: Use of e-commerce becomes more common as the firm gets bigger (in terms of no of employees)

Table 7: Use of e-commerce and company size (in terms of number of employees)

Use of e-commerce	No of employees in the firm					Total
	1-9	**10-24**	**25-49**	**50-99**	**100+**	**1-9**
Yes	27	19	24	85	2	157
%	17,2	12,1	15,3	54,1	1,3	100,0
No	57	21	41	23	1	143
%	39,9	14,7	28,7	16,1	,7	100,0
Total	84	40	65	108	3	300
%	28,0	13,3	21,7	36,0	1,0	100,0

$\chi 2=50.643$ d.f.=4 $\chi 2$ (table) =9.49 $P<0.05$

Cross-tab test ($\chi 2$ being greater than the table value) indicates that there is a positive relationship between the use of e-commerce and firm size. Both parametric and non-parametric correlation tests supports that conclusion:

Pearson Correlation: -0,342**
Kendall's tau_b: -0,330**
Spearman's rho: -0,360**

Hypothesis 2: Use of e-commerce becomes more common as the firm gets bigger (in terms of sales revenue)

Table 8: Use of e-commerce and company size (in terms of sales revenues)

	Annual sales revenue of the firm (YTL)					
Use of e-commerce	<20.000	20.000-50.000	51.000-100.000	100.000-250.000	>250.000	Total
Yes	5	16	7	8	121	157
%	3,2	10,2	4,5	5,1	77,1	100,0
No	11	47	14	23	48	143
%	7,7	32,9	9,8	16,1	33,6	100,0
Total	16	63	21	31	169	300
%	5,3	21,0	7,0	10,3	56,3	100,0

$\chi 2$=58.101 d.f.= 4 $\chi 2$ (table) =9.49 P<0.05

According to the result of the test, the possibility of using e-commerce is higher as the sales revenue increases. Further support comes from the correlation tests below:

Pearson Correlation: -0,380**
Kendall's tau_b: -0,384**
Spearman's rho: -0,412**

Hypothesis 3: Use of e-commerce (B2C) becomes more common as the firm gets bigger (in terms of sales revenue)

Table 9: Use of B2C e-commerce and the firm size (annual sales)

	Annual sales (YTL)				Total	
Use of B2C	Less than 20.000	20.000-50.000	51.000-100.000	100.000-250.000	More than 250.000	
Fully agree	2	4	2	4	21	33
%	6,1	12,1	6,1	12,1	63,6	100,0
Agree	0	2	3	3	12	20
%	,0	10,0	15,0	15,0	60,0	100,0
Non decided	0	0	0	0	80	80
%	,0	,0	,0	,0	100,0	100,0
Disagree	1	10	1	0	1	13
%	7,7	76,9	7,7	,0	7,7	100,0
Fully disagree	2	0	1	1	7	11
%	18,2	,0	9,1	9,1	63,6	100,0
Total	5	16	7	8	121	157
	3,2%	10,2%	4,5%	5,1%	77,1%	100,0%

$\chi 2$=58.101 d.f. = 16 $\chi 2_t$ =26.30 P<0.05

The hypothesis 3 cannot be rejected at 5% level as the $\chi 2$ value is greater than the critical value. That is, bigger companies are more inclined to use B2C commerce. The correlation tests provides additional support to that argument as stated below:

Pearson Correlation: 0,423**

Kendall's tau_b: 0,407**

Spearman's rho: 0,455**

Hypothesis 4: Use of B2B e-commerce becomes more common as the education level of the employees gets higher

Table 10: Use of B2B e-commerce and the education level of employees

Use of B2B	**Average education level of the employees**				Total
	Secondary	High school	University	Graduate	
Fully agree	3	26	7	2	38
%	7,9	68,4	18,4	5,3	100,0
Agree	56	51	5	0	112
%	50,0	45,5	4,5	,0	100,0
Non decided	1	0	0	3	4
%	25,0	,0	,0	75,0	100,0
Disagree	0	0	0	2	2
%	,0	,0	,0	100,0	100,0
Full disagree	0	1	0	0	1
%	,0	100,0	,0	,0	100,0
Total	60	78	12	7	157
%	38,2	49,7	7,6	4,5	100,0

$\chi 2=119.789$ d.f. =12 $\chi 2_t = 21.00$ $P<0.05$

The test indicates that there is a positive relationship between the level of education of the employees and the business-to-business e-commerce use by the firms. Nonparametric tests supports that result.

Pearson Correlation : -0,012
Kendall's tau_b: -0,230**
Spearman's rho: -0,234**

Hypothesis 5: Relatively bigger firms (in terms of sales revenue) agree that use of e-commerce speeds up the transactions

Table 11: Use of e-commerce and the speed of commercial transactions

E-commerce speeds up transactions	Annual sales (YTL)					Total
	Less than 20.000	20.000-50.000	51.000-100.000	100.000-250.000	More than 250.000	
Fully agree	4	3	3	4	101	115
%	3,5	2,6	2,6	3,5	87,8	100,0
Agree	1	10	0	2	14	27
%	3,7	37,0	,0	7,4	51,9	100,0
Not decided	0	0	0	1	1	2
%	,0	,0	,0	50,0	50,0	100,0
Disagree	0	2	1	0	3	6
%	,0	33,3	16,7	,0	50,0	100,0
Fully disagree	0	1	3	1	2	7
%	,0	14,3	42,9	14,3	28,6	100,0
Total	5	16	7	8	121	157
%	3,2	10,2	4,5	5,1	77,1	100,0

$\chi 2$=74,021 d.f.=16 $\chi 2_t$ =26.30 P<0.05

The hypothesis cannot be rejected, supporting the argument that bigger firms agree that use of e-commerce increases the speed of economic transactions. Bilateral correlation tests supports that view as well.

Pearson v-correlation: -0,314**
Kendall's tau_b: -0,385**
Spearman's rho: -0,482**

Hypothesis 6: Lack of legal framework makes the use of e-commerce difficult

Table 12: Use of B2C e-commerce and sufficiency of legal framework

	We use B2C e-commerce					Total
Legal framework of e-commerce is not sufficient	Fully agree	Agree	Undecided	Disagree	Fully disagree	
Fully agree	13	3	0	1	5	22
Agree	13	11	76	2	3	105
Undecided	2	3	0	10	0	15
Disagree	4	3	2	0	3	12
Fully disagree	1	0	2	0	0	3
Total	33	20	80	13	11	157

$\chi 2=140.153$ d.f.=16 $\chi 2_t =26.30$ $P<0.05$

The users of B2C e-commerce agree with the view that the legal framework of Internet use is still not sufficient. Nonparametric tests gives further support for that view.

Kendall's tau_b: 0,167*
Spearman's rho: 0,173*

Econometric Analyses

In this section, the factors affecting the use of e-commerce by the SMEs, the potential benefits of using e-commerce in business and the main barriers to use e-commerce will be analyzed by econometric logit models. Logit and probit models are useful models for discreet dependent variable and discreet data. Logit models are preferred if the observations are skewed towards to the end or beginning (Emcee, 2002:14). As the data obtained through the survey seem to show non-normal distribution, ordered logit model is used in this study.

The first empirical analyses investigates whether the characteristics of the company have an impact on the use of e-commerce. The following ad hoc model is estimated for that purpose:

Use of e-commerce = f (No of employees, education level of employees, annual sales revenue of the firm, average age of employees).

Table 13 presents the estimation results of the model. Likelihood Ratio (LR) statistics indicates that the model is significant as a whole. While interpreting the results, the codification of the survey data should be kept in mind: 1 indicates ‘fully agree’, while 5 indicates ‘fully disagree’.

Table 13: The factors affecting the use of B2C e-commerce (Dependent variable: B2C e-commerce)

	Model 1		Model 2	
Variables	**Coefficient**	**Z-statistics**	**Coefficient**	**Z-statistics**
Education	-0.172	-0.675	---	---
No of employees	1.272**	6.441	1.309**	6.924
Sales revenue	-0.792**	-4.578	-0.817**	-4.806
Age of employees	1.036*	2.466	0.936*	2.399
Limit Points				
Limit_2	0.347	0.315	0.612	0.598
Limit_3	1.325	1.175	1.585	1.505
Limit_4	4.429	3.864	4.679	4.329
Limit_5	5.409	4.648	5.665	5.158
Diagnostic Statistics				
LR statistics	63.542		63.083	
LR prob value	0,000		0.000	
Pseudo-R^2	0,154		0.152	
N	156		156	

*p< 0.05, ** p<0.01.

The electronic commerce between the firm and the customer (B2C) is affected positively by the sales revenue of the company and education level of the employees. The implementation of e-commerce increases as the company size increases and education level of the employees rises. On the other hand, smaller firms with respect to number of employees seems to use more e-commerce probably in order to reach the markets easily. Younger people are more familiar with the Internet using, thus the companies with relatively younger employees are more inclined to use e-commerce in their businesses. Excluding the education variable, which is found to be nonsignificant statistically, from the model does not change the results as seen in Model 2.

The above model is re-estimated by changing the dependent variable as B2B e-commerce and the results are given in Table 14.

Table 14: The factors affecting the use of B2B e-commerce (Dependent variable: B2B e-commerce)

	Model 1		Model 2	
Variables	**Coefficient**	**Z-statistics**	**Coefficient**	**Z-statistics**
No of employees	0.895**	4.474	0.935**	5.058
Sales revenue	-0.200	-1.092	-0.217	-1.208
Education	-0.171	-0.543	---	---
Age of employees	1.190*	2.540	1.091*	2.561
Limit Points				
Limit_2	2.570	2.012	2.883	2.650
Limit_3	7.348	5.201	7.674	6.010
Limit_4	8.265	5.457	8.609	6.232
Limit_5	9.396	5.414	9.744	6.021
Diagnostic Statistics				
LR Statistics	35.319		35.019	
LR prob value	0.000		0.000	
Pseudo-R^2	0.147		0.146	
N	156		156	

*p< 0.05, ** p<0.01.

Sales revenue of the firm does not seem to affect e-commerce with their agents. However, the number of employees and average age have negative effects on the use of e-commerce. Smaller firms with younger employees seem to prefer to use e-commerce.

Second group of econometric analyses relates the characteristics of the firm to the perceived benefits of e-commerce. It investigates whether the perceived benefits of e-commerce vary with the characteristics of the company. The following model is estimated accordingly:

Benefits of e-commerce = f (No of employees, education level of employees, annual sales of the firm)

Table 15: Perception of e-commerce

Benefits of e-commerce	**No of employees**	**Sales revenue**	**Education**
Commercial model of future	-0,803** (-3,467)	-0,455** (-0.455)	-0.829* (-2.176)
Lower cost	-0.614** (-3.508)	-0.557** (-3.258)	0.962** (3.525)
Easier reach to customers	0.545** (3.066)	0.182 (1.093)	0.452 (1.805)
Faster trade	-0.239 (-1.281)	-0.655** (-3.699)	0.671* (2.234)
Opening to world markets	0.248 (1.367)	0.222 (1.311)	0.446 (1.762)
Expanding markets	0.321 (1.789)	0.229 (1.283)	0.512* (2.009)
Competitive advantage	-0.457* (-2.538)	-0.479* (-2.811)	0.926* 3.270
Powerful image	-0.412* (-2.219)	-0.357* (-1.945)	1.472** (4.872)
Research & development	-0.150 (-0762)	-0.579** (-3.023)	1.423** (4.702)

*p< 0.05, ** p<0.01. The figures in brackets are z-statistics

According to the results given in Table 15, as the firm size increases with respect to both number of employees and annual sales revenue, e-commerce is perceived to be the trade model of future. Education level of the employees influences that perception positively. Relatively bigger companies think that use of e-commerce would lower the costs, speeds up the commercial activities, gives competitive advantage and provides a powerful image for the firm. On the other hand, the perception of the potential benefits such as expanding the markets, opening up to the world markets, supporting R & D facilities do not seem to be affected by the characteristics of the firms.

The last group of empirical analyses focuses on the barriers to use of e-commerce. The literature as well the face-to-face interviews in the field expose several problems in using e-commerce in businesses, including the lack of sufficient legal framework, specialized personnel and information, government guidance and finding trade in cyber world insecure. The following model is estimated in order to examine whether these specified problems are valid for our sample of firms:

e-commerce = f (security, government support, legal framework , knowledge and specialized personnel)

Again two models are estimated with two dependent variables: B2B commerce and B2C commerce. The results are presented in Table 16 and 17.

Table 17: Barriers to e-commerce (Dependent variable: B2B e-commerce)

Potential barriers	**Coefficient**	**z-statistics**
Security	1,004**	4,502
Government support	0.052	0.152
Legal framework	1.323**	3.204
Knowledge and specialized personnel	0.500*	1.849
LR statistics	56.864	
LR prob value	0.000	
Pseudo R^2	0.237	
n	156	

*p< 0.05, ** p<0.01.

Positive and significant coefficients indicate that lack of security, proper legal framework, knowledge and skilled personnel are main impediments to use e-commerce for many businesses. However, the lack of government support does not seem to be taken as a barrier to use e-commerce. The analysis is repeated by changing the dependent variable to B2C commerce to see if trade between the firm and the agents is influenced by these barriers. The estimation results are presented in Table 18. The results are almost the same with the previous estimations.

Table 18: Barriers to e-commerce (Dependent variable: B2C e-commerce)

Potential barriers	**Coefficient**	**z-statistics**
Security	0,441*	2,351
Insufficient Government support	-0.411	-1.693
Legal framework	1.003**	3.074
Knowledge and specials personnel	0.591*	2.547
LR statistics	18.314	
LR prob value	0.000	
Pseudo R^2	0.044	
n	156	

*p< 0,05, ** p<0,01.

Conclusion

Firms are aware of the fact that e-commerce would increase the speed of business, lower the cost of production, give competitive advantage, enable to reach the customers easily and expand the markets. Particularly small and medium size enterprises have to adopt changing information and communication technologies rapidly in order to exploit these benefits and become competitive in globalizing world markets..

B2B and B2C e-commerce and the use of ICTs are more common in relatively bigger firms in terms of capital, sales revenue and employment. The main reasons why the SMEs are not able to use ICTs are found as the lack of information and specialized personnel, security and legal framework.

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Similarities and Differences of The 1994 and 2001 Turkish Currency Crises: A Signal Approach

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Abstract

The paper will examine the 1994 and 2001 Turkish currency crises by using early warning system which is based on the "signal" approach proposed by Kaminsky, Lizondo and Reinhart (KLR) (1998). The "signal" approach is a non-parametric approach. In this approach, the behavior of a number of individual variables is monitored and they are evaluated against a certain threshold levels. If any of these indicator exceeds its threshold, it is said that indicator issues a "signal" that a currency crisis may occur within a given period.

The objectives of this paper are two folds: to investigate causes of currency crises under consideration and to compare similarities and differences of the 1994 and 2001 currency crises. The data consist of monthly data and range from January 1987 to November 2005 for the following variables: reserves, inflation rate, GDP growth, portfolio capital inflow to reserves, short term external debt to reserves, domestic debt, money supply to reserves, current account to GDP, real exchange rate overvaluation, regional stock market return, regional market pressure index, stock market index, export and import.

Results showed that 2001 crisis is deeper and costlier than 1994 crisis, external factors play more imported role in 2001 crisis than 1994 crisis and in both crises Weighted Composite Index increases sharply previous the both crises.

Introduction

Turkey experiences two major currency crises in the post stabilization and liberalization period. After the April 1994 currency crisis, the Turkish economy once again found itself more severe and persistent currency crises in February 2001. The effect of the 1994 and 2001 currency crises on the Turkish economy were extremely costly. In 1994 and 2001, GDP (unemployment) decreased (increased) 4 % (7%) and 9 % (12%), respectively[1].

Even though there are a great deal of studies related to the 1994 and 2001 Turkish currency crises, most of them investigate each crises separately[2]. Therefore, those studies can not reach a general conclusion about causes of the 1994 and 2001 currency crises and can not compare the similarities and the differences of the 1994 and 2001 currency crises. To fill up this gap, it is worth to study the causes of the 1994 and 2001 currency crises and try to show similarities and differences of both currency crises.

The paper will examine the 1994 and 2001 currency crises by using early warning system which is based on the "signal" approach proposed by Kaminsky, Lizondo and Reinhart (1998). The "signal" approach is a non-parametric approach. In this approach, the behavior of a number of individual variables is monitored and they are evaluated against a certain threshold levels. If any of these indicator exceeds its threshold, it is said that indicator issues a "signal" that a currency crisis may occur within a given period.

The paper is organized as follows. In section 2, we provide a brief literature review about financial crises models. In section 3, we introduce "signal approach", data and variables. In section 4, we represent our results from "signal approach" model. Section 5 is conclusion.

Financial Crises Models

There are mainly two approaches in the literature to explain the determinants of currency crises. The first-generation model was developed by Krugman (1979) and extended by Flood and Garber (1984) in response to currency crises in developing countries in the 1980s. According to the first-generation currency crises model, expansionary fiscal and monetary policies are inconsistent with fixed exchange rate policies. When the fiscal deficit is financed by expansion of domestic credit, reserves decrease to defend the fixed exchange rate and significant loss of reserves forces the authorities either to devalue or float the domestic currency.

Second-generation models are due to Obstfeld (1986) and later extended by him (1994, 1996) to respond to currency crises when the fundamentals of an economy were sound, as in the 1990s. According to second-generation models, changes in the government's objective function change agents' expectation and trigger currency crises. In Obstfeld's (1994, 1996) model, the government favors lower unemployment and higher output: hence when the costs of defending the peg (such as higher interest rates, higher unemployment, lower growth) are more than the benefit of defending the peg (such as gaining credibility and lower inflation) the government devalues even if macroeconomic fundamentals such as foreign debt, budget deficit, reserves etc are sound.

[1] T.C.M.B.

2 Yeni Türkiye Dergisi (2001), Kriz özel sayısı 41 and Ekonomik Kriz Oncesi Erken Uyari Sistemleri (2006).

There are mainly two alternative methods to predict to currency crises. First one is limited dependent variables estimation which using logit or probit model to predict financial crises. Due to the failure of the limited dependent variables estimation method to predict the currency crisis, Kaminsky, Lizondo and Reinhart (KLR) came out a new approach in 1998, which is called "Signal Approach". In signal approach, each variable are monitored separately from each other and the deviation of the variable exceeds a certain "threshold" value before crises give us an early warning signal about a possible currency crisis within a specific period of time.

Signal approach has some advantages. First, if variables have sharp changes between crisis and tranquility periods, signal approach may predict crises better. Second, indicators can be ranked according to noise-to signal ratio, which ability of indicator to predict crises and avoid false signals.

KLR (1998) surveyed a large number of empirical studies to identify the most important indicators. Their survey covered 76 currency crises and included 15 developing and 5 developed countries during 1970-1995. Out of more than 100 indicators, they founded following (real exchange rate, real interest rate, imports, M2 multiplier, output, bank deposits, "excess" M1 balances, exports, terms of trade, international reserves, stock prices, real interest rate differential, M2/international reserves, lending rate/deposit rate and domestic credit/GDP) 15 indicators most important. In their empirical work for signal approach, they found that the best indicators of currency crises based on noise-to signal ratios are real exchange rate, export, stock prices and M2/ international reserves.

Ucer, Van Rijckeghem and Yolalan (1998) applied KLR's signal approach in to the April 1994 Turkish currency crisis. In their empirical work, first, they duplicated KLR's work for Turkey during the fourth quarter of 1989 to fourth quarter of 1997, with exception of the real interest rate differential, lending rate/deposit rate and bank deposits. Second, they examined seven additional variables (export/import, short-term advances to the treasury/GDP, short-term external debt/GNP, (reserves/M2Y), domestic government debt stock, domestic government debt maturity, government deficit/GDP and short-term advances to the treasury/GDP). In their finding, KLR variables performed very poor to predict the 1994 Turkish crisis. Out of the 12 KLR variables only excess M1 variables signaled two times, export, M2/reserves and stock prices variables signaled one time and seven variables did not signal. Additional variables performed well compared to KLR variables. Export/import, (reserves/M2Y),domestic government debt stock and short-term advances to the treasury/GDP variables signaled two times, short-term advances to the treasury/GDP variable signaled one time and short-term external debt/GNP signaled three times.

Studies related to 1994 and 2001 Turkish currency crises showed that exchange rate overvaluation, current account deficit, capital outflow, increase in external debt and money supply were main indicators of currency crises[3].

[3] C. Gerni, Ö. S. Emsen, M. K. Değer (2006), M. Alagöz, N. Işık, G. Delice (2006), M. Doğanlar (2006), and S. Değirmen, A. Şengönül, I. Tuncer (2006).

Signal Approach

In this study, we uses the "signal" approach model proposed by KLR (1998) to compare similarities and differences of the 1994 and 2001 currency crises.

Signaling Horizon and Threshold Level

To make the signal approach model operational we need to define a signaling horizon and a threshold level. The signaling horizon or crises window can be defined as the period within or time interval over which crises would be anticipated by indicators. We use 12 months crises window for currency crises. The threshold level is chosen to minimize the "noise-to-signal" (bad signal to good signal) ratio. We will use following matrix to measure the "noise to signal" ratios for each indicators.

	Currency Crisis	No Currency Crisis
Indicator issues a signal	A	B
Indicator does not issue a signal	C	D

* 12 months window was selected.

Where A(t) is the number of instances in which a indicator issues a signal and a currency crisis occurred in the next 12 months (i.e. A(t) is the number of the time the indicator provides "good signal" about the occurrences of currency crisis). B(t) is the number of instances in which a indicator issues a signal and a currency crisis did not occurred in the next 12 months (i.e. B(t) is the number of the time the indicator provides "bad signal" or "noise" about the occurrence of currency crises in the next 12 months). C(t) is the number of instances in which a indicator did not issues a signal in the next 12 months when there was a currency crisis in the next 12 months (i.e. C(t) is the number of the time the indicator did not provide a good signal about the occurrence of currency crises in the next 12 months). D (t) is the number of instances in which a indicator did not issues a signal in the next 12 months when there was no currency crisis in the next 12 months (i.e. D(t) is the number of the time in which neither indicator issue a signal and crises occurred in the next 12 months). It is obvious from above matrix that the perfect predictor will produce only observations A and D.

Data Sample

The data consist of monthly data and range from January 1987 to November 2005. Most of the data are from the International Financial Statistics CD-ROM database. International Financial Corporation's Emerging Market Dataset and Morgan Stanley Countries Index provide stock market indexes. Table 1 shows selected variables and references for expected signs.

Table 1: Selected variables and expected signs

Explanatory Variables	Expected Sign	References
Stock market index	_	Kaminksy, Lizondo and Reinhart (1998), Kaminksy and Reinhart (1999)
Return of regional stock market index **(RSMI)**	-	Bilson, Brailsford and Hooper (2001)
Inflation rate	+	Fama (1981), Geske and Roll (1983), Stulz (1986)
GDP	-	Kaminksy, Lizondo and Reinhart (1998), Kaminksy and Reinhart (1999)
Reserves	-	Kaminksy, Lizondo and Reinhart (1998), Kaminksy and Reinhart (1999)
Portfolio capital inflow/Reserves	-	Bond (1999)
Export	-	Kaminksy, Lizondo and Reinhart (1998), Kaminksy and Reinhart (1999)
Import	+	Kaminksy, Lizondo and Reinhart (1998), Kaminksy and Reinhart (1999)
Real exchange rate	+	Frankel and Rose (1996)
Short term external debt / reserves	+	Sachs and Radelet (1998)
Short term domestic debt / reserves	+	Ucer and Yeldan (1998)
Ratio of money supply to reserves	+	Calvo and Mendoza (1996), Frankel and Rose (1996)
Ratio of current account to real GDP	-	Kaminksy and Reinhart (1999)
Regional market pressure index variable **(RMPI)**	+	Eichengreen, Rose and Wyplosz (1996), Fratzscher (2002)

Regional Stock Market Index provided by International Financial Corporation's Emerging Market Dataset and Morgan Stanley Countries Index. Regional Market Pressure Index constructed individual countries market pressure index. The regional market pressure index for Turkey is the average of Greece, Russia, Germany, England, France, Italy and Spai's market pressure index.

Results from Signal Approach

Results based on signal approach represented table 2 and 3. By using those two tables we can see the similarities and the differences of the 1994 and 2001 currency crises.

Table 2 reports performances of selected crises indicators for 1994 and 2001 crises. The first two columns show the number of times a signal was issued in the 12 months window preceding the indicated crises. The last two columns give aggregate information about the threshold level and noise-to-signal ratio. Based on the noise-to-signal ratio except inflation all variables appear useful because their noise-to-signal ratio is less than one. Lower noise-to-signal ratio is preferred. From table 2, we can reach following conclusions. All of the

crises indicators (except inflation for 2001) issued at least one signal prior to 1994 and 2001 crises. Prior to 1994 (2001) crises selected variables issued 27 (30) signals. Out of 14 variables import variable signaled seven times, reserves variable signaled three times and reel exchange rate, export, CA/GDP, inflation and GDP variables signaled two times prior to 1994 currency crises. Out of 14 variables import and CA/GDP variables signaled six times, RSMI variable signaled three times and portfolioInv./reserves, domestic debt, external debt, RMPI and GDP variables signaled two times prior to 2001 currency crises. Regional market pressure index, regional stock market index, CA / GDP, PortfolioInv/Reserves and external debt variables issued six signals prior to 1994 currency crisis and fifteen signals prior to 2001 currency crisis. Therefore, we can say that external factors play more imported role in 2001 crisis than 1994 crisis.

Table 3 evaluates overall performance of crises indicators 12 months prior to crises. The first two columns show the number of indicators and number of signal issued in monthly base prior currency crises. The last column shows Weighted Composite Index (I)[4]. Weighted Composite Index is total number of signal divided by noise-to signal ratio and gives aggregate information about the likelihood of upcoming crises.

Table 2: Overall Performance of Selected Variables

	Number of Signals in Preceding 12 Months		**Aggregate Information**	
	February 1994	**February 2001**	**Threshold**	**Noise-to-Signal**
Reserves	3	1	-10	0.18
Real Exchange Rate	2	1	+10	0.48
Stock Market Index	1	1	-18	0.57
Export	2	1	-10	0.86
Import	7	6	+40	0.76
Portfolio Inv./Reserves	1	2	-10	0.81
Domestic Debt	1	2	+12	0.48
External Debt	1	2	+15	0.54
M2/Reserves	1	1	+9	0.63
CA / GDP	2	6	-6	0.49
RMPI	1	2	-0.45	0.94
Inflation	2	0	+5	**1.9**
RSMI	1	3	-7	0.87
GDP	2	2	-6	0.71

[4] $I_t = \sum_{j=1}^{n} S_{jt} / W_j$ where S_{jt} is 1 if variables j issued a signal in period t, 0 otherwise and W_j is the adjusted noise-to signal ratio of each variable j.

Table 3: Selected Variables Performance Monthly Base

Summary of Prediction : 1994 Crisis				**Summary of Prediction : 2001 Crisis**			
Dates	Number of Indicator	Number of Signals	Weighted Composite Index	Dates	Number of Indicator	Number of Signals	Weighted Composite Index
Feb-1993	14	1	5.55	Feb-2000	14	1	2.04
Mar-1993	14	2	3.67	Mar-2000	14	1	2.04
Apr-1993	14	3	5.44	Apr-2000	14	2	4.05
May-1993	14	1	1.31	May-2000	14	2	3.35
Jun-1993	14	4	8.13	Jun-2000	14	2	3.50
Jul-1993	14	1	1.31	Jul-2000	14	1	1.31
Aug-1993	14	3	4.56	Aug-2000	14	2	2.47
Sep-1993	14		0.01	Sep-2000	14		0.01
Oct-1993	14	2	2.55	Oct-2000	14	4	5.95
Nov-1993	14	2	2.46	Nov-2000	14	5	11.35
Dec-1993	14	2	1.84	Dec-2000	14	3	4.98
Jan-1994	14	3	7.49	Jan-2001	14	4	7.34
Feb-1994	14	2	3.60	Feb-2001	14	3	7.85

Weighted Composite Index increases prior to both crises. Specially, started from October Weighted Composite Index higher prior to 2001 crisis than prior to 1994 crisis. Therefore, we can say that 2001 crisis is more predictable than 1994 crisis.

Table 4 shows the cost of 1994 and 2001 crises. We used three crises indicator to evaluate the cost of currency crises. For each indicator, we identified maximum level prior the crisis, minimum level, and recovery period. In 1994 currency crisis, reserves reached maximum level (17.8 Billion $) at October 1993 then reached minimum level (12.4 Billion) at May 1993 (9 months period). Finally, reserves recovery at January 1995. Recovery of reserves took 27 months. In 2001 currency crisis, reserves reached maximum level (36 Billion $) at July 2000 then reached minimum level (28 Billion) at November 2001 (11 months period). Finally, reserves recovery at October 2002. Recovery of reserves took 28 months. Recovery of SMI in 1994 (2001) crisis took 7 months (44 months). Recovery of industrial production in 1994 (2001) crisis took 19 months (34 months).

We can concluded from table 4 that 2001 crisis is deeper and costlier than 1994 crisis.

Table 4: Cost of Currency Crises

Cost of 1994 Crisis					
Indicators	Maximum	Minimum	Recovery		
Reserves	Oct. 93=17.8 B.	May 94= 12.4 B.	Jan. 95=18.2 B.	9 months	27 months
SMI	Jan. 94=241	March 94=145	Aug 94=245	5 months	7 months
Industrial. Production	Dec. 93=86	June 94= 68	July 95=88	13 months	19 months
Cost of 2001 Crisis					
Indicators	Maximum	Minimum	Recovery		
Reserves	July 2000=36 B.	Nov 01= 28.	Oct. 02=36 B.	11 months	28 months
SMI	Apr. 2000=17200	March 01=8432	Dec.03=17326	33 months	44 months
Industrial. Production	July 2000=108	Jan. 01= 91	April 03=110	27 months	34 months

Conclusion

In this study, we used signal approach to identify which variables tent to indicate that a country might be vulnerable to a financial crisis. Even if it is generally accepted that currency crises are unpredictable the results from table 2 show that all of the crises indicators (except inflation for 2001) issued at least one signal prior to 1994 and 2001 crises. Also, table 3 shows that in both crises Weighted Composite Index increases sharply. Specially, started from October Weighted Composite Index higher prior to 2001 crisis than prior to 1994 crisis. Therefore, we can conclude that both crises are predictable but 2001 crisis is more predictable than 1994 crisis.

External variables issued six signals prior to 1994 currency crisis and fifteen signals prior to 2001 currency crisis. Therefore, we can conclude that external factors play more imported role in 2001 crisis than 1994 crisis. Finally, the result from table 4 shows that 2001 crisis is deeper and costlier than 1994 crisis.

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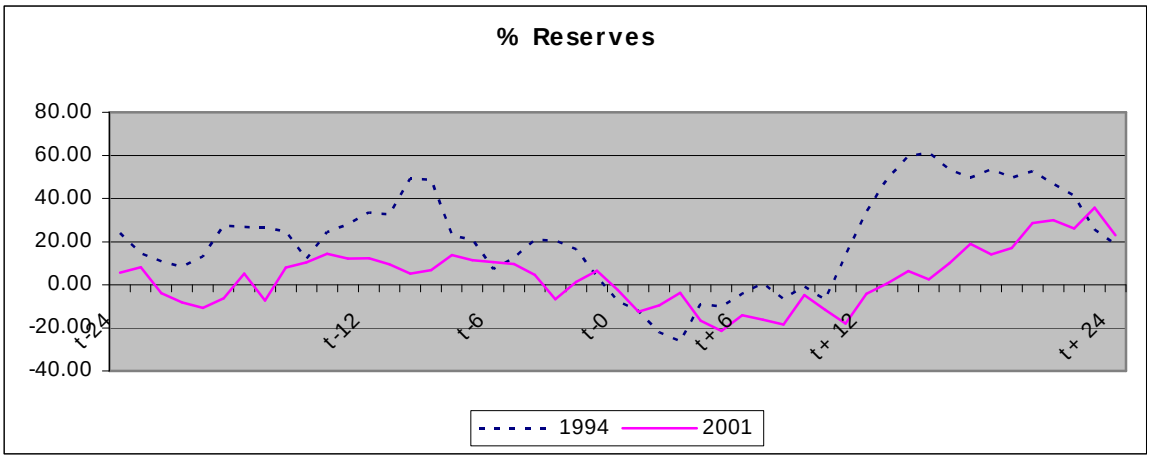
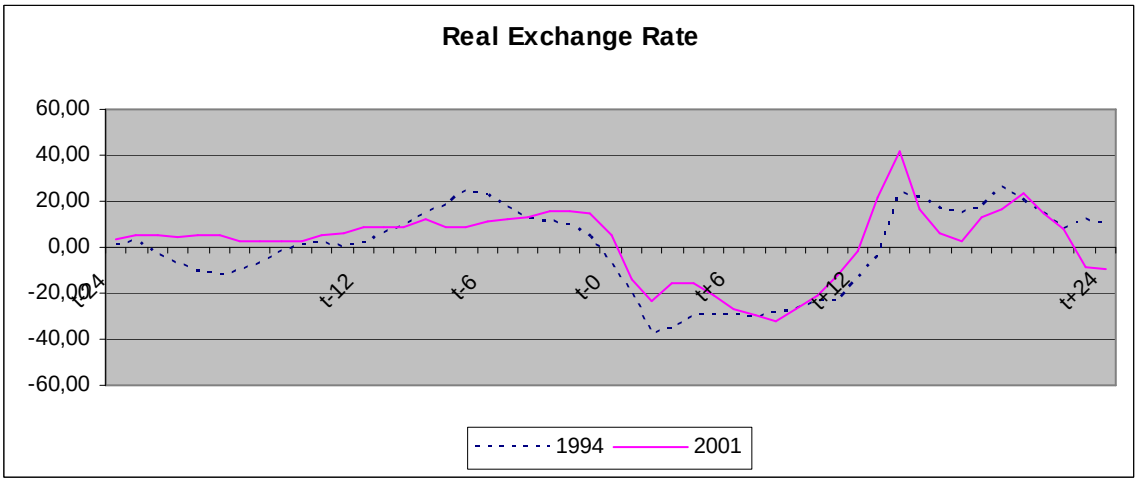
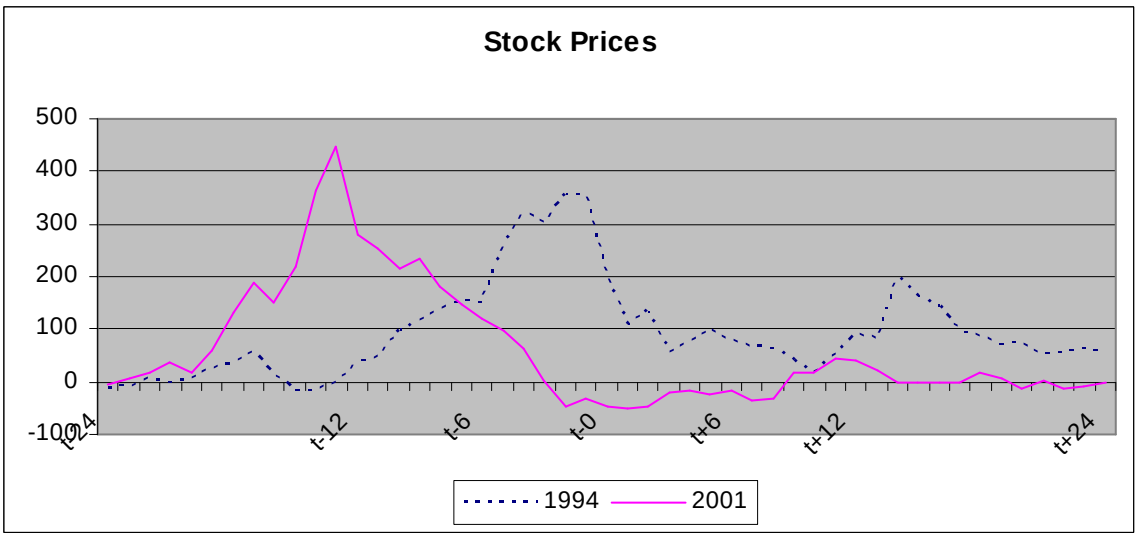
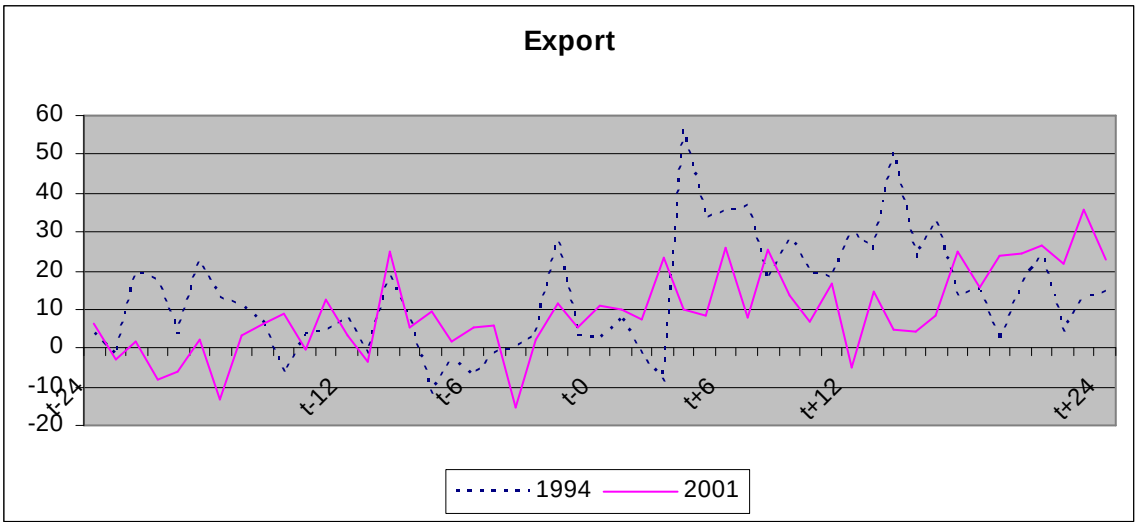
Appendices: Percentage change of selected variables 24 months prior crises.





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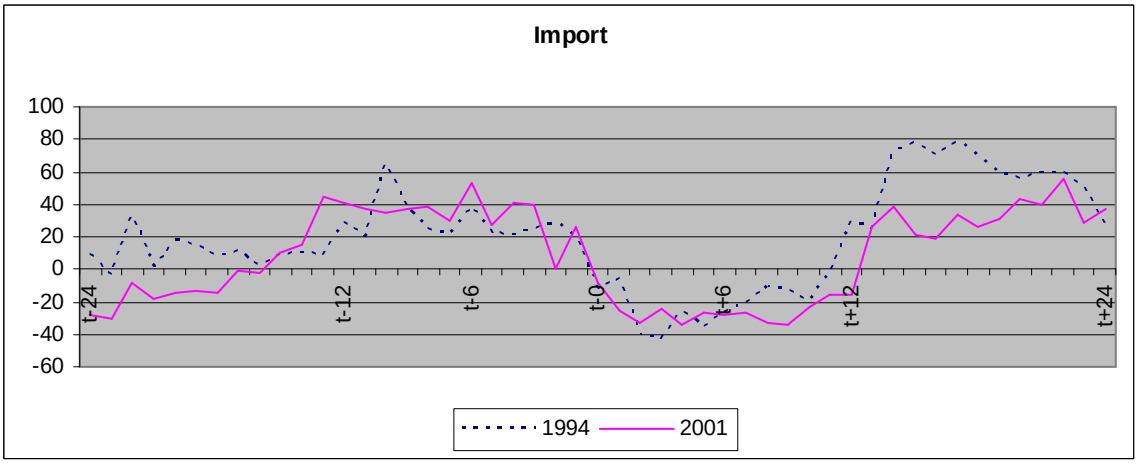
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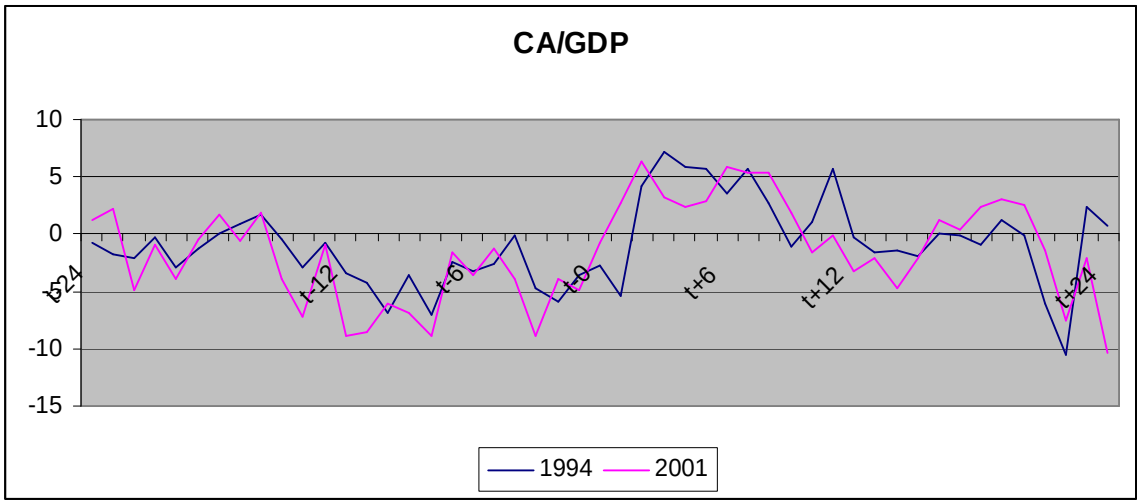
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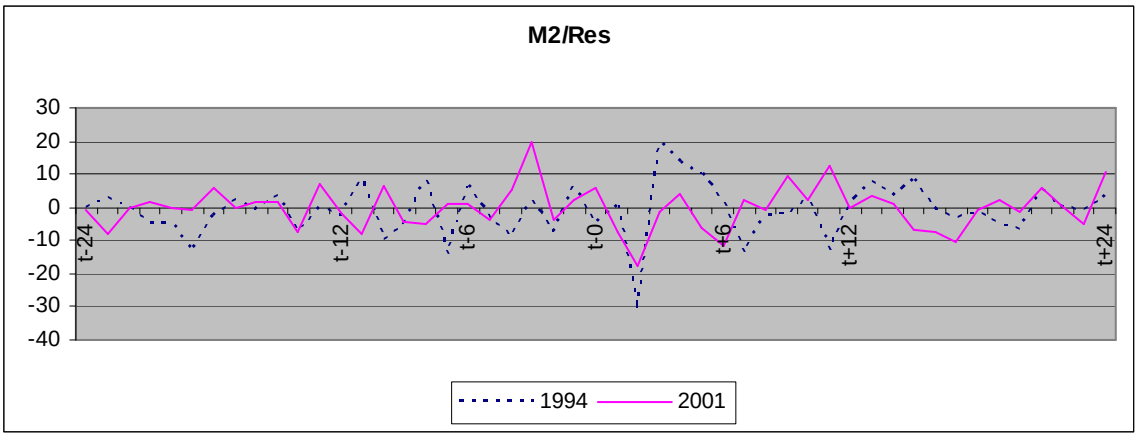
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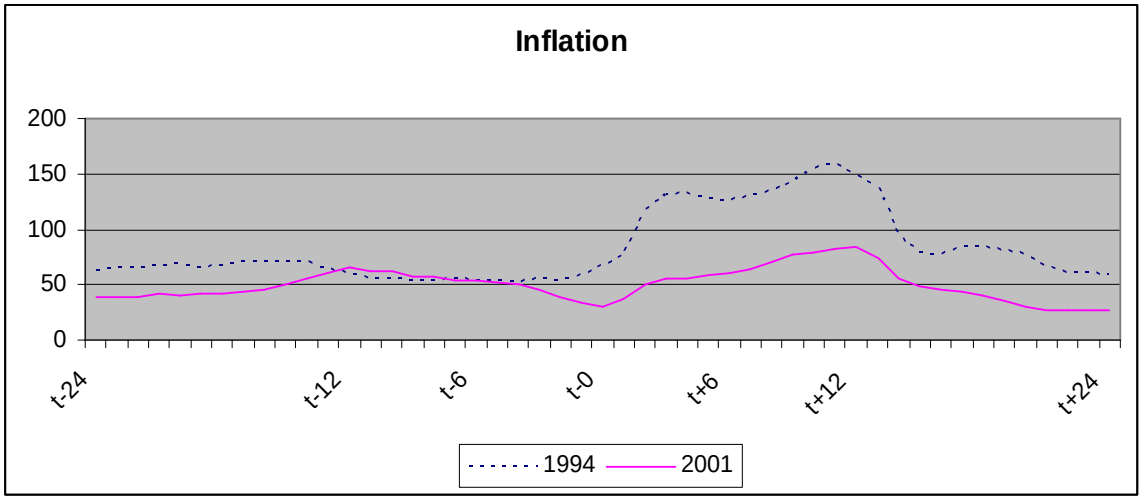
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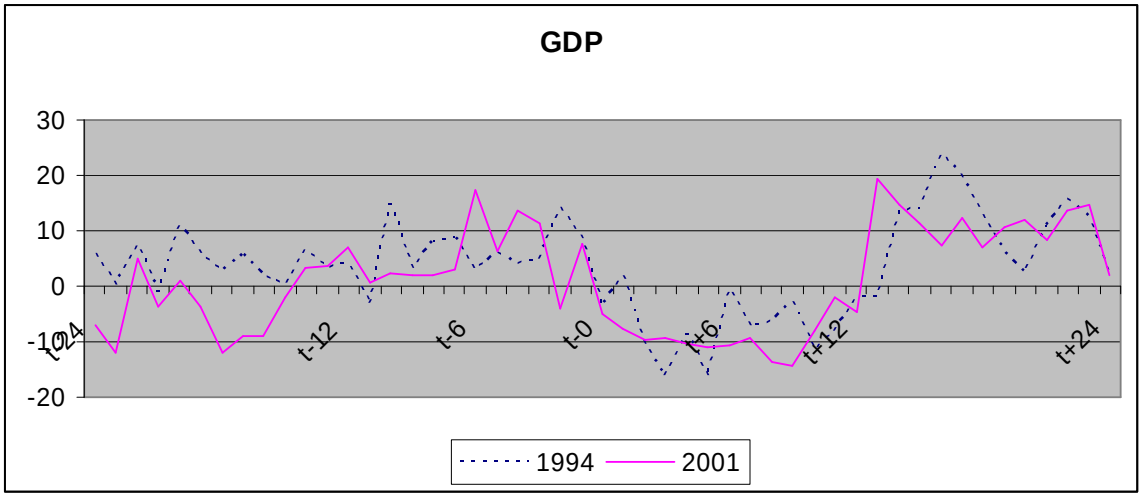
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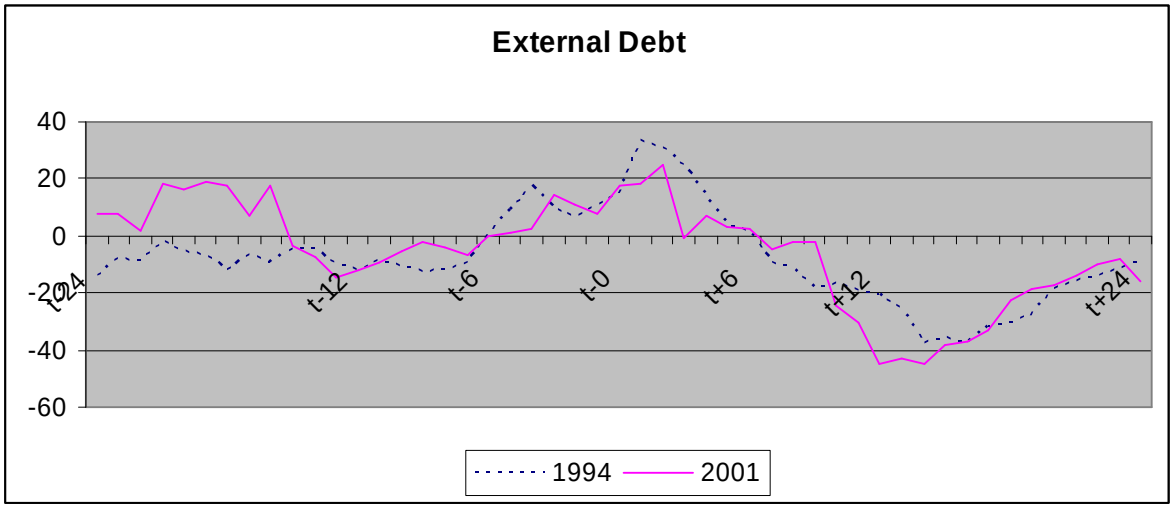
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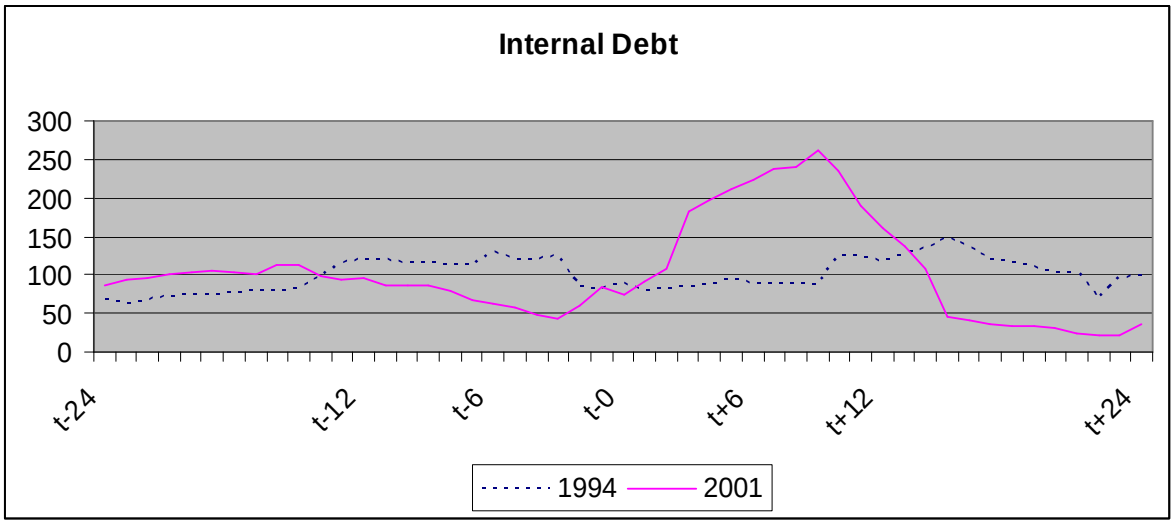
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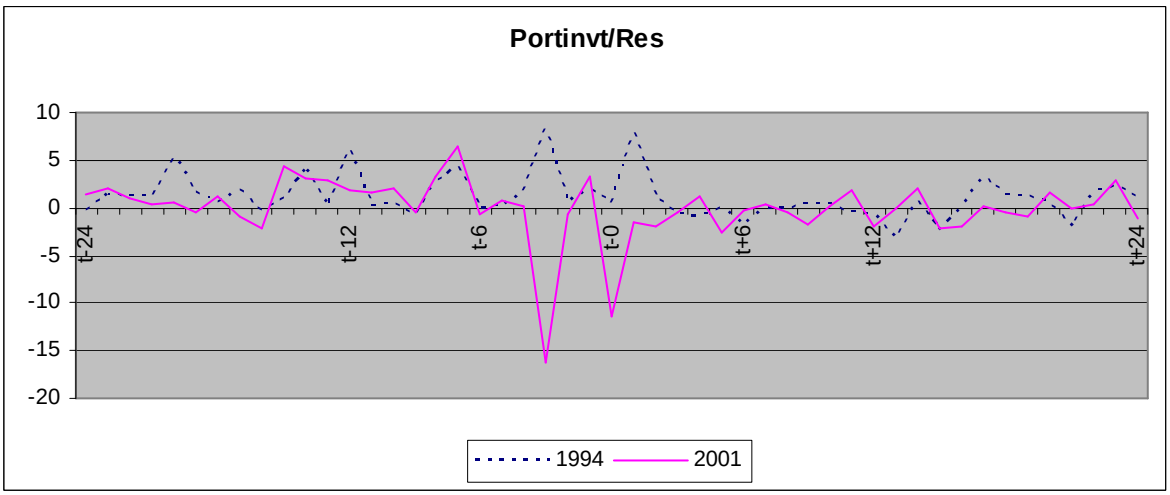
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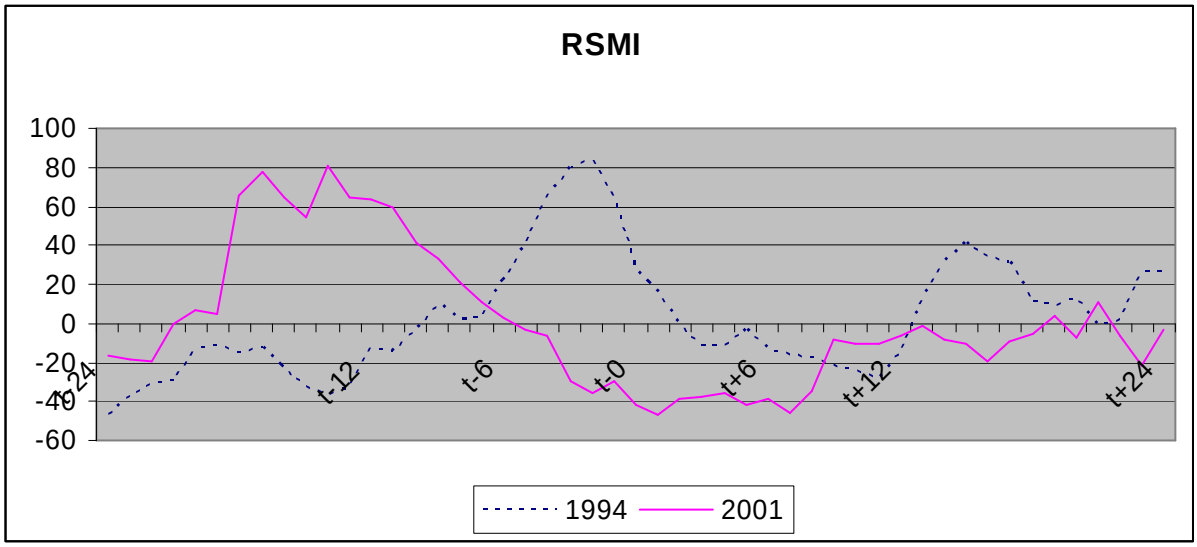
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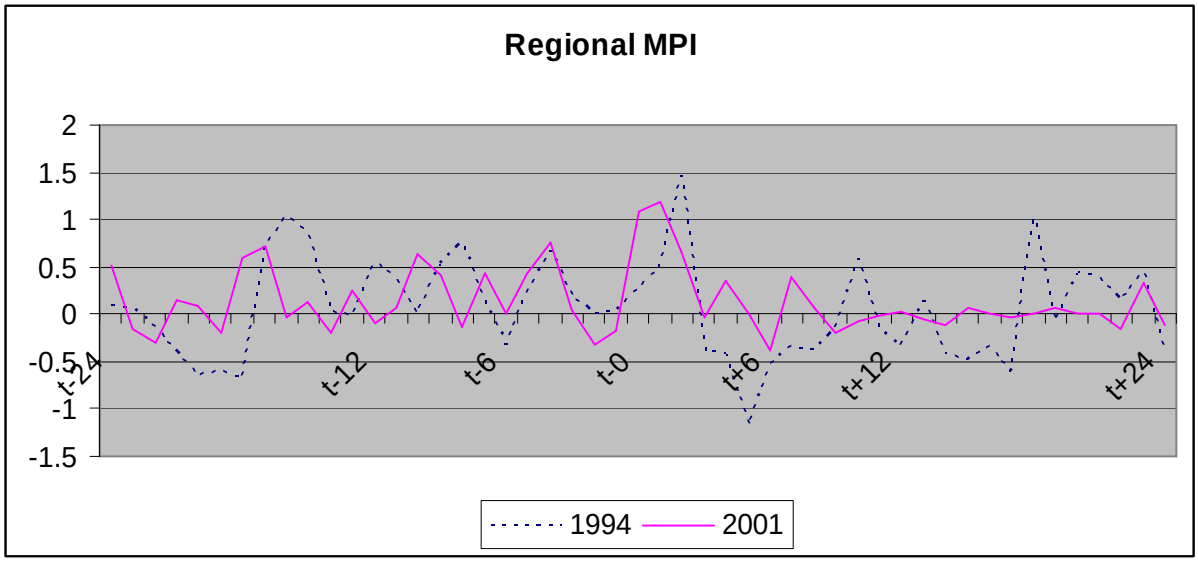
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Economic Development and Religiosity: An Investigation of Turkish Cities

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Abstract

The relationship between the degree of religiosity and economic development is empirically investigated for a cross-section of all Turkish cities with municipal authorities. It is found that economic development and the degree of religiosity have a non-linear relationship. Religiosity increases with industrialization first, however, as the industrialization increases more, the degree of religiosity decreases. Coastal towns are less religious. Mosques and schools are complements rather than substitutes as they affect each other positively. This can be interpreted as the ideological competition between religious communities and secularists.

Introduction

This paper investigates population and development elasticity of religiosity of a cross-section of all Turkish cities with municipal authorities. Villages are excluded from the sample since data are not available for them. Investigating the determinants of religiosity at the aggregate city level is not a worthless endeavor since scholars from different disciplines try to understand the sources of degree of religiosity, especially after the September 11 attacks. Religiosity of a particular city in this paper is measured by the number of mosques in total number of all buildings in that city. Only mosques are included in the analysis here since there is very small number of religious buildings related to other religions in only small number of cities in Turkey. Therefore, this is an aggregate economic analysis of mosques in the city level. It can be argued that the number of mosques themselves might not necessarily be a good measure of how religious a community is if mosques are almost always empty. Even if it is so, since mosques are built by donations of either individuals or non-governmental organizations and land is a relatively expensive factor in Turkey, mosque financiers still have a perception that society/community values the mosques more or they have the intention of making people more religious (religious propaganda or ideological competition with secularists in Turkey) if mosques are chosen among alternatives like schools, sport centers, cultural centers, etc. Therefore, it would not be wrong to have the number of mosques as a measure of religiosity. In fact, popular discussions among different political circles in Turkey often cite the number of mosques as a measure of religiosity.

This paper investigates the two elasticities mentioned in the first sentence of introduction section since there is a popular understanding in Turkey, and in many other circles in different countries in this matter, that economic development reduces the need for religious services or religiosity. The assumed link from economic development to reduced religious services, as theory suggests, is the modernization. Modern societies/communities, as opposed to traditional societies/communities, are assumed to be less religious or have more secularization (Giddens,1993; Martin,1978) even though the USA does not confirm this explanation, Verweij et al. (1997). Modernization theory states that increasing modernization leads to the process by which religion loses its social significance in human behavior (Wilson, 1982). The modernization process is characterized as development which marks the transition from agrarian or traditional economy into large scale industrial or commercial economy, Verweij et al. (1997). It is claimed that industrialization and commercialization make people more worldly (secular). Some scientist, however, discussed that modernization theory should be abandoned completely since it is simple wrong. They claim that modernization of USA does not reduce the degree of religiosity of people in that country as the church attendance rate is all time high in the 1990s as the issue is discussed in great detail in Stark and Iannaccone (1994).

This paper therefore explicitly tests this popular perception that modernization reduces the degree of religiosity of a society as the issue is not exhaustively empirically investigated, under the condition that economic development is assumed to transform the societies from traditional ones into modern ones. This paper is organized as follows. The next section reviews the related literature. Section III defines the data and gives some descriptive statistic and section IV gives the estimation results. Section V concludes the paper.

Literature Review

Studies of religion and economics are analyzed and summarized in Iannaccone (1998). It is mainly mentioned three lines of inquiry: microeconomic determinants of religious behavior, economic consequences of religion, and religious economics, which is primarily about economic policies from a religious perspective like Islamic banking and taxation as specific examples of the research. Recently, the literature about economics of religion focuses more on the first two lines. Papers about the microeconomic determinants of religious behavior use the degree of religiosity as the dependent variables and different economic variables as the independent variables (Verweij et al., 1997; Smith et al. 1998; Smith and Sawkins, 2003; McCleary and Barro, 2006; Arano and Blair, 2007; Lopez and Santos, 2008). Papers about economic consequences of religion investigate different religions and their effects on economic growth and development. This branch of the literature uses the Weber (Protestant Ethic and the Spirit of Capitalism) work as an inspiring paper (Grier, 1997; Blum and Dudley, 2001, 208; Guiso et al. 2002; Barro and McCleary, 2003; Montalvo and Reynol-Querol, 2003, 202; Noland, 2005; Cavalcanti et al. 2007,106). In addition to these '*direction of causation'* studies, recently some papers are investigating the political results of religious behaviors as MacCulloch and Pezzini (2007) states that revolutionary rise in a country can be offset by belonging to a religion which lowers the probability of revolution by between 1.8 and 2.7 percentage points. Another paper by Lehrer (2004) investigates the role of religion in union formation.

The already existing studies have the following features.

-They are mostly using different kinds of survey data sets for religiosity and other social attitudes like World Values Survey (WVS), General Social Surveys (GSS), International Social Survey Programme (ISSP), and other surveys.

-Most of them are cross-country studies.

-Most of the studies are about developed countries since data are usually unavailable for developing countries.

This paper, however, is contributing to existing literature from several dimensions: First of all, this study uses a novel data set of all existing buildings in use for all the cities (both small and large) with municipal authorities. The data set is prepared by the Turkish Statistical Institution (TSI). Secondly, this paper is about a cross-section of cities in a relatively homogeneous country, Turkey. Turkey is 99.8 % Muslim (Sunni), 0.2 % Christians, Jews, and other religions[1]. Cross-country studies about the relationships between economic growth/development and religiosity might have some problems in especially determining the effects of religion on growth since growth of different countries might be affected by other several cultural variables than religion. In addition to that, data about religiosity of different countries are including a vast array of subjectivity of surveys. Thirdly, this study is about a developing country. In addition, this study is the first study of its kind in Turkey. In fact, this data set, to the best of our knowledge, has not been used in another paper.

[1] CIA Factbooks.

Investigating the relationship between religious and other economic and social variables by the tools of economics is a relatively new topic in economics. The relationship between cultural and religious factors and economic well being or economic development is recently being paid more attention, especially after the September 11 2001 attack to Twin Towers in New York City as mentioned before in the introduction section. The main motivation of this paper is to contribute to this literature. This paper investigates the population and development elasticity of religiosity. Therefore, the size of religious services (the degree of religiosity) is assumed to be in a relation with the size of population and the level of economic development.

Population can serve two purposes to test: first, in the cities with higher population, the cost per capita of the services would be smaller if there is increasing returns to scale with respect to religious services, which mostly show public good features. As is known, public goods highly likely show the feature of increasing returns to scale as Alesina and Wacziarg (1998) showed it in a different context of public expenditures. As an example, a mosque except for Fridays, where some congestion effect reveals, is a public good since it is nonexcludable and nonrival. If this is the case, the more populated the city, the smaller the cost of religious services per capita, mainly cost of building the mosque since imams are getting paid by government but mosques are being built by nongovernmental organizations or individuals in Turkey. Second, cities with higher population are relatively culturally more heteregenous cities than the cities with smaller population. In more heteregenous cities, there would be two types of social behavior in terms of financing religious services or participation to religious services.

The first, different groups of people try to free ride, in which case, supply of services of public good per capita would be smaller if the income or wealth is distributed relatively evenly. If the income distribution is relatively bad, then this outcome would not necessarily have to be observed since some religious wealthy people alone can take the financial burden of the religious services, mainly building the mosques. As a related observation, it should be mentioned here that small towns have relatively better income distribution than big cities have in Turkey even though big cities have a higher income per capita. As a second observation, most mosques are built on land which is donated by wealthy people in Turkey. Donations by the attendees of the mosques are mostly used for maintenance of the mosques.

The second, cultural heterogeneity would make the citizens of the city more or less open minded or less or more conservative respectively. If cultural heterogeneity makes the citizens more open minded or less conservative, religious public services per capita would be smaller in more populated cities. If, on the contrary, cultural heterogeneity makes the citizens of the city less open minded or more conservative, religious public services per capita would be higher in more populated cities.

What would be the final effect of population on religious services depends on the dominating factors. Which effects would be eventually prevailing is an empirical question since theoretically all possible three types of behavior are likely to be observable.

The level of development can also affect the religiosity of societies or individuals. As the literature is reviewed briefly above, the relationship between economic and socio political developments and degree of religiosity is investigated in the literature in some detail (Mangeloja 2005, 2350; McCleary and Barro, 2006, 150; Arano and Blair, 2007;). The

direction of causality is usually one of the main concerns in most of the research in this field. One way of directions is from the development to religiosity and the other way is the reverse. Development, it is claimed in the literature reviewed above, increases industrialization and therefore secularization or decreased level of religiosity. However, this may not be the only outcome of development. Development can cause a religious market competition since different sects or denominations might have the resources to compete. This market structure and government regulation of it can affect the degree of religiosity. In short, development can also increase the degree of religiosity. This issue is entirely an empirical one. The degree of religiosity can affect the development and growth as well, the reverse causation. More religious communities, as is discussed in the literature, can develop a social trust among themselves to do better business. In other words, higher level of religiosity can increase the social capital and therefore economic growth and development. This issue is also entirely empirical one since different countries or societies can respond this relationship differently. Therefore, there is a huge need for more empirical studies for different societies or countries.

Data and Descriptive Statistics

The domain of the empirical study is the cross section of the Turkish cities. Provinces (il), towns (ilce), and small towns (belde) are used in the study. There are 81 provinces, 850 towns, and 2267 small towns in Turkey. Villages are excluded from the study due to non availability of the data.

In terms of the variables in the empirical models here, first type of public good is the number of mosques in total building. That is, mosques and mescits, smaller and easy-built (sometimes an apartment can be used as a mescit) versions of mosques. There is some small number of churches in some of the major cities. However, their statistical effects are ignorable since almost all of the religious buildings are mosques or mescits. The second type of public goods is the number of buildings for educational and cultural use in total number of all buildings. These different buildings and their use are defined below. Aggregate wealth per capita of the city is proxied by total number of all buildings per person. The building classification in Table 1 below is using international classification of buildings.

Table 1: Descriptive Statistics

		Pop.	Res.	Com.	Ind.	Educul.	Health	Gov.	Rel.	Agri.	total
Provinces	mean	255954.26	25308.98	2133.18	868.16	112.03	70.58	140.66	83.64	92.01	32223.94
	std	453238.40	41058.45	3051.18	1809.52	177.56	122.20	277.45	96.50	147.93	52144.71
	max	3168054.00	246231.00	15924.00	9484.00	1325.00	914.00	2221.00	562.00	930.00	301642.00
	min	17274.00	1487.00	94.00	2.00	16.00	6.00	10.00	3.00	1.00	2665.00
Towns	mean	28336.76	2902.85	273.64	61.88	15.93	9.03	17.14	13.86	73.66	3930.31
	std	67691.67	4627.83	523.71	141.43	20.81	14.88	25.62	17.72	156.51	6143.76
	max	663299.00	43799.00	9583.00	1547.00	270.00	183.00	496.00	209.00	1960.00	56484.00
	min	683.00	72.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	115.00
Small Towns	mean	4191.17	639.53	33.66	13.05	3.78	2.78	3.87	4.10	64.22	888.35
	std	5526.08	808.50	74.97	54.68	2.83	6.49	12.90	3.24	103.14	918.02
	max	148981.00	15509.00	1380.00	1475.00	38.00	217.00	536.00	33.00	1298.00	18954.00
	min	858.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	156.00

Pop.: Population, Res.: Residential Buildings, Com.: Building for commercial use, Ind.: Building for industrial use, Educul.: Building for educational and cultural use like schools, private tutoring institutions, all the schools related buildings like sports centers, school cafeteria, dormitories, etc. Health: building for health, social and sportive use, Gov.: Government buildings, Rel.: Buildings for religious use (mosques, smaller mescits), Agri.: Building for agricultural use, total: total buildings in a particular city.

The Model and Results of Regressions

The first model to estimate

$$Y_i = Z_i \gamma + \varepsilon_i \qquad (1)$$

Where the dependent variable is the number of mosques in total number of all buildings in a given city, independent variables are population, industrialization, level of wealth, and educational and cultural use buildings in the total number of all buildings along with several dummy variables. Level of wealth is measured by total number of buildings per capita. Eq. 1 is estimated by OLS and 2SLS to account for endogeneity with all variables in the system as instrumental variables. The results of these regressions are reported in Table 2.

Table 2: Religiosity and Development

	Dependent Variable: Number of religious buildings in total number of buildings		Dependent Variable: Number of religious buildings in total number of buildings	
	Regression 1: OLS		Regression 2: 2SLS	
	Coefficient	t-stat	Coefficient	t-stat
constant	-2.88***	-19.48	-2.99***	-19.83
Population	-0.16***	-11.73	-0.18***	-12.19
Industrialization	0.02***	2.70	0.02**	2.37
Industrialization^2	-0.004**	-2.10	-0.004*	-1.89
Wealth	-0.23***	-6.48	-0.35***	-7.28
Building for educational and cultural use in total buildings	0.23***	10.12	0.20***	8.85
Coastal towns	-0.24***	-5.98	-0.22***	-5.52
Aegean	-0.39***	-9.28	-0.37***	-8.65
Mediterranean	-0.26***	-5.81	-0.26***	-5.82
Marmara	-0.63***	-14.03	-0.62***	-13.59
East Anatolia	-0.38***	-7.40	-0.40***	-7.64
Central Anatolia	-0.27***	-7.19	-0.27***	-7.20
South East Anatolia	-0.38***	-6.47	-0.40***	-6.88
Adj-R^2	0.31		0.31	
Observations	2297		2297	

*** p<0.01, ** p <0.05, *p<0.10,

Industrialization=((Buildings for industrial use+ buildings for commercial use)/ buildings for agricultural use)

Wealth: Total buildings/population. Regional dummies: Aegean, Mediterranean, Marmara, East Anatolia, Central Anatolia, South East Anatolia, Black Sea.

All the variables except for dummy variables are in their natural logarithms. According to Table 2 there is a non linear relationship between industrialization and the degree of religiosity in Turkish cities. At the beginning level of industrialization, the degree of religiosity is increasing; however, as the industrialization increases eventually the degree of religiosity is decreasing. There is also a negative relationship between wealth and the degree of religiosity: as wealth increases, the degree of religiosity decreases.

These results here are confirming the secularization hypothesis of modernization theory. As industrialization and wealth increase, the religiosity decreases. We can not test for religious competition in this paper as it is tested for many other countries (Smith and Sawkins, 2003; Lopez and Santos, 2008) since majority of the population is Muslim and Sunni. Therefore, there is no competition between different religions and/or different denominations or sects. There is however a highly likely ideological competition between religious communities and secularists. The results of the regressions of eq.1 indicate that educational and cultural buildings in total buildings are positively significantly affecting the religiosity. That is, if a city relatively to other cities has a higher ratio of cultural and educational buildings in total buildings, that city has also higher ratio of mosques to total buildings. This can be interpreted as the existence of ideological competition between secularists and religious communities in a city if mosques and educational and cultural buildings are not being funded by the same people. As is known very well that mosques are being built by individuals or non-governmental institutions, schools (educational buildings) or cultural buildings are being built by government. The regression is controlled for population and wealth. Coefficient of population is negative and significant, showing that crowded cities are less religious. Different links of population variable as defined above can not be disaggregated into different variables since data are not available. It is

very interesting to observe that coastal towns which are tourism towns are less religious or the degree of religiosity for those towns is smaller compared to other towns. Tourism promotes non-religious business opportunities and makes people more open minded and secular.

In order to address the endogeneity problem, eq.1 is run by 2SLS. The results of 2SLS are also reported in Table 2. The results of regression 2 are very similar to those of regression 1.

In order to be able to investigate the ideological competition between schools and mosques, eq. 2 below is run by a system of equations. The system estimation is done by 3SLS and the results are reported in Table 3.

$$Y_1^i = Z_i\gamma + \alpha_1 Y_2^i + v_i \qquad (2)$$

$$Y^i{}_2 = X_i\beta + \alpha_2 Y_1^i + \varepsilon_i$$

Where y_1^i is the natural logarithm of percentage of mosques in total number of all buildings and y_2^i is the natural logarithm of percentage of educational and cultural buildings in total number of all buildings Zi and Xi re vectors of independent variables, □and □ are vectors of unknown parameters and □□ and. v_i are error terms.

Table 3: System Estimation

	Dependent Variable: Number of religious buildings in total number of buildings		Dependent Variable: Number of cultural and educational buildings in total number of buildings	
	Estimation method: 3SLS			
	First equation in the system		Second equation in the system	
	Coefficient	t-stat	Coefficient	t-stat
Constant	-2.91***	-19.62	-3.64***	-28.21
Population	-0.18***	-11.15	-0.13***	-9.84
Industrialization	0.02***	2.66	0.006	0.94
Industrialization^2	-0.004**	-2.21		
Wealth	-0.32***	-6.80	-0.42***	-13.56
Expenditures on education and culture (% in total)	0.22***	10.22		
Coastal towns	-0.22***	-5.76	-0.14***	-3.71
Number of religious buildings in total number of buildings			0.22***	10.95
Aegean	-0.37***	-8.57	-0.16***	-3.89
Mediterranean	-0.26***	-5.75	-0.12***	-2.75
Marmara	-0.61***	-13.86	-0.17***	-3.94
East Anatolia	-0.40***	-8.15	0.14***	2.98
Central Anatolia	-0.26***	-6.99	-0.13***	-3.57
South East Anatolia	-0.39***	-5.75	-0.07	-1.08
Adj-R^2	0.31		0.27	
Observations	2297		2297	
System Observations	4594 (Balanced System)			

***p<0.01, **p<0.05, *p<0.10

Table 3 shows that the non-linear relationship between the degree of religiosity and industrialization is kept in system estimation as well. All the variables are significant except for the industrialization variable in the second equation in the system. Since schools are built by the government and it is exogenous to industrialization, it is not surprising that industrialization is not statistically significant. Schools are built if there is enough population. Industrialization is not required to build schools since children of the non-industrial cities also need to go to school and the government should provide schooling for them. Table 3 indicates that schools and mosques are complement rather than being substitutes since they affect each other positively and significantly. If schools and mosques are not funded by the same resources, this complementarity can be interpreted as ideological competition. This is an interesting result since popular press discusses the ideological competition between secularist government structure and religious communities in Turkey. This point, however, needs to be investigated with different type of disaggregated data, which is a subject of another paper.

Conclusion

This paper investigates empirically the relationship between the degree of religiosity and economic development for a cross section of Turkish cities. Degree of religiosity is measured by the total number of mosques in total number of all buildings, whereas industrialization is measured by the ratio of industrial and commercial buildings to agricultural buildings. It is observed that there is a nonlinear relationship between the degree of religiosity and industrialization. As industrialization is increased a little, the degree of religiosity is also increased. Therefore, villagers are less religious than people who live medium size commercial cities, ceteris paribus. As industrialization increases more, the degree of religiosity is decreasing, conforming the hypothesis of modernization and secularization.

Coastal towns are found to be less religious. This is not surprising the coastal towns in Turkey are known culturally very liberal. Coastal towns are tourism towns and cultural very diverse. Cultural diversity might reduce the *neighborhood pressure* to practice religion.

Another interesting finding is that mosques and schools are complement and there might be a ideological competition between secularists and religious communities.

As a further research, a different type of data set is needed to investigate whether there is really ideological competition between secularists and religious communities.

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Multilateralism or Bilateralism: Trade Policy of the EU in the Age of Free Trade Agreements

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Abstract
Until 2006, trade policy of the European Union (EU) had mainly been focused on multilateralism embraced by the Doha Development Agenda (DDA). Meanwhile, the EU maintained an effective suspension on the opening of bilateral or regional negotiations where their increasing number was considered a 'spaghetti bowl' that creates problems for the international trading system. However, the suspension of the DDA negotiations in July 2006 forced the EU to reveal a new trade policy with the motto of "rejection of protectionism at home, accompanied by activism in creating open markets and fair conditions for trade abroad" which focuses on the removal of tariff and non-tariff barriers to trade of goods and services. Consequently, the EU gave pace to signing FTAs with its significant trade partners. This new trade strategy based on increasing FTAs and thus on bilateralism, which aims at the highest possible degree of trade, investment, and services liberalization, targets regulatory convergence and the abolishment of non-tariff barriers beside stronger provisions on intellectual property rights and competition. This paper discusses whether the new trade strategy of the EU leads to a distraction of the EU's trade policy focus from multilateralism to bilateralism or it still remains committed to the WTO.

Introduction

Following the temporary suspension of the Doha Development Agenda (DDA) of the World Trade Organization (WTO), in October 2006, the European Commission (EC) revealed a new trade policy strategy under which the EU will pursue bilateral free trade agreements (FTAs) with targeted economies in order to secure new markets and protect or enhance competitiveness for European businesses. This new strategy was a significant shift from the EC's *de facto* moratorium of any bilateral agreements and expressing loyalty to multilateral trade policy focus of the WTO. This change in the trade policy strategy raised concerns about the completion of the DDA and the future of the multilateral trading system, as the biggest proponent of multilateralism shifted its attention to bilateralism.

This paper aims to analyze the evolution, motives and main characteristics of the European Union (EU)'s external trade policy and the possible consequences of the adoption of the new trade strategy on the further progress of the WTO-based multilateral trading system. Section 2 explains the historical stance of the EU on bilateralism and multilateralism, and its previous trade policy strategy. Section 3 analyzes the post-Doha international trade environment and the new trade policy of the EU. Section 4 examines the trade relations of the EU with the countries the European Commission is either negotiating an FTA or set a target to pursue one. Concluding remarks discuss how this policy shift of the EU might influence the fate of the multilateral trading system.

Evolution of the EU's Trade Policies

Regionalism through Regional Trade Agreements (RTAs) or Free Trade Agreements (FTAs) has been widely discussed among trade economists since the 1950s. In the pioneering theoretical approach on the subject, Viner (1950) introduced the concepts 'trade creation' and 'trade diversion' and stressed the discriminatory aspects of regional trade liberalization. His claim was that, bilateral or regional economic integration can create trade by lowering tariffs and thereby reducing prices, but it can also lead to trade diversion for the countries outside the trade agreement. Thus, regional or bilateral trade agreements increase the exports of the signatory countries at the expense of third countries.

The formation of the European Economic Community (EEC) in 1957 and European Free Trade Association (EFTA) in 1960 became the first remarkable examples of regional trade agreements. On the other side of the Atlantic, the US was keeping a multilateralist approach to trade liberalization, based on the negotiated rules of the General Agreement on Tariffs and Trade (GATT). While Europe was integrating in the 1960s and 70s, the US was rejecting proposals for a North Atlantic Free Trade Area (Panagariya, 1999, p. 481). Thus, since the 1980s, RTAs were mostly limited to Western Europe and regionalism was mainly a 'European' concept. According to Bhagwati (1993), "*the first wave of regionalism that took place in the 1960s failed to spread because the US supported a multilateral approach*." Following Bhagwati's terminology, the 'second wave of regionalism' started after the failure of the GATT multilateral trade negotiations in November 1982, whereas this time the US changed its position and favored RTAs. This regionalism wave affected both developed and developing countries and led to the formation of several regional groupings including the EU, NAFTA and Mercosur. Hence the EU, itself an example of a regional integration, has been an early promoter of regional trade agreements, and the 1970s and the 1990s witnessed several preferential trade agreements of the EU with different countries.

However, in the mid 1990s, the EU turned its attention to multilateralism. The conclusion of the Uruguay Round of multilateral trade negotiations in 1994, and the establishment of the WTO in 1995 to provide the institutional support to the multilateral trade agreements, flourished the expectations that a world trading system based on common rules and multilateral liberalization can be formed. There was an expectation that "*exceptions to multilateralism, such as regional trade agreements (...) would either become less of an alternative policy option for countries or will need to be adapted and conducted in such a manner as to become outward-oriented, not inward-looking, and thus constitute building blocks for the new multilateralism ushered in by the WTO.*" (Mashayekhi et al., 2005, p. 3) EU's steer towards multilateralism was reinforced when Romano Prodi, the president of the EC, appointed Pascal Lamy as the European Commissioner for Trade in 1999. Lamy was a strict proponent of multilateralism and during his period as the Commissioner, the EU maintained an effective suspension on the opening of bilateral or regional negotiations to conclude FTAs, and championed the multilateral trading system. Lamy (2002) explained this policy as one "*pursu[ing] all existing mandates for regional negotiations with vigour and fairness, but not to begin any new negotiations*". (p. 1412) This trade strategy was based on two reasons: first, it favored the multilateral approach of the Doha Development Agenda (DDA) and the EU did not want to take any initiative that might detract from its completion; and second, the EU had a 'deep integration' approach in FTAs and these agreements were complex and time-consuming to negotiate (Lamy, 2002, pp. 1412-1413). Increasing the number of bilateral agreements has been labeled as 'spaghetti bowl' of overlapping trade rules that erode the principle of non-discrimination and raise the transaction costs of doing business, and was assumed to complicate the international trading system as a whole.

The EU had announced its strict loyalty to the completion of a comprehensive multilateral round of the WTO, but certain developments were creating some disturbances in this trade policy stance. The first development was that, the US had started to pursue an activist FTA policy based on 'competitive liberalization' after the Bush Administration had restored the Fast Track Negotiating Authority (also known as the Trade Promotion Authority) in 2002, which had expired and not been in effect since 1994. With the Authority, the US saw an opportunity to catch up with the EU's long record of pursuing preferential agreements (CRS, 2006) and started FTA negotiations with several countries including Chile, Singapore, Australia and Morocco. Second, the DDA, which was set to conclude in December 2006, started to show significant slowdown in progress towards multilateral liberalization. Especially after the Cancun talks collapsed in 2003, and three of the 'Singapore issues'[1] dropped down from the DDA in 2004, the wisdom of multilateralism started to be questioned in the EU. Even Lamy argued, in the Trade Policy Assessment document that summarizes his five-year term as the Trade Commissioner, that, "*our arguments in favour of a better regulated multilateral world have been less effective. Indeed, arguably as a result, trade policy or the WTO has too often been the sole focus for efforts to strengthen international governance, which risks weakening its legitimacy both internally within the Union, and in the outside world. I don't believe the WTO can or should remain the sole island of governance in a sea of unregulated globalization.*" (European Commission, 2004, p. 5) Lamy had stuck to his initial policy of keeping the moratorium on FTAs during his service in the Commission, but he also had given the first signs of a probable change in the EU trade policy.

[1] Singapore issues are; investment protection, competition policy, transparency in government procurement and trade facilitation. On 1 August 2004, WTO members agreed to start negotiations on trade facilitation, but not on the other three Singapore issues.

New Trade Policy of the EU: Focus on FTAs

In July 2006, negotiation talks in Geneva failed to reach an agreement and the DDA was officially suspended. This development threw multilateralism into a bleak future. Regarding the fact that the biggest competitor, the US, has been pursuing FTAs with many countries, especially with developed and emerging markets in East Asia, the EU had to act as soon as possible to avoid trade diversion and a shift in the EU's trade strategy had already become inevitable. With the suspension of the DDA, multilateralist position of the EU has lost its ground and the Commission has been forced to change its trade policy focus.

The European Commission revealed a new trade policy strategy in October 2006, under which the EU would pursue bilateral FTAs with major economies in order to secure the market access and competitiveness of European companies in important markets. The core of the new trade strategy of the EU has been summarized by the Commission as; "*rejection of protectionism at home, accompanied by activism in creating open markets and fair conditions for trade abroad*" (European Commission, 2006).

The new trade policy strategy primarily focuses on the need to identify and remove tariff and non-tariff barriers (NTBs) to market access for goods and services that are important for the European exporters. With the FTAs, the Commission also aims to solve some behind-the-border issues, especially the Singapore issues of investment protection, competition policy, and transparency in government procurement, which cannot be tackled by the DDA. The new trade policy strategy report also revealed an agenda aiming to influence the forces driving change, to seize the opportunities of globalization and to manage the risks and challenges posed by the emerging economies especially in Asia and South America.

The FTA strategy constitutes a very important part of this trade policy. The EU already has quite a large number of bilateral deals: the agreements with the EFTA countries, the customs union with Turkey, the goods agreements with the Euromed countries and the preferential arrangements offered to the sub-Saharan African, Caribbean and Pacific (ACP) countries. The EU had also signed FTAs with Chile, Mexico and South Africa. Furthermore, as the recent developments in the world trade system made it necessary for the EU to enhance its access to new markets in order to protect and improve competitiveness of European business, the Commission defined economic criteria, target countries and coverage for future FTAs.

The European Commission defines the key economic criteria for new FTA partners as market potential and the level of protection (tariffs and NTBs) against EU export interests. In this sense, the Commission defines ASEAN, Korea and Mercosur as prior FTA partners, and India, Russia and the Gulf Cooperation Council as countries of direct interest. China, on the other hand, despite meeting many of the criteria, is not defined as a possible FTA partner, but a country of special attention because of the opportunities and the risks it presents (European Commission, 2006, pp. 10-11). The EU's new FTA strategy aims at the highest possible degree of trade, investment, and services liberalization, in addition to a ban on export taxes and quantitative import restrictions. The main targets are regulatory convergence, non-tariff barriers and stronger provisions on intellectual property rights (IPRs) and competition. These trade relations could also include incorporating new cooperative provisions in areas relating to labor standards and environmental protection. In

this sense, the EU would also have to take the erosion of its existing trade preferences into account when negotiating FTAs, which could translate into sheltering certain products from tariff cuts (ICTSD, 2006).

The trade policy change in the EU raised the concerns that the EU was shifting its attention from the WTO to bilateral agreements, and the revival of the DDA would become more difficult. Although the strategy report clearly states that *"there will be no European retreat from multilateralism and the EU remains committed to the WTO"* (European Commission, 2006, p. 10), the rising number of FTA negotiations and proposals in the years after the policy shift keeps these concerns alive.

After the announcement of its new FTA strategy, the EU has instantly given pace to its efforts for signing FTAs. Currently, the following can be listed as the key EU bilateral agreements:

- Economic Partnership Agreements in negotiation with ACP countries (Cotonou)
- Free Trade Agreements with EFTA, EEA, Euromed, Mercosur (in negotiation), Mexico, Chile and South Africa
- Customs Unions with Turkey, Andorra and San Marino
- Partnership and Cooperation Agreements with Russia and Ukraine

As stated in the strategy paper, primarily targeted FTA partners were ASEAN and Korea, and negotiations with both of them started in May 2007. Following them, FTA talks with another important economy in Asia, with India, started in June 2007. In addition, the EU accelerated the FTA talks that had started before the policy change, but had been suspended because of the EU's multilateralist position (e.g. FTA negotiations with the Gulf Cooperation Council (GCC) and Mercosur). The EU is also seeking to negotiate FTA agreements with Russia and the Andean and Central American countries. There are also FTA proposals to the EU from several countries including Japan and Pakistan. In the appendix, we display summarized tables for the trade indicators (amounts and shares of exports and imports) of the EU with its target FTA partners and those for the previous FTA partners from 2000 to 2006. The numbers evidence an increasing trend for each country and country group (such as ASEAN and MERCOSUR) in both export shares and import shares of the EU.

Motives Behind the EU's Free Trade Agreements

In this section we will explore the trade relations of the EU with the countries that it is negotiating or seeking for an FTA. We begin with an examination of the broader picture showing on which grounds and motives the EU has pursued bilateral trade agreements so far. Then we exemplify the motives and the possible gains from potential bilateral agreements with Korea, ASEAN and India with which the EU has already started negotiations.

According to Woolcock (2007), the EU's framework of bilateral and regional trade agreements can be differentiated into two main motives; foreign policy and security, and commercial interests. Political motivations were dominant in EU's trade agreements related to its neighborhood policy, including the Europe Agreements with the Central and Eastern European countries, the Euro-Med Association Agreements with Mediterranean countries, and the Stability Pact with the countries of the Western Balkans. The

commercial or economic motivations for economic partnership agreements or FTAs, on the other hand, primarily focus on limiting or neutralizing potential trade diversionary effects which result from FTAs concluded between important trading partners and a third country. The prime example of neutralizing trade diversion through an FTA is the EU–Mexico FTA, motivated by a desire to neutralize trade diversion after the conclusion of NAFTA. Commercial motivations also include forging strategic links with countries or regions experiencing rapid economic growth, and enforcement of international trade rules.

Regarding the current FTAs of the EU, we observe that commercial or economic interests are the dominant motivations. Neutralizing trade diversion motive can be observed in all FTA negotiations that started in the new trade policy environment. ASEAN, Korea and India had already been approached by the US, and the EU needed to pursue FTAs with these important markets as soon as possible in order to avoid diversion of the imports of these countries from Europe to the US.

Some research has been done on the trade potential of these countries (such as Korea, ASEAN and India) in the context of bilateral trade agreements. One of these studies belongs to Kim and Lee (2004), who examine the trade potential capacity of the EU and Korea using the gravity model approach. A simple gravity equation embodies the 'normal' patterns of bilateral trade by integrating the economic, geographical and cultural factors. Frankel (1997) argues that if actual trade volume is higher than the normal level of trade that is obtained from the gravity factors (economic, geographical and cultural), then intra-regional trade bias occurs. Kim and Lee employ a gravity equation analysis which intends to estimate the trade potential capability of Korea and the EU-15. Constructing two models, one for estimating separately the gravity equations for 52 countries between 1980 and 2002, and another for estimating the normal pattern of bilateral relations in the world, the authors first find that there is a noticeable degree of over-trade between the EU-15 and Korea. Another point the paper reveals is that this over-trading is a result of the fact that *"Korea has enjoyed a higher ratio of openness in terms of the ratio of the trade volume with respect to GDP"* (Kim and Lee, 2004, p.147). Second, when Korea and its trade with the world are considered, the EU-Korea trade is found to be under-traded, pointing to the possible explanation that Korea's trade volume with the EU is much less than its trade performance with its other trading partners. Another paper of Kim (2005) emphasizes that an FTA with Korea would be desirable for the EU because the structural EU trade deficit since the 1990s is usually attributed to the problems EU companies and products encounter while entering and operating in the Korean market. These problems create barriers to trade as the Korean rules for both products and services differ from those of the EU. Hence, an FTA between the EU and Korea is expected to be advantageous for the EU especially if it succeeds in removing the trade barriers, adoption of the EU standards for goods and services and strong cooperation. Besides, as Korea is one of the most dynamic emerging markets in East Asia, the EU finds it much beneficial to build an economic basis in Korea, where an FTA would effectuate the role (Kim, 2005, p. 10).

Regarding the relations between the EU and ASEAN which date back to 1980, we can start with the first EU-ASEAN agreement that was concluded in the form of a cooperation agreement. It was a declaration of good will and intentions and contained some basic principles about trade. Although this initiation developed a political dialogue between the EU and ASEAN, it was not able to prioritize closer and deeper relations. In the 1990s, the two partners engaged in a significant effort to deepen the cooperation and encourage greater contact. However, the 1997-1998 Asian Financial Crisis impeded the relations once

more. After the recovery from the effects of the crisis, in 2001 and 2003, the EU attempted to vitalize its relations in Southeast Asia and classified ASEAN as a key economic and political partner. The following priorities were designated for the relations with the Southeast Asia (Moeller, 2007):

• Supporting regional stability and the fight against terrorism;

• Promote human rights, democratic principles and good governance in all aspects of EC policy dialogue and development cooperation;

• Dialogue incorporating issues such as migration, trafficking in humans, money laundering, piracy, organized crime and drugs;

• Invest dynamism by launching a trade action plan called Transregional EU-ASEAN Trade Initiative (TREATI);

• Support the development of less prosperous countries;

• Intensify dialogue in specific policy areas.

These priorities constitute a well-established ground for the EU to stimulate a cooperative environment in Southeast Asia. Moeller (2007) points to two long term and far-reaching benefits for EU-ASEAN relations arising from an FTA: first, it will please them both in Asian integration; and second, an FTA will enhance their ability to tackle non-conventional and common threats to stability and security (Moeller, 2007, p. 478).

Theoretically, these two benefits may be gained without an FTA, but the political environment calls for one. Since ASEAN has already concluded or is negotiating FTAs with so many other partners, it seems difficult to solidify EU-ASEAN relations without such an agreement. According to Moeller (2007), for ASEAN, *"an FTA with the EU may provide a platform for adjusting the competitive position of member states, making them more capable of carving out a platform for competing with Asia's two giants: China and India"* (Moeller, 2007, p. 479). Since most ASEAN countries can no longer compete on costs, they are in need of gaining competitive characteristics in areas such as corporate governance, legal system, protection of intellectual property rights, design, quality, performance. As long as some of these issues are not covered by the international set of trade rules under the WTO, a considerable number of countries seek a solution through FTAs. What is more, an EU-ASEAN FTA will confirm the belief that the two partners trust each other and their intention to deepen and spread cooperation into other areas. One such area is supposed to be transnational security issues. Therefore, in case the EU and ASEAN fail to achieve enhanced cooperation in trade and economics, *"dealing with more complex issues such as security issues will be impossible"* (Moeller, 2007, p. 479).

Botezatu (2007) also handles the circumstances of an EU-ASEAN FTA as a question of 'when' rather than 'whether'. She emphasizes that the EU and Southeast Asia share many common interests and features in the sense that they both seek ground for deeper integration between their own member states and they are both embedded in multilateral trade relations in the multi-polar world. Here arises another common situation for them which results from the shortcomings of the multilateral system. Politically, they reflect their will on creating a more effective multilateralism through cooperation in a wider range

of issues besides trade such as development aid, economic assistance and non-military security cooperation. Since there is a huge development gap between ASEAN's rich and poor members, financial aid from the EU and hence a bilateral agreement is considered an opportunity that should not be missed. In terms of trade relations, the strong commercial links between these two blocs confirm the necessity. The EU was ASEAN's third largest trading partner as of 2007. Similarly, ASEAN is of crucial economic importance for the EU. Cooperation on environmental issues such as the Kyoto Protocol and dialogue on migration are also common aspirations of the two trade partners. Taking these into consideration, Botezatu concludes that the establishment of a free trade area between the EU and ASEAN will certainly welcome important economic benefits that will support and expand the European model of integration among ASEAN countries.

Finally, the EU started negotiations with India on a bilateral trade and investment agreement on 28 June 2007. Before, the Council had adopted a negotiating Directive for an FTA with India on 23 April 2007, together with negotiating Directives for an EU-ASEAN and an EU-Korea FTA[2]. India is trying to adhere to a 'grand leap forward' liberalization model[3], which targets to improve its manufacturing exports and information technologies, and aims to ease its access to foreign markets. Having already become an important production base and outsourcing destination for EU companies, India is in the target of the EU who aims to get access to the large Indian market, increase its investment and the export of goods and services, and settle on favorable trade rules and regulations. The bilateral FTA is supposed to prepare the ground for a 'strategic partnership' in trade and investment. Polaski et al. (2008) employ a simulation analysis using the social accounting matrices of India and the EU and find the possible effects of an FTA on the EU. According to the analysis, all the macroeconomic indicators of the EU, such as private consumption, government consumption, investment consumption, import demand, export supply and total domestic production, display significant increases. For instance, export supply appears to increase by 1.35 billion dollars corresponding to a 0.05 % change, whereas import demand is found to increase by 3.21 billion dollars which corresponds to a 0.11% rise. Similarly, total domestic production is expected to increase by 0.05% as a result of the simulations.

To sum up, reasons for bilateral trade agreements other than commercial motivations have started to come to the fore as multilateral trade has encountered some obstacles and as solutions to these obstacles can only be sought through FTAs between individual partners. The EU has adopted itself to evaluate the best strategy with its potential partners in order to deepen integration, expand its share in world exports, incorporate dialogue on universal issues such as migration and environment and promote good governance and development cooperation.

Conclusion

The European Community (later the European Union) has been a landmark for regionalism. By promoting its own model of regional integration throughout Europe and its neighboring countries, the EC/EU aimed to enhance its reach to different markets. Nevertheless, it also supported the multilateral trade liberalization of the GATT/WTO, albeit not as loyal as the US. In the late 1990s, the EU shifted its attention entirely to the

[2] http://ec.europa.eu/trade/issues/bilateral/countries/india/index_en.htm
[3] This strategy is announced by the Department of Commerce, Ministry of Commerce and Industry, India at http://commerce.nic.in/index.asp.

completion of multilateral WTO negotiations and put a moratorium to all bilateral agreement talks. However, the collapse of the WTO negotiations in Cancun in 2003, proliferation of FTA negotiations by the US, and finally the suspension of the DDA in July 2006 forced the EU to pursue bilateral FTAs in order to protect the competitiveness of European businesses.

The shift of the trade policy focus of the EU from multilateralism to bilateralism raised concerns about the future of the WTO. Although the strategy paper of the new trade policy clearly expressed that there will be no European retreat from multilateralism and the EU is still loyal to WTO principles, the question still remains: will it be feasible (or even necessary) to revive the DDA after concluding several FTAs?

There is a significant difference between the 'new generation' FTAs of the EU and its previous bilateral trade agreements and the European integration scheme. Former FTAs were mainly concluded with neighboring states or former colonies and the essential motives behind those FTAs were dominantly foreign policy and enlargement. The new trade policy of the EU, on the other hand, puts a strong emphasis on economic arguments by linking FTAs to purely economic criteria, such as the market potential of the partner and the existing tariff and non-tariff barriers to EU exports. Having completed the economic integration in almost entire Europe and its neighborhood, the EU now targets the emerging economies in Asia and Latin America. Another noteworthy characteristic of the new generation FTAs is that, in the absence of the WTO negotiations, the EU sees these FTAs as an opportunity to negotiate regulatory and beyond-the-border issues that are not included in the DDA, and also to deal with 'tough' issues like agriculture, which seems almost impossible to solve in the multilateral talks. Relying upon these motivations, surveyed research on the potential consequences of FTAs between the EU and selected countries evidence the gains from increasing free trade and cooperation.

We argue that, although both the US and the EU express that they are still loyal to multilateralism, the recent surge of FTAs makes the revival of the DDA more difficult. As major trade partners achieve their goals in increasing bilateral trade by removing the trade barriers, the marginal gains from the results of multilateral negotiations diminish. Currently, it seems that multilateralism is losing its ground against bilateralism. The hopes for agreeing on multilateral free trade based on common WTO rules seem to be fading away, but this does not mean that 'free trade' is weakening; bilateralism and FTAs became the new tools of globalization and free trade. As for the Doha Round, as the Trade Minister of India, Kamal Nath said, "the round is not dead, but between intensive care and the crematorium", and two years after the suspension of the talks, we can say that each FTA makes the DDA one step closer to the crematorium.

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Appendix

All sources: Authors' calculations from COMTRADE (2008)

Table A.1. Exports of the EU with Target FTA Partners (millions $)

	ASEAN	MERCOSUR	S. Korea	India	China	Russia	GCC
2000	37.724	21.935	15.064	12.368	23.512	20.353	27.314
2001	38.482	21.702	13.895	11.175	27.086	27.569	30.508
2002	37.768	17.257	16.322	12.444	32.669	31.962	33.744
2003	43.457	17.345	18.185	16.107	46.024	41.390	42.115
2004	53.330	22.844	22.190	21.181	59.932	56.999	51.073
2005	55.844	25.644	24.998	26.215	64.310	70.081	62.579
2006	61.939	29.656	28.783	30.447	80.219	92.311	70.002

Table A.2. Share in EU's Total Exports (%)

	ASEAN	MERCOSUR	S. Korea	India	China	Russia	GCC
2000	4,75	2,76	1,90	1,56	2,96	2,56	3,44
2001	4,79	2,70	1,73	1,39	3,37	3,43	3,79
2002	4,41	2,02	1,91	1,45	3,82	3,73	3,94
2003	4,34	1,73	1,82	1,61	4,60	4,14	4,21
2004	4,43	1,90	1,84	1,76	4,98	4,73	4,24
2005	4,20	1,93	1,88	1,97	4,84	5,28	4,71
2006	4,15	1,99	1,93	2,04	5,37	6,18	4,69

Table A.3. Imports of the EU with Target FTA Partners (millions $)

	ASEAN	MERCOSUR	S. Korea	India	China	Russia	GCC
2000	64.034	22.638	24.591	11.804	68.316	48.922	20.914
2001	59.043	23.021	20.566	11.977	72.739	48.141	17.794
2002	63.896	23.715	22.830	12.802	84.576	50.648	17.379
2003	74.283	29.173	29.074	15.788	119.048	66.394	22.832
2004	85.913	35.269	37.650	20.185	158.488	100.384	31.759
2005	87.907	37.928	41.292	23.480	196.335	132.631	46.405
2006	103.951	44.402	58.323	29.034	284.954	149.713	46.418

Table A.4. Share in EU's Total Imports (%)

	ASEAN	MERCOSUR	S. Korea	India	China	Russia	GCC
2000	6,96	2,46	2,67	1,28	7,42	5,32	2,27
2001	6,70	2,61	2,33	1,36	8,25	5,46	2,02
2002	7,17	2,66	2,56	1,44	9,49	5,68	1,95
2003	6,98	2,74	2,73	1,48	11,18	6,24	2,14
2004	6,69	2,75	2,93	1,57	12,35	7,82	2,47
2005	6,01	2,59	2,83	1,61	13,43	9,07	3,17
2006	5,94	2,54	3,33	1,66	16,29	8,56	2,65

Table A.5. Exports of the EU with Previous FTA Partners (millions $)

	Chile	Mexico	S. Africa
2000	3.161	12.991	10.725
2001	3.283	13.565	11.034
2002	2.951	14.306	11.475
2003	3.293	16.078	15.032
2004	3.878	18.289	19.953
2005	4.827	20.816	22.448
2006	5.363	23.952	25.529

Table A.6. Share in EU's Total Exports (%)

	Chile	Mexico	S. Africa
2000	0,40	1,64	1,35
2001	0,41	1,69	1,37
2002	0,34	1,67	1,34
2003	0,33	1,61	1,50
2004	0,32	1,52	1,66
2005	0,36	1,57	1,69
2006	0,36	1,60	1,71

Table A.7. Imports of the EU with Previous FTA Partners (millions $)

	Chile	Mexico	S. Africa
2000	4.680	6.707	13.328
2001	4.546	6.825	14.218
2002	4.568	6.151	14.224
2003	5.566	7.333	16.745
2004	8.962	8.545	19.614
2005	9.767	11.163	20.779
2006	15.548	13.768	23.180

Table A.8. Share in EU's Total Imports (%)

	Chile	Mexico	S. Africa
2000	0,51	0,73	1,45
2001	0,52	0,77	1,61
2002	0,51	0,69	1,60
2003	0,52	0,69	1,57
2004	0,70	0,67	1,53
2005	0,67	0,76	1,42
2006	0,89	0,79	1,32

The Relationship between FDI and Growth under Economic Integration: Is There One?

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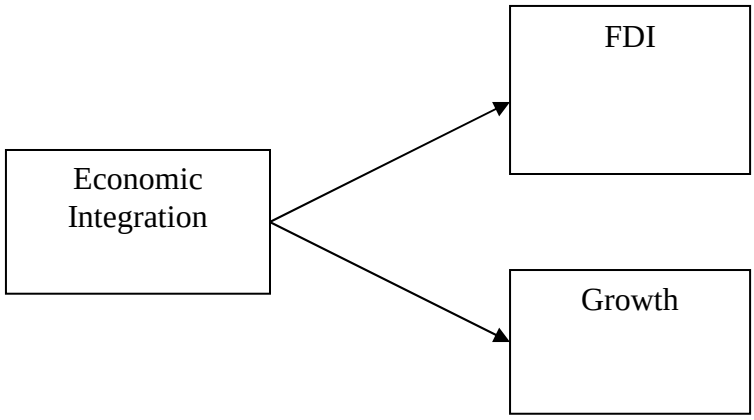
Abstract

This study is a contribution to the debate on the relationship between FDI and growth. The idea that the alleged link between FDI and growth is rather the consequence of both FDI and growth responding endogenously to economic integration is tested empirically. The results confirm precisely this point: it is not FDI as such but economic integration, in any form or shape that determines growth.

Introduction

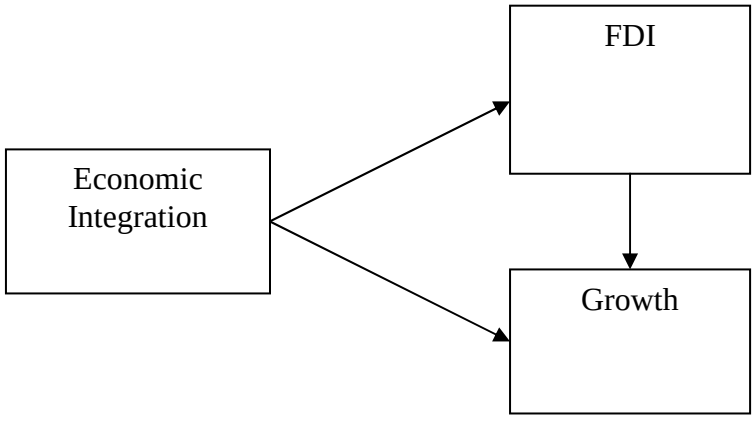
The relationship between FDI and growth is one of the most intensively researched issues in international economics. There is a fair amount of evidence suggesting that there exists a positive relationship between these two quantities, albeit with some qualifications (see, among others, Borenzstein et al. 1998). More controversial has been the issue whether underpinning such a positive relationship there is causality running from FDI to growth or not. One recent twist on this debate has been provided recently by Ting Gao (2005). According to Ting Gao's paper, the often observed positive correlation between FDI and growth might not imply any causal relationship, since both of them might respond endogenously to economic integration. The situation he suggests is like the one illustrated in flowchart 1 below:

Flowchart 1

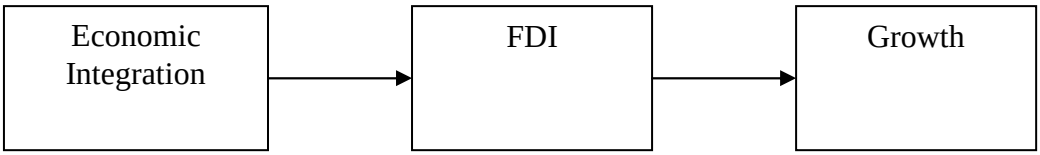


By contrast, according to the bulk of the literature on FDI and growth, causation would run from FDI to growth. Economic integration could then also be accommodated in either of two ways, as shown in flowchart 2 below:

Flowchart 2a



Flowchart 2b



The aim of this paper is to gather empirical evidence and evaluate flowchart 1 against flowchart 2. This is novel in the sense that although the literature on FDI and growth is abundant, to the best of my knowledge, there is no study that has tested the relationship when economic integration is included. Such a study would be an important contribution in the face of works like that of Ting Gao, which cast doubts on the causal relationship between FDI and growth.

The Econometric Framework

This study aims at testing the existence of a causal relationship that runs from economic integration through FDI to growth. With this objective in mind, the following econometric specification is used:

$$FDI_{it} = \alpha_0 + \alpha_1 \text{int}egr_{it} + \alpha_2 instr_{it} + \alpha_3 controls_{it}$$
$$g_{it} = \beta_0 + \beta_1 FDI_{it} + \beta_2 \text{int}egr_{it} + \beta_3 controls_{it}$$

The econometric specification consists of a structural model made up of two equations. The first has the ratio of FDI flow to GDP (*FDI*) as the dependent variable, which is regressed on economic integration (*Integr*), on an instrument for *FDI* and on a set of three control variables (*controls*)[1]. The second equation has the growth rate of output (*g*) as the dependent variable, and this is regressed on *FDI*, economic integration and the same set of control variables. Estimation is done via two-stage least squares (2SLS), the most common method used for estimating simultaneous-equation models (see Greene, 2003). The quality of this study hinges a great deal on the choice of a good instrument. The variable to be instrumented is FDI, hence in this case an instrument is good if it is highly correlated with FDI and weakly correlated, if at all, with growth. This is a hard call, particularly in growth regressions, where most economic variables have some kind of relationship with growth. In the specific case, the variable chosen as instrument is the lagged value of FDI[2].

Another important issue relates to the computation of the variable *Integr* . The existing literature on the subject has produced measures of integration which are based on FDI, trade and private capital flows (as an example, see Ismihan et al., 1998). In our case, reliance on such an index would create a serious endogeneity issue in the first equation, since FDI would enter both sides of the equation. Ideally, our measure of integration should not include FDI at all in its calculation. On the other hand, an accomplished

[1] The three control variables chosen (in logs) are inflation (measured by GDP deflator), population, and human capital, proxied with years of schooling.
[2] In the regression with the full sample of all 51 countries (i.e. regressions 1.1, 2.1 and 3, see below), lagged FDI correlation coefficient is 0.697 with current FDI, and 0.057 with *g* respectively.

measure of integration should take financial integration into account, an important part of which is of course FDI. This study tries to strike a delicate balance between these two opposite considerations. To this end, the variable *Integr* consists of an index computed as the average of two items. The first item is a trade integration index which is computed as follows:

$$TII_{it} = \frac{Openness_{it} - Min_{Openness}}{Max_{Openness} - Min_{Openness}}$$

where TII_{it} stands for trade integration index for country *i* at time *t*, $Openness_{it}$ is the ratio of exports plus imports to GDP (in constant prices) and $Min_{Openness}$ and $Max_{Openness}$ are the minimum and maximum openness values in the sample respectively (both over time and across countries).

The second item is a financial integration index which is computed in a likewise fashion as follows:

$$FII_{it} = \frac{FI_{it} - Min_{FI}}{Max_{FI} - Min_{FI}}$$

where FII_{it} stands for financial integration index for country *i* at time *t*, FI_{it} is the ratio of financial assets plus financial liabilities to GDP for country *i* at time *t*, and Min_{FI} and Max_{FI} are the minimum and maximum financial integration values in the sample respectively. Finally, the variable $Integr_{it}$ is calculated simply as:

$$Integr_{it} = \frac{TII_{it} + FII_{it}}{2}$$

FDI still enters the calculation of the variable *Integr* because an important part of financial assets and liabilities are FDI assets and liabilities. Notice however that endogeneity concerns have been addressed in three ways. First, FDI assets and liabilities are two stock concepts while the calculation of the variable *FDI* is based on FDI inflows. This difference should work towards decoupling *FDI* from *Integr* . Furthermore, when compared with the integration measure produced by Ismihan et al. the weight of FDI has been reduced. Finally, the variable *Integr* is a measure of the relative position of each country within the sample, whereas the variable FDI is an absolute measure of the ratio of FDI inflows to GDP. It is perfectly conceivable to think of a situation in which a country witnesses an increase in *FDI* and at the same time its relative position in the sample with respect to the same quantity worsens.

For complete peace of mind, I also run regressions in which the measure of integration is based on the openness measure only. This is done in two ways. First, I use a measure of integration, denoted *Integr*2 , which is simply the trade integration index calculated above, as follows:

$Integr2_{it} = TII_{it}$.

The third measure of integration employed is just the trade openness variable as such, with no further manipulation. That is:

$$Integr3_{it} = Openness_{it} = \frac{Exports_{it} - Imports_{it}}{GDP_{it}}$$

Underpinning such measures is the idea that economic integration equals trade integration. Obviously, FDI does not enter the calculation of these measures in any way.

The three variables $Integr_{it}$, $Integr2_{it}$ and $Integr3_{it}$ yield three different sets of regressions. As far as $Integr_{it}$ and $Integr2_{it}$ are concerned, in each case regressions are run not only with respect to the full dataset of 51 countries, but also to the reduced dataset including developing and developed countries. This gives six regressions, to which I refer as regressions 1.1, 1.2, 1.3 and 2.1, 2.2, 2.3 in the Tables. This is not repeated in the case of $Integr3_{it}$, since it would not add much information. Hence, the latter is referred to as regression 3.

One further alternative measure of integration could also potentially be used to check for robustness of the results. Such a measure would be based on an evaluation of the barriers to integration. In principle, this measure should account both for tariffs as well non tariff barriers (NTB). Because of severe lack of data on NTB in the time dimension, a measure that account both for tariffs as well as NTB is not feasible. Even if the index were to be based on tariffs' data only, lack of data would still be severe enough to undermine any kind of comparison that one would want to make with the other measures of integration. I therefore leave this option as a possible addition to be included in future research, once data coverage on tariffs and NTB improves.

Data and Sample Selection Issues

There is a choice of sources for the data regarding the main variables of this study. FDI data were taken from the UNCTAD FDI online database, GDP data came from the U.N. National Accounts database. Data on trade openness (used in calculating $Integr$) are from the Penn World Tables, Version 6.2. Data regarding financial assets and liabilities, used to calculate the financial integration index, are from the External Wealth of Nations (EWN) database (see Kose et al., 2006). As for the control variables, data on population and inflation came from the World Development Indicators 2005 (World Bank) and, in a few instances (mainly for 2004) from the World Development Indicators online. Finally, data for average years of schooling (my proxy for human capital), came from Barro and Lee dataset on educational attainment (2000).

With respect to sample selection, this was dictated by availability of data for the main variables. Initially I had thought to have a panel of both developed and developing countries covering as large a geographical area as possible for the time interval 1980-2004. Included in the sample are countries from Latin America, East Asia and Pacific, South Asia, Africa, Middle East, Eastern Europe, as well as the OECD countries. It soon became clear, though, that in order to maintain the countries of Eastern Europe in the sample, the time interval had to be shortened to the period 1990-2004. After running the regressions, breath of geographical coverage seemed to be qualitatively more important than the length of the time interval chosen, I opted for sticking to the period 1990-2004 and keeping the

countries of Eastern Europe in the sample. As a result of this strategy, the sample includes 51 countries (the full list is given in the Appendix) covering 15 years. In the year 2000, these 51 countries accounted for approximately 65% of world GDP[3], and for 78% of world population. The regression with the full sample, both in terms of countries included and years covered, features 680 observations, instead of the potential 765 (51*15=765), because 51 values are lost when lagging FDI for the first year (1990), and inflation data include 34 negative rates, which result into 34 lost values when taking logs (51*15=765-51=714-34=680). Detailed descriptive statistics are shown in Tables 4, 5 and 6.

Results

The results of the 2SLS regressions are displayed in Table 1 (first stage) and Table 2 (second stage)[4]. As discussed earlier, results are given for three different types of integration measures, and along three different levels of aggregation (all countries, developing countries and developed countries). Regressions are identified by two digits, the first referring to the integration measure used, and the second referring to the level of aggregation. For example regression 2.1 refers to $Integr2_{it}$ and to all countries, and so on. Table 1 clearly shows that economic integration is a significant and positively signed determinant of FDI. Such result holds no matter how one defines integration or which level of aggregation is chosen. In the case of Table 2, two points emerge in almost as equally clear-cut a manner as the message conveyed by Table 1. Firstly, integration is a positive determinant of growth in all cases but regressions 1.2 and 1.3. This point is in full accordance with Gao (2005). Secondly, an even more important point, FDI is never a significant contributor to growth. This (non) result is very robust to all types of integration measures and all levels of aggregation. It is also perfectly in line with the argument that the alleged relationship between FDI and growth might just be a classical example of omitted variable bias, where the omitted variable in the specific case would be economic integration. To make the evidence more compelling, I run a fixed-effects regression of FDI on growth without economic integration[5], whose results are presented in Table 3. As before, the exercise is repeated for all countries in the sample, the developing countries and the developed countries respectively. The evidence that I get is mixed, since FDI is significant at the 5% level if I restrict attention to developed countries, not significant when attention is restricted to developing countries and significant at the 10% level if the entire sample is included. This is precisely the kind of mixed evidence that would emerge from past literature on FDI and growth. Such uncertainty is wiped out though once economic integration enters the frame, as we have seen. Then, there is simply no role for FDI, singularly considered, as a determinant of growth.

[3] The figure for world GDP in 2000 is taken from world GDP estimates produced by DeLong and available online at http://econ161.berkeley.edu/TCEH/1998_Draft/World_GDP/Estimating_World_GDP.html. The figure for world population in 2000 is taken from the U.N. population database (online address: http://esa.un.org/unpp/).

[4] In all regressions concerned, the fitted model is the one with fixed-effects. The Hausman test, performed to test for its suitability against the random-effects model, returned high values of the chi-square statistic in all cases.

[5] Once again the Hausman test was used to aid the decision whether to go for fixed or random effects. Once again that test returned a high chi square statistic in all cases, confirming appropriateness of the fixed-model.

Conclusion

This study has been yet one more attempt at shedding light on the relationship between FDI and growth. The new twist here, after taking inspiration from recent theoretical work by Gao (2005), consisted in adding the variable "economic integration" to the analysis. Exactly as expected, and as claimed by Gao, the alleged positive link between FDI and growth disappears once integration is added. This study suggests that the current frenzy of countries from all income brackets to attract FDI as a way to improve their growth prospects, might be misplaced. What countries that want to grow faster should do is to become ever more integrated with the world economy. The actual mode of integration, whether through trade, FDI or else, seems not to matter.

This study can be improved upon and extended in several ways. Firstly, the dataset of reference should be extended as new data become available, particularly with respect to the countries of Eastern Europe and the countries belonging to the lower income brackets. Also, the concept of economic integration should be augmented to include labor market integration. Labor of course, is a very important dimension of the economy, and I have left it out both for problems of data availability and a lack of an effective proxy to measure labor integration. In future work however, the latter should definitely be included if one is to make a more convincing claim that, under economic integration, there is no link between FDI as such and economic growth.

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Appendix

a) Tables

TABLE 1 **First Stage Estimation Result of 2SLS Regression**
Dependent Variable: FDI

	Regression Number						
Independent Variable	1.1 (All Countries)	1.2 (Developing)	1.3 (Developed)	2.1 (All Countries)	2.2 (Developing)	2.3 (Developed)	3 (All Countries)
	Coefficient (Standard Error)						
integr (integr2, integr3)	0.1009***	0.0275*	0.1334*	0.063***	0.0254*	0.2128***	0.0003***
	(0.02523)	(0.01548)	(0.0498)	(0.0202)	(0.0147)	(0.0626)	(0.0001)
lagged FDI	0.4504***	0.4550***	0.4247***	0.4814***	0.4546***	0.4069***	0.4814***
	(0.0379)	(0.047)	(0.0629)	(0.0361)	(0.0471)	(0.0621)	(0.0362)
pop	-0.0091	-0.0174	-0.0713	-0.0010	-0.0105	-0.0957	-0.0009
	(0.0337)	(0.0249)	(0.1335)	(0.0340)	(0.0249)	(0.1303)	(0.0339)
infl	-0.00094	-0.0023**	0.0026	0.0006	-0.0023**	0.0028	-0.0006
	(0.0015)	(0.0012)	(0.0045)	(0.0015)	(0.0012)	(0.0045)	(0.0015)
H	-0.0091	0.0017	-0.0138	-0.0086	-0.0028	-0.1002	-0.0086
	(0.0346)	(0.025)	(0.1035)	(0.0352)	(0.0262)	(0.1100)	(0.0352)

TABLE 2 **Second Stage Estimation Result of 2SLS Regression**
Dependent Variable: g

	Regression Number						
Independent Variable	1.1 (All Countries)	1.2 (Developing)	1.3 (Developed)	2.1 (All Countries)	2.2 (Developing)	2.3 (Developed)	3 (All Countries)
	Coefficient (Standard Error)						
FDI	-0.1160	-0.0098	-0.0466	-0.1140	-0.1451	-0.1256	-0.114
	(0.1064)	(0.2415)	(0.0686)	(0.0930)	(0.2382)	(0.0737)	(-0.9299)
integr (integr2, integr3)	0 .1215***	0.0385	0.0259	0.1449***	0.1414***	0.1267***	0.0006***
	(0.0379)	(0.0376)	(0.0284)	(0.0273)	(0.0356)	(0.0397)	(0.0001)
pop	-0.1168***	-0.1345**	-0.0145	-0.1003**	-0.1096*	-0.0843	-0.1004**
	(0.0426)	(0.0584)	(0.0622)	(0.0420)	(0.0574)	(0.0635)	(0.0421)
infl	-0.0066***	-0.0073**	-0.0041*	-0.0055***	-0.0062**	-0.0036	-0.0055***
	(0.0019)	(0.0029)	(0.0021)	(0.0019)	(0.0029)	(0.0022)	(0.0019)
H	0.0628	0.0892	0.0860*	0.0306	0.0378	0.0052*	0.0306
	(0.0438)	(0.0599)	(0.0481)	(0.0436)	(0.0602)	(0.054)	(0.0437)

TABLE 3 Fixed-Effects Regression
Dependent Variable: g

	Regression Number		
Independent Variable	1.1 (All Countries) Coefficient (Standard Error)	1.2 (Developing)	1.3 (Developed)
FDI	0.0958*	0.0921	0.0630**
	(-0.0503)	(0.1224)	(0.0248)
pop	-0.0886*	-0.1150*	0.0295
	(0.0459)	(0.0630)	(0.0488)
infl	-0.0120***	-0.014***	-0.0035**
	(0.0019)	(0.0027)	(0.0019)
H	-0.0302	-0.0216	0.0503
	(0.0438)	(0.0592)	(0.0402)

TABLE 4
Descriptive Statistics **all**

	Obs	Mean	Standard Error	Min	Max
FDI	765	0.0298	0.0406	-0.0588	0.4603
integr	765	0.1811	0.1179	0	0.8839
integr2	765	0.2674	0.1689	0	1
FII	765	0.9486	0.1034	0	1
integr3	765	32.9814	19.4799	1.9823	115.3647
GDP(millions)	765	482267.4	1109062	4904	8734868
g	765	0.0323	0.0466	-0.3392	0.6854
laggedFDI	714	0.0297	0.0408	-0.0239	0.4603
pop (millions)	765	90.706	212.664	3.049	1294.846
infl	765	39.6876	323.1064	-5.5509	7485.8
H	765	7.5422	2.6319	0.55	12.306
logpop	764	17.2019	1.4015	14.9303	20.9816
loginfl	731	1.8242	1.3792	-3.0909	8.9207
logH	765	1.9301	0.4924	-0.5978	2.51

TABLE 5
Descriptive Statistics **developing**

	Obs	Mean	Standard Error	Min	Max
FDI	450	0.0289	0.0321	-0.0239	0.2146
integr	450	0.2887	0.1373	0	0.7992
integr2	450	0.2532	0.1759	0	1
FII	450	0.3243	0.1511	0	1
integr3	448	30.98	19.931	1.982	115.364
GDP(millions)	450	153275.4	207277.2	4904	1477367
g	450	0.0373	0.0578	-0.3392	0.6854
laggedFDI	420	0.0281	0.0313	-0.0239	0.2146
pop (millions)	450	125.8228	265.6321	3.049	1294.864
infl	450	65.4176	419.2691	-5.5509	7485.8
H	450	6.2771	2.3816	0.55	10.756
logpop	450	17.555	1.4077	14.9303	20.9816
loginfl	437	2.4736	1.3286	-3.0909	8.9207
logH	450	1.7312	0.5327	-0.5978	2.3754

TABLE 6
Descriptive Statistics **developed**

	Obs	Mean	Standard Error	Min	Max
FDI	315	0.031	0.0505	-0.0588	0.4603
integr	315	0.2173	0.161	0.0061	0.9689
integr2	315	0.31	0.2042	0	1
FII	315	0.1247	0.1432	0	1
integr3	315	35.7891	18.5092	8.0979	101.0557
GDP(millions)	315	950757.9	1597697	43043	8734868
g	315	0.0252	0.0209	-0.0638	0.1168
laggedFDI	294	0.0319	0.0515	-0.0053	0.4603
pop (millions)	315	39.7873	60.864	3.448	295.4069
infl	315	2.812	2.7968	-2.4899	20.6907
H	315	9.35	1.7867	4.33	12306
logpop	315	16.692	1.2263	15.0533	19.5038
loginfl	294	0.8564	0.7341	-2.3834	3.0296
logH	315	2.2141	0.2173	1.4655	2.51

b) Countries Included in the Sample

Argentina	Philippines	Denmark
Brazil	Rep. Korea	Finland
Chile	Sri Lanka	France
Colombia	Thailand	Germany
Costa Rica	Egypt	Greece
Dominican Republic	Nigeria	Ireland
Mexico	South Africa	Italy
Paraguay	Czech Republic	Japan
Peru	Hungary	Netherlands
Uruguay	Poland	New Zealand
Venezuela	Romania	Norway
Bangladesh	Russian Federation	Portugal
China	Turkey	Spain
India	Australia	Sweden
Indonesia	Austria	Switzerland
Malaysia	Belgium and Luxemburg	United Kingdom
Pakistan	Canada	United States