Network Effects in Risk Sharing and Credit Market Access: Evidence from Istanbul[×]

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Abstract

It is a truism that households in developing countries that face idiosyncratic income/expenditure shocks may face difficulties in smoothing consumption through formal credit institutions, and hence rely, at least partially, on informal ties. While this issue has been explored extensively in the literature for rural areas, the picture reflecting the urban setting remains uninvestigated. This paper aims to fill this gap by presenting an exclusively designed survey implemented in Istanbul. The results of a multi-stage logit estimation of the survey data indicate that monetary transfers from social networks and formal loans are complements, while general usage of network help implies an increased likelihood of asking for network help for easy and/or favorable access to credit. In addition, material security emerges as the key determinant of both eligibility for and use of a formal loan, and of having network help available in easing the loan approval process by banks.

Keywords: Social networks; risk sharing; credit market access; Turkey; household survey.

Jel No: C35, C42, D12, O18, Z14

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1 Introduction

In a developing country context—because of income variations caused, *inter alia*, by being employed in the informal sector, no job security and irregular pay—families who face idiosyncratic expenditure shocks may have difficulties in smoothing consumption. A body of literature has been concerned with the way in which households in developing countries manage to deal with this problem in a rural setting.[1] Since formal credit markets and well-functioning formal social security mechanisms are usually limited in such environments, if not totally missing, social networks—mainly in the form of family webs of connections—are found to be the main risk-sharing instruments.[2] Indeed, anthropologists have long argued that social networks are of particular importance in pre-capitalist societies and that such webs of connections may even, to some extent, resist developments in the financial sector.[3]

The seminal study in risk-sharing literature is Rosenzweig (1988), which examined the role of families in risk sharing in low-income rural areas. The results indicate that kinship ties serve both as family bonding grounds and consumption-smoothing mechanisms through which implicit insurance-based transfers may take place. Moreover, these transfers are found to be viewed as superior to credit market insurance, whenever available, by rural households. Other important contributions on the debate of risk sharing in rural areas are by Cochrane (1991), Udry (1994), Townsend (1994, 1995), Goldstein (1999, 2004), Fafchamps and Kurosaki (2002), Fafchamps and Lund (2003), Udry and Duflo (2004), and Goldstein et al. (2005). By and large these indicate that, although full insurance is usually rejected, strong evidence of risk sharing and some degree of consumption smoothing seem to exist among networks of friends and families in rural areas. Furthermore, the types of social networks used by households to mitigate risk are not seen as limited to family and friends; scholars like Jalan and Ravallion (1998), Gertner and Gruber (2002), Kazianga and Udry (2004), and Suri (2005) examine risk sharing in social networks that are extended to ethnic groups and neighbors.

While most of the empirical studies consider social networks to be exogenous, there are also many theoretical and experimental studies which analyze the endogenous formation and stability of social networks as well as the structure of risk sharing taking place within them (see Coate and Ravallion, 1993,

[1] Consumption smoothing has been studied both at the individual and at the household levels. For the sake of simplicity, we shall not be making such a differentiation, and use the two terms interchangeably.

[2] The discussion of social networks takes its roots from the social capital literature. For detailed information on social capital, its role in economics, and empirical analyses of social capital, see Coleman (1988), Keefer and Knack (1997), Glaeser, Laibson, and Sacerdote (2000), Durlauf (2002), and Durlauf and Fafchamps (2004). Social networks constitute the main platform for information exchange and transfers. Information flows within networks are analyzed in various areas, some of which are labor markets, as in Calvo-Almengol and Jackson (2006); migration, as in Bauer and Gang (2002); trade, as in Fafchamps and Minten (2002); and technology adoption, as in Conley and Udry (2001), Munshi (2004), and Bandiera and Rasul (2006). Our emphasis, as we shall state explicitly, will be on the role of networks in money transfers.

[3] An obvious contributor along this line is Polanyi (1957), who argued that there exist three forms of integration in any societal organization, with differing weights: reciprocity, redistribution, and exchange. In that sense, reciprocity–involving the movement of funds, goods, or services among two or more economic subjects (individuals, groups, institutions) that are situated symmetrically with respect to one another in a symbolic network—is expected to continue to assume importance in today's societies. See Adaman and Madra (2001) for further discussions.

Jackson and Wolinsky, 1996, Ligon et al., 2000, Genicot and Ray, 2003, Bloch et al., 2005, Charness and Genicot, 2004, and Bramoulle and Kranton, 2005).

Finally, besides functioning as risk-sharing mechanisms and sources of money transfers, social networks are also found, as in Okten and Osili (2004), to facilitate households' access to formal credit institutions. Their study, which takes a new approach to existing debates on risk sharing, shows that community and family networks are important in accessing a formal credit institution from which to borrow.

An interesting and so far uninvestigated question in the developing country context is whether households in urban, as opposed to rural, areas—where credit markets are (relatively speaking) available and well-developed—are directing themselves to formal credit institutions or whether they are still relying on their social networks (in the form of co-locality, family, etc.) to smooth consumption, and if they do prefer formal institutions, whether they use their networks to obtain easy/favorable access to formal credit. It is at this juncture that our study is positioned, with the aim of filling the gap in the risk-sharing literature by focusing on urban households in a developing country. More specifically, our study—which is based on an empirical investigation of the results of a household survey exclusively designed for this purpose—primarily analyzes the consumption-smoothing behavior of urban households when they are short of cash as a result of idiosyncratic income or expenditure shocks. In contrast to previous literature, *both* formal loans and informal money transfers are considered as risk-sharing instruments. While categorizing the preferences of households in using formal loans and/or informal transfers, our study also highlights the effects of social networks on easy/favorable access to formal credit institutions.[4]

We chose Istanbul as the site to put forward our questions, and in May 2006 we exclusively designed and conducted a face-to-face survey for this purpose (sample size: 600) with a representative power of the city at the household level (with a confidence interval of 95% with an error margin of ±0.04). Istanbul, the economic, intellectual and cultural capital of Turkey with a population of 12 million, is a unique *mélange* of informal connections and developed formal credit and insurance institutions. Despite regulations in the financial sector, as well as high economic growth averaging an annual rate of 6% in the last five years, the total household credit-to-GDP ratio in Turkey is 9%, which falls well below the average of 17%, 18%, and 50% in CEE countries, emerging markets, and key European economies, respectively—implying the continued existence of informal network ties in providing loans. All in all, strong variations in economic, educational and cultural levels of households constitute the basis of the heterogeneity of the city that connects Asia to Europe, as if representing variations between the two continents.

The descriptive statistics and the multi-stage logit estimations of the survey data lead to striking results on the consumption-smoothing behavior of Istanbulites. We observe that the level of wealth and extent of network usage in the areas of money transfers, as well as access to job opportunities, health and education services etc., are found as equally significant factors in determining household behavior when dealing with idiosyncratic shocks. In the same vein, past reciprocal behavior is found to reduce the likelihood

[4] Because of time limitation in the survey, we were not able to explore the mechanisms through which such social networks affect access to formal institutions.

of using a formal loan. Furthermore, monetary/in kind receipts from social networks and formal credits are observed to act as complements in consumption smoothing. Extensive use of network ties in general also increases the likelihood of asking help from networks to ease the loan approval process.

The results of this analysis support the co-existence of formal and informal risk-sharing mechanisms functioning both as substitutes and complements for the case of Istanbul, providing insight to the literature on the finance–growth nexus. The evidence that higher wealth increases the likelihood of choosing a formal loan suggests that improvements in wealth distribution may encourage households to further benefit from formal credit institutions by easing eligibility, and in turn, may contribute to the deepening of the financial sector.

This paper proceeds as follows: section 2 presents background information on Istanbul. Section 3 develops the conceptual framework for households' consumption smoothing behavior where formal and informal insurance mechanisms do co-exist. The econometric framework is discussed along with the survey design and descriptive statistics in section 4. Section 5 presents the empirical results. Concluding remarks follow in section 6.

2 Social structure and formal financial markets in Istanbul

Istanbul, a city of 12 million (approximately one-sixth of the total population of Turkey) as of 2005, is no doubt the cultural, intellectual and financial center of Turkey. By creating a per capita income of about 7,000 USD (PPP adjusted) in 2005, which is roughly 50 percent greater than the country's average, the city offers job opportunities to millions of people, which explains the wave-after-wave migration to the city. (Note that the city's population has increased tenfold in the last 50 years.) Thus, the first- and second-generation migrants constitute a large portion of the population—Istanbul consists of millions of people who have origins in different cities all around Turkey. The variation in the economic, educational and cultural levels of individuals makes it impossible to form a general, homogeneous profile of a household living in Istanbul. Where one side of the city is the center of intellectual and cultural activities with well-educated people, the other side is crowded with less educated, if not illiterate, people living in shanty houses and working in low-paid, informal jobs. In a way, many Istanbuls exist within the city itself.[5]

This heterogeneity may be one of the reasons for the presence and continuation of tightly connected social networks; but there certainly exists a set of cultural, sociological and political dimensions behind the close ties that connect households in Turkey in general, and in Istanbul in particular. The most common ties are argued to be family and friends networks. Other important ones are of a colocality nature (for those relatively recently migrated) as well as of a religious and political kind; to these one should add NGOs and professional societies which provide a facilitating environment for people to form their own networks.

[5] See Keyder (1999) and (2005) for an elaboration of the urbanization issue of Istanbul and the current socio-economic status of the city.

The financial sector in Turkey has been one of the fastest growing sectors in the last two decades (although with an interval at the 2001 financial crisis), and surely Istanbul has been leading in that regard. The banking sector in the country started to consider the households' credit market much more seriously after the late economic policies caused a decrease in interest rates. The sector responded by decreasing the volume of funds to government financing and transferring their resources to the private credit market. The decreasing interest rates also affected the demand side and household consumption rose as a response; the suppressed consumption motivations and beneficial credit opportunities increased household demand for loans.[6] Since 2002 it has been much easier to get personal/household credit for consumption/education; there are hundreds of bank branches all over the city, hundreds of ATMs, and all major banks offer Internet and phone banking to their costumers—to cite a few signs of developments in the formal credit market.

Finally, insurance and social security, so far chiefly provided by the public sector, are also useful instruments for risk pooling of households. Although these mechanisms are not directly used to smooth consumption, by increasing the level of security of the households they have an indirect effect on households' behavior when coping with cash shortages. Despite the fact that the insurance sector has been growing fast, many households are skeptical about these opportunities or do not find insurance necessary. Meanwhile, the social security system in Turkey is becoming more beneficial and protective for households with reforms that are underway. Yet problems remain, among which two have implications for the purpose of this paper. First, since social security is based on employment, it is not a universal coverage. Secondly, because of high social security expenditures, not all employers guarantee social security to their workers, although they are required to do so by law. Hence, only a proportion of the population are beneficiaries. Therefore, insurance and social security as risk-sharing mechanisms are not yet well-developed.

Putting all these together, a continuation of informal networks is expected in Istanbul. Nonetheless, the overall effect of these on risk-sharing, and—to the extent that they exist—the factors underlying such networks, are yet to be explored.

3 Conceptual framework

Focusing exclusively on rural areas, the aforementioned studies in the risk-sharing literature analyze how household consumption changes in response to changes in household income to check the existence of full insurance. In its basic form, the tests of the hypothesis of full insurance are conducted by regressing the change in individual consumption on the changes in the household income and the average village consumption. If the coefficient of the change in household income is statistically indifferent from 0 and the coefficient of the change in average village consumption is statistically indifferent from 1 simultaneously, it will then be concluded that full insurance takes place. That is, household consumption does not respond to the changes in household income, but varies in accordance with changes in average village consumption. Partial risk sharing is said to exist if the null hypothesis of full insurance is rejected, but at the same time

[6] Although the financial crisis in 2001 had negative effects on both the demand and supply of household loans, starting with 2002 the credit market regenerated its impetus.

household consumption is more sensitive to changes in average village consumption than to those in individual income. The majority of studies in the literature report strong evidence of partial risk sharing.

As the aim of this study is to bring an urban perspective into the debate on risk sharing at the household level, the urban setting of a developing country was explicitly considered while constructing the survey on which this study is based. A developing country setting provides a rich framework on two accounts. On the one hand, it is not accurate to expect consumption smoothing to take place solely via formal institutions, since financial markets are unlikely to be fully functioning and/or well-developed. On the other hand, as setting and/or maintaining informal social ties may not be easy, it would be misleading to consider the average city consumption, because of the existence of diverse socio-economic statuses. Hence, combining the two, the focus should be on the identification of the ways in which households cope with the change in their consumption resulting from a variation in income or expenditure.

In our analysis, modifying the conceptual framework used in Fafchamps and Lund (2003), we propose that households use the following three methods to deal with their cash shortages which are assumed to be exogenous: (i) loans from formal institutions, (ii) transfers from social networks, and (iii) households' own financial resources. In a formal manner, for household *i*, consumption at time $t = 0$ (before a shock that leads to a cash shortage), $c_{i,0}$, can be expressed as follows:

$$c_{i,0} = y_{i,0} + w_{i,0}, \tag{1}$$

where $y_{i,0}$ is the household income consisting of a permanent and a transitory component and $w_{i,0}$ is the asset accumulation and/or savings of the household. When the shock is faced, the household is expected to smooth consumption using the additional two instruments, thus for $t = 1$ (after the shock) the above equation becomes:

$$c_{i,1} = y_{i,1} + w_{i,1} + a_{i,1} + b_{i,1}, \tag{2}$$

where $a_{i,1}$ is the amount of loans the household receives from formal credit institutions, and $b_{i,1}$ is the amount of transfers the household receives from social networks.

In order to obtain a loan from formal credit institutions, which corresponds to $a_{i,1}$ in equation (2), households must be eligible for a formal loan. Households are classified as eligible or not, based on meeting the conditions for formal loan approval. It goes without saying that eligible households may as well choose not to take up a formal loan. But, once they decide to obtain a formal loan, they may use their social networks in order to accelerate the loan approval process or to benefit from formal credit opportunities on more advantageous terms. Therefore, modeling this process requires a three-stage framework. At the first stage, whether or not the individual is eligible for a formal loan is determined. At the second stage, whether or not the eligible individual chooses to take up the formal loan is determined. At the third and final stage, whether or not the eligible individual who opts for the formal loan does so with help from his or her networks is determined. As such, our path extends the direction of Okten and Osili (2004) in stressing the role of social networks as a tool of information dissemination for credit access toward the role of social networks in providing favorable terms in credit access. To put it in a taxonomical framework,

$Y_0 = 1$ if the individual is eligible for the formal loan, 0 otherwise;

$Y_1 = 1$ if the eligible individual chooses to take up the formal loan, 0 otherwise;

$Y_2 = 1$ if the eligible individual who chooses to take up the formal loan does not use social networks for access, 2 if he/she uses social networks for access, 0 if he/she does not have such networks.

As is clear, Y_1 is realized only when $Y_0 = 1$, and Y_2 is realized only when $Y_1 = 1$ (and thus when $Y_0 = 1$). This makes it possible to classify households into 5 types: Type A households are those with $Y_0 = 0$. Type B are those with $Y_0 = 1$ and $Y_1 = 0$. Type C are those with $Y_0 = 1$, $Y_1 = 1$ and $Y_2 = 0$. Type D are those with $Y_0 = 1$, $Y_1 = 1$ and $Y_2 = 1$. Type E are those with $Y_0 = 1$, $Y_1 = 1$ and $Y_2 = 2$. Henceforth, we will refer to households according to their types.

[Insert Figure 1 about here]

Figure 1 displays this categorization. In addition, in Figure 1, each type is further divided into three groups based on whether or not they use money transfers from their social networks, i.e. $b_{i,1}$ in equation (2). The first group consists of those households who do not have any social networks from which to get money transfers, or do have such social networks but are rejected for money transfers. The second group includes those households who have such social networks but do not prefer to use these for money transfers. The third group is composed of those households who receive money transfers from their social networks.

Finally, households may as well use their own financial resources, which is represented by $w_{i,1}$ in equation (2). One way might be to use household monthly income to deal with the shock, and thus reduce household consumption. Other types of financial resources considered in this study are interest earnings from deposits at banks, savings, asset sales, and credit card usage. (Note that this further division is not displayed in Figure 1.)

It is possible to use these three instruments in various combinations, as suggested by equation (2). Using equation (2) as a backdrop, our aim in this paper is to analyze when and how individuals use formal credit, $a_{i,1}$, if they do so. More specifically, in investigating the use of formal credit, we will consider the use of money transfers from social networks, $b_{i,1}$, as well as the use of own financial resources, $w_{i,1}$, as explanatory variables, among other household characteristics.

4 Econometric framework and survey data

Based on the conceptual framework developed above, we designed a survey which was conducted on households living in Istanbul, with which, in addition to obtaining descriptive information about the household types, we estimated a three-stage logit model that is in line with the *sequentiality* of the conceptual framework described above.[7] The three-stage logit model is constructed as follows. In the first stage, the determinants of household eligibility for formal loan are investigated. This is done through

[7] This multi-stage logit model is similar to the multi-stage probit model of Okten and Osili (2004).

estimating a binary logit model with Y_0 as the dependent variable. The second stage analyzes when the eligible individual chooses to use formal credit. A binary logit with Y_1 as the dependent variable is estimated at this stage. The third stage explores the factors that influence the use of networks in accessing formal credit by those individuals who are eligible and choose to use formal credit. Here, the dependent variable is Y_2, which covers three possibilities: the individual does not have any networks to use, does have those networks but prefers not to use them, or the individual uses his/her networks. Hence, a multivariate logit model is estimated at the third stage. The explanatory variables used in these regressions vary by stages and will be explained in subsection 4.2.

4.1 Survey and descriptive statistics

The survey questions were first experimented on three focus groups, each consisting of 5–7 household representatives (the grand total being 19) who were characterized as having different economic and social backgrounds in order to test the overall applicability of the survey. The fieldwork was conducted through face-to-face interviews with households by a professional survey company in May 2006.[8] The sampling procedure was as follows. Population distribution within Istanbul was calculated on the basis of the urban population of its 32 districts. The districts were ranked according to their population and those first ones, that in the aggregate formed 80 percent of the total population, were named as large-size districts and the rest were named as small-size districts. The large-size districts were considered as self-representing, and for the rest of the sample three small-size districts were chosen randomly in proportion to their sizes. A total of 50 neighborhoods were then selected randomly as representatives of the selected districts. In the final step, within each neighborhood, streets were categorized as low-, medium-, and high-income groups, based on the official records on property values, and two streets from each category, i.e. six streets from each neighborhood, were randomly chosen. In each street, two households were randomly selected. The targeted survey size was 600 (representing the city at household level within a 95% confidence interval with a margin of ±0.04).

The interview was conducted with the household member who was well informed about the economic past of the household.[9] Respondents were then asked whether their household had any significant income or expenditure variations in the past two years, which we named as "shocks." If they did not experience any shocks, or if they did but refused to participate in the study (the rejection rate was 12 percent), then the interviewers passed to the predetermined alternative household on the same street. The shocks were considered to be exogenous to the households, and were defined as "expected" or "unexpected" necessities that caused cash shortages. Valuable asset purchases or marriage expenses were included in this definition along with the obvious ones such as health/education expenditures or problems arising when the

[8] The survey is available from the authors upon request.
[9] Since our aim was to collect data at household, as opposed to individual, level, we applied no randomization or quota at the household unit.

breadwinner loses his/her job.[10] Respondents, representing households which had experienced more than one shock in the previous two years, were then asked to specify the shock which had the most severe effect on their economic well-being, and to consider this while answering the survey.

Since the main objective of this paper is to define households' behavior in dealing with cash shortages, respondents were asked how as a household they responded to shocks with the risk-sharing mechanisms identified in section 3. Detailed questions on credit usage, money transfers from networks, and usage of own financial resources were then followed. Next, respondents were asked whether as a household they received any help from their networks in areas other than money transfers. Finally, the number of people contributing to household income, household members' education levels and social security statuses, and household's monthly expenditures as well as material security levels were investigated. Key descriptive information is summarized below.

- The most common shocks faced were debt repayments (40.3 percent), unemployment (18.2 percent), health expenditures (14.0 percent), and educational costs (10.5 percent). 32 percent of the shocks were unexpected. The detailed results are presented in Table 1.

[Insert Table 1 about here]

- 23.3 percent of the sample was found ineligible, i.e. Type A. Note that we relied on the responses of the household representatives to the survey questions to classify households as eligible and ineligible (since objective data on eligibility is unavailable). Out of the 600 households in our sample, 76.7 percent revealed they were eligible. Among the eligible households, 41.3 percent were found to have obtained a formal loan. Of those households who obtained a formal loan, 18.4 percent were Type C, 47.9 percent were Type D, and 33.7 percent were Type E. Further descriptive information on household types is presented in Table 2.

[Insert Table 2 about here]

- The favorite method to deal with cash shortages was found as households' own financial resources, w in equation (2), with 67.50 percent of the total sample, which includes monthly income, interest earnings from deposits at banks, savings, asset sales, and credit card usage. The second preferred method was money transfers from social networks, b in equation (2), with 42.17 percent of the total sample, and the third one was formal loans, a in equation (2), with 31.67 percent of the total sample and 41.30 percent of eligible households. Only 4.67 percent of the total sample could not use any of these three methods.

[10] Note that there is no universal health coverage in Turkey. Those unemployed and those working in the informal sector have to carry the burden, and even if one has a public/private health insurance, in case of a health problem, one may have to make a sizeable contribution. In the same vein, although the bulk of the educational system in the country is almost free of charge, families may have to incur substantial costs.

- The results show that households also use their social networks to find new jobs, to register their children to preferred schools, and to have easy access to health care. The data depicts a lack of strong positive correlation between the social networks counted on in these areas and social networks trusted in money transfers, with the corollary that households who have social networks for money transfers do not necessarily have social networks, say, to find new jobs, and vice versa.

4.2 Explanatory variables

The survey enabled us to gather a rich set of information to use as explanatory variables in our regressions. We included all the information that we thought would characterize the households' eligibility, the decision to obtain a formal loan, and the decision to use networks for easy/favorable formal loan access. These variables are listed below.

- *Household characteristics*: average education level, number of income earners, income per household member, material security, social networks index, and number of children in the household.
  - *Education:* Higher education level might be an indicator of being more informed about the credit markets. Thus higher education was expected to indicate higher tendencies to benefit from the formal loan opportunities. This variable was calculated as follows. The number of years spent for compulsory education is subtracted from the total years of education for each household member, which gives the education score for each member. Then the average education score for the household is constructed by dividing the total score by the weighted household size (which was computed according to Eurostat methodology).
  - *Material security:* As higher levels of material security indicate lower default risk, material security is expected to increase the probability of obtaining a formal loan. However, as it is a form of alternative financing, it may also decrease the likelihood of obtaining a loan. In the survey, respondents were asked whether they had certain material possessions. Respondents were also asked to report whether they were covered by a social security scheme, and the amounts of debt and receivables, if any. If a household had any debts and/or receivables that amounted to more than one-third of the monthly household income, we recorded that household as debtor, creditor, or both. Using 1 and 0 for each possession, social security coverage, and debt/credit status, we applied the principal component analysis to calculate an index showing the material security level for each household.
  - *Income per capita:* Similar to material security, the effects of a higher level of income per capita are ambiguous. In the survey, respondents were asked how much the average monthly expenditures of a similar household would be, as a proxy for the income of the household. We adjusted this amount for those who were not asked to pay any rent for housing (as they used their

acquaintances' residence), and for those who received regular amounts in cash and in kind transfers. Per capita income was then calculated by using the weighted average household size.

- *Number of income earners in the household:* The higher the number of income earners is, the lower the default risk is. Thus, when the number of income earners is higher, it is anticipated that the household is more likely to obtain a formal loan. In calculating this variable, all those household members who earn money in the formal or informal sector are scored with 1, and those who only receive retirement pensions are scored with 0.5. The summation of the scores of household members gives the total number of income earners in the household. This is intended as a proxy for labor market participation.
- *Social networks index:* This index was constructed to quantify the networks the households belonged to with the anticipation that it would indicate the potentiality of informal borrowing and/or of getting assistance in access to formal credit. It was composed by using the data on ethnicity (Turkish vs. Non-Turkish origin), religion (sects of Islam, other religions, degree of religiousness), migration, and social integration of the household members through participation in volunteer activities of any organizations or NGOs, neighborhood meetings, family visits, cultural activities, etc. We constructed this index via the principal components analysis.
- *Number of children in the household:* Households with more children were more likely to pay more for education and health expenses; therefore, such households might be assumed to face greater amounts of cash shortages compared with households with fewer or no children. All those household members younger than age 14 were considered to be children.

- *Network usage index*: Besides how many networks households had, network usage might equally be important in determining the households' behavior when faced with the shock. Note that this is different from social networks index in the sense that the social network index indicates a potentiality, while the network usage index indicates a realization. This index was defined in two different ways. In the first alternative, the network usage index included money transfers from social networks as well as receiving help in other areas such as finding new jobs, gaining access to some health services, or registering children for preferred schools. In the second alternative, the index only included money transfers. By using the two alternative definitions, we aimed to determine the differences between social networks used for money transfers only, and social networks used for help in general. We asked respondents whether their household received any money transfers from their networks to cope with the shock, and we also asked them whether their household received any help from their networks to find new jobs, to gain access to health services and to register their children for schools of their preferences. Respondents chose one of the following answers: "Use networks" (meaning that they did use the networks), "Not use networks" (meaning that networks were available but they did not use them), and "Unavailability of networks" (meaning that no networks were available). Using the principal component analysis, an index showing the network usage of the household was constructed.

- *Reciprocity*: This was an indicator showing to what extent households were providing support to others, taking into account the importance of potential reciprocal activities. Just like the network usage index, the reciprocity index was defined in two alternative ways, the first one considering help in general and the second one exclusively money transfers. We rephrased all the network usage questions in a reciprocal way to learn how much help households provided to their networks in the form of money transfers, and help in employment, education, and health services. This index is constructed by the principal component analysis.
- *Usage of own financial resources*: Since households also use their own financial resources to cope with the shocks, those with higher levels of this variable might be assumed to have less of a tendency to obtain a formal loan. We asked respondents what sort of financial resources their households owned and which of these they used to smooth consumption when they faced the shock. The usage of own resources is added as a dummy variable to the regressions.
- *Definition of the shock*: This is a dummy variable which is 1 if the shock was unexpected, and 0 otherwise (recall that respondents were asked whether their household had any significant income or expenditure variations in the past two years). Of the nine shocks that were listed—health expenditures, unemployment, business expenditures, establishing a new business, death of the person responsible for earning the household income, education expenditures, marriage, valuable asset purchases, and debt repayments—respondents were asked to reveal those experienced. Of these, health expenditures, unemployment, and death are categorized as unexpected shocks. When faced with unexpected shocks, social networks may be more willing to help households in need, reducing the tendency to obtain a formal loan.[11]
- *Percentage of the loan request approved (by banks)*: It was anticipated that those households which used their networks for easy/favorable formal loan access would be more likely to obtain the total amount requested. This is captured by the dummy variable which was defined as taking the value of 1 if at least 75 percent of the loan demanded was obtained, and 0 otherwise.

5 Results

We ran two sets of regressions to analyze our data as discussed in section 4. In the first set of regressions all the explanatory variables described in section 4.2 were used. As mentioned above, social networks used for money transfers and social networks used for help in other areas need not be identical. Therefore, the network usage and reciprocity indices, when calculated using all possible areas of help, might lead us to overestimate the importance of these two variables. Taking this into account, the second set of regressions

[11] Of the unexpected shocks, expenditures on health may as well be thought of as being *expected*. Anecdotal observations and the results of our focus groups indicated that if health expenditure in the family is expected, you would rather plan ahead in time to acquire some form of formal insurance with which you would be able to cover most of, if not all, the expenses. Therefore, if a respondent revealed health expenditures as the source of the financial burden, it is highly likely that it was unexpected.

used the second definitions for these indices (see section 4.2), which only measured the usage of networks and reciprocity in terms of money transfers.[12]

Stage 1: Determination of eligibility

- In both sets of regressions (see Table 3), the binomial logit estimation results indicated that material security and the number of income earners were positively significant at 1 and 10 percent, respectively. Since formal credit institutions require loans to be given on wealth and income, the effect of these variables on the eligibility of households was positive, as expected. Also, Type A households were found to have the minimum number of income earners in their households, which supported this result (see Table 2).

[Insert Table 3 about here]

- The network usage index was found to be negatively significant at 5 percent only in the first set of regressions. This result shows that households who used their social networks in general, and not only for money transfers, were more likely to be ineligible for a formal loan.
- Although low income and education levels are defining factors of Type A households, eligibility depends on neither. In addition, eligibility is independent of the social networks index, reciprocity index, and the number of children in the household.

Stage 2: Determination of the use of formal credit by eligible households

- In both sets of regressions (see Table 4), the definition of the shock was negatively significant at 1 percent, implying that households were more likely to contract formal loans when faced with expected expenditures. The underlying mechanism may be thought of as follows: unexpected shocks drive households out of the credit market due to an increased uncertainty about the future, and in turn, due to a reduced possibility of repayment.
- The usage of own resources was also negatively significant at 5 percent in the first set, and at 1 percent in the second set of regressions, implying that a formal loan was seen as a substitute for using own resources.

[Insert Table 4 about here]

- Material security was positively significant at 5 percent in the first set of regressions and at 10 percent in the second set. Households with higher levels of material security were more likely to contract formal loans due to relative security about the future.

[12] Note that households' ability to receive money transfers from networks may be correlated with their money transfers to networks. We checked the correlation between the second definitions of network usage index and reciprocity index, and found no significant evidence of correlation, as otherwise we would have to run the second set of regressions again without the reciprocity index.

- The network usage index was also positively significant at 5 percent in the first set of regressions and at 10 percent in the second set. Those households who used their networks for money transfers only, as well as those who received network help in general, were found to be more likely to contract formal loans. This indicates that households viewed their social networks as complements when they contracted formal loans.
- The reciprocity index was negatively significant at 10 percent in the first set of regressions and at 5 percent in the second set. This shows that households who did not help or transfer money to their social networks in the past were less likely to receive help or money transfers from their connections. Therefore, they chose formal loans over transfers from social networks.
- As in the first stage, education, income, the social networks index, and the number of children in the household turned out to be statistically insignificant. Moreover, the number of income-earning households was also insignificant.

Stage 3: Determination of the use of networks in accessing formal credit

Table 5 reports the multivariate logit results for Stage 3 using Type C households as the base category. For space considerations, the results using Type D or Type E households as the base category are not included (and are available from the authors upon request).

- In both sets of regressions, material security was positively significant at 1 percent for Type D and 5 percent for Type E relative to Type C. In addition, higher material security implied a higher likelihood of being a Type D household relative to Type E. Hence, even if higher wealth implied the availability of networks that households could benefit from in terms of easy/favorable access to formal credit, when wealth exceeded a certain (indeterminate) threshold, households chose not to use those networks.
- The usage of own resources was positively significant at 1 percent for Type D relative to Type C in both sets, and at 1 percent and 5 percent for Type E relative to Type C in set 1 and set 2, respectively. This again implies that those households who were able to use their own resources in case of difficulty were more likely to have networks for easy/favorable loan access that they could benefit from. This variable does not help the differentiation between Type D and Type E households.

[Insert Table 5 about here]

- Income was positively significant at 5 percent in the first set and at 10 percent in the second set for Type D households. Type D households also had the maximum average income per capita. These show that households with higher income levels tended to have more social networks for easy/favorable loan access but did not use these networks. It is therefore conceivable to think that they were able to get sufficient amounts of formal loans since formal institutions tend to consider higher income as a signal of lower default risk.

- This last result was also supported by the positive significance of the approval of the high percentage of the total loan requested (75 percent and above) at 5 percent for Type D households in the first set of regressions and 10 percent in the second.
- In the first set of regressions, the network usage index was negatively significant at 1 percent for Type D and at 10 percent for Type E households. In the second set, it was significant at 1 percent for Type E households only. These results show that those households who did not use their social networks for help in general were more likely to have no networks to receive help in accessing formal credit. In addition, the more excessive the network usage was, the higher was the likelihood of being a Type E household relative to a Type D, indicating that those who extensively used their networks in general at the same time tended to use their networks for access to formal credit.
- The number of children in the household was significant at 10 percent for Type E households in the first set of regressions. Households with more children would require extra money for expenses on education, etc., and thus were more likely to use their social networks for easy/favorable loan access.
- Although Type D and Type E households had the highest average social networks indices and education in the sample, these variables were found not to be effective at this stage. Higher levels of education might be thought to imply more power and prestige, thus enabling one to get credit without receiving any help, when in fact help was received implicitly.[13] The reciprocity index and the number of income earners were also found to be insignificant.

In order to check for the robustness of our results in the way certain variables are defined, we also ran our 3-stage regressions with different definitions of some of the explanatory variables which are found to be insignificant above. We redefined education as a dummy variable taking a value of 1 if at least one member of the household had a university degree, and 0 otherwise. The number of income earners was defined in two alternative ways. First, the original variable was divided by the number of adults in the household; secondly, a dummy variable with a value of 1 if at least one member of the household was working at the formal sector, and 0 otherwise, was created. The results do not change with these new definitions. Moreover, the addition of a new variable showing the average age of adults in the household (to proxy for the idea that a young married couple may have fewer social network ties, and thus, be more inclined to use formal credit) does not affect the results either. In all these new regressions, the insignificant regressors remain insignificant, indicating that our results are robust in the way in which these variables were defined.

6 Conclusion and discussion

[13] Our experience with the focus groups showed that it is not easy to differentiate between those households who did not want to use their social networks from those who did not find it necessary to do so. Therefore, regardless of the motivation, we are only interested in their choice of not using the available social networks.

This study aimed to extend the results in the existing risk-sharing literature by analyzing the risk-sharing schemes and formal credit access in a unique urban setting, Istanbul, where social networks are tightly connected and at the same time formal credit institutions are relatively well-developed. The survey, which was designed and conducted specifically for this study, provided detailed information on the risk-sharing behavior of 600 randomly chosen urban households who had experienced cash shortages due to income or expenditure shocks in the past two years. The data on the usage of formal credit, transfers from networks, the usage of household resources, various household characteristics, and the nature of shocks faced is analyzed with a multi-stage logit estimation in order to characterize the households according to their risk-sharing behavior and to determine the effective variants in their choices.

The descriptive statistics of the survey data indicate that most households primarily benefit from their own financial resources when coping with cash shortages. Moreover, money transfers from social networks are commonly preferred as risk-sharing mechanisms. When such transfers were further analyzed, it was noted that they took place mostly within small networks of family and friends—in contrast to the claim that religious networks have been playing an increased role in such transfers in Istanbul.[14]

The econometric analysis of the data yield interesting results. First, household eligibility for a formal loan is affected only by wealth and labor force participation, in a positive way. Secondly, wealthier households are more likely to choose to obtain a formal loan, and the use of own resources are perceived as substitutes for a formal loan. Thirdly, the likelihood of a formal loan contract is higher if the expenditure shock was an expected one.

The implications of network usage for the decision of obtaining a formal loan can be summarized as follows. First, if the household had used help from networks, then the likelihood of contracting a formal loan would have increased. In that respect, networks and formal loan can be thought of as complements. Secondly, past reciprocal behavior reduces the tendency to choose formal loan, possibly due to the trust in the network ties in terms of reciprocating the help.

The paper also investigated the role of networks in providing favorable terms in and/or easing the loan approval process. Households with financial security appear to have network help available in terms of access to formal credit. But once financial situation is above a certain threshold, households prefer not to use that help. Moreover, the extensive usage of networks in general implies that households at the same time use network ties for easing the access to formal credit.

Other striking evidence is that education, income, and the potentiality of networks are found to have no significant effect on the categorization of the households. While wealth is highly significant throughout our analysis, income is found to be insignificant in determining households' preferences on obtaining a formal/informal loan, a result which is reflected in the fact that the income averages among household types are not significantly different. The availability of social networks does not imply the possibility of money transfers or help from them in general. Yet, if the available networks were actualized by the households, they were perceived as complements to a formal loan.

[14] To that, one could raise two speculations: One might be that help received from religious networks is generally in kind; the second might be that households may name their contacts with religious ties as friends.

The result that transfers from social networks are by and large considered as important by urban households in Istanbul is worth reflecting upon. Although credit markets are functioning well in Istanbul, general mistrust in the banking sector due to the past bank crisis (of 2001) may be one possible explanation for this finding. Also, formalities in the credit markets may have driven many households out of these markets due to the exaggerated common beliefs about the harshness of the procedures and penalties in obtaining and repaying the loan (as revealed by many in our focus group studies). The importance of the material security level for eligibility and for the decision to obtain a formal loan leads to the suggestion that improvements in the household material security level and movements towards a fair distribution of wealth may ease eligibility and encourage households to further benefit from formal credit institutions.

Nevertheless, improvements in material security and further deepening of financial markets may not make informal transfers totally redundant in the future. First, considering the fact that households view their social networks as insurance against possible difficulties in repayments of their formal loans, the respective demands for the two types of risk-sharing instruments can be thought to be evolving in an *interwoven* manner. Secondly, to the extent that the high level of social capital among closed circles (friends/families) will continue to be a societal characteristic, independent of the level of the development of formal institutions, people may well consider social networks as a superior alternative to formal settings.

This said, however, such social, close networks may not be functioning smoothly and amicably at all times—back pages of tabloid newspapers are always full of horror stories of bloody fights of (almost always masculine) people "over the issue of debt." Yet, as the survey highlighted, not an insignificant amount of people in Istanbul still go for their networks in one way or another in cases of consumption smoothing. Hence, the view that reciprocal and informal insurance and credit arrangements are of an earlier and to-be-superseded variant of modern (and more efficient) insurance/credit institutions does not seem to hold for the case of Istanbul, at least as of today. What the future will bring about is an open question, since it is a truism, after all, that Istanbul cuts across not only geographical and political but also cultural and economic categories.

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Figures and Tables

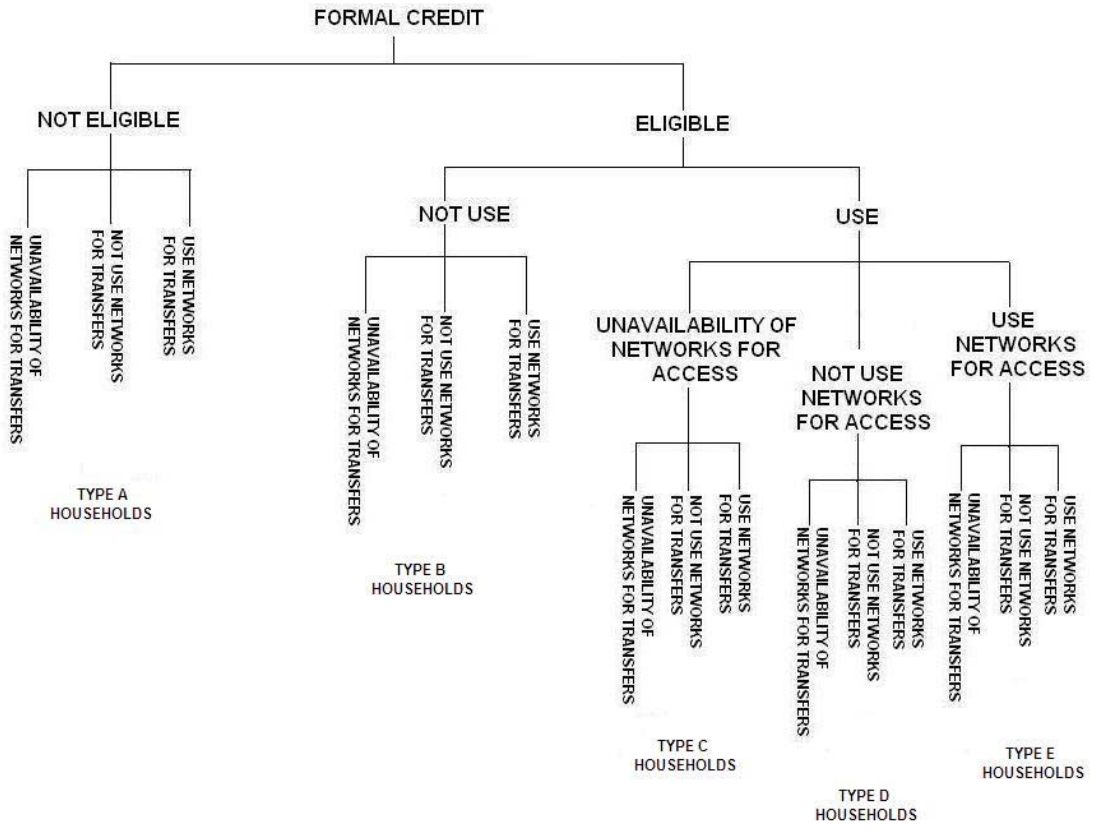

Figure 1: Household types

Households	Type A	Type B	Type C	Type D	Type E	Total
Health expenditures	18.5	15.9	0.0	9.9	9.4	14.0
Unemployment	33.6	16.7	5.7	10.9	7.8	18.2
Business expenditures	2.9	4.4	5.7	7.7	7.8	5.0
Establishing a new business	0.0	2.2	0.0	5.5	3.1	2.1
Death	0.0	0.4	0.0	0.0	0.0	0.2
Education expenditures	7.9	13.7	14.3	8.8	3.1	10.5
Marriage	1.4	3.3	2.9	6.6	4.7	3.5
Valuable assets	1.4	1.9	20.0	15.4	14.1	6.2
Debt repayments	34.3	41.5	51.4	35.2	50.0	40.3
Unexpected shocks	52.1	33.0	5.7	20.9	17.2	32.3

Table 1: Types of shocks in percentages

Household types in the sample						
Households	Type A	Type B	Type C	Type D	Type E	Total
Number	140	270	35	91	64	600
Percentage	23.3	45	5.8	15.2	10.7	100
Some descriptive data on households in averages (Standard deviations in parentheses)						
Households	Type A	Type B	Type C	Type D	Type E	Total
Income per capita	500.61	753.5	544.57	872.13	656.3	689.93
	(345.5)	(1214.73)	(461.1)	(1111.56)	(364.53)	(958.45)
No. of income earners	1.19	1.42	1.56	1.61	1.56	1.42
	(0.86)	(0.90)	(1.03)	(0.93)	(1.15)	(0.94)
Education per capita	1.25	2.46	2.50	3.52	3.00	2.40
	(2.68)	(2.91)	(2.72)	(3.15)	(2.83)	(2.96)
Adult age	36.48	35.49	37.67	37.03	35.05	36.03
	(8.43)	(7.41)	(8.32)	(8.53)	(8.05)	(7.96)
No. of income earners/No. of adults	0.43	0.5	0.47	0.53	0.51	0.49
	(0.28)	(0.25)	(0.27)	(0.26)	(0.27)	(0.26)
Social networks Index	2.37	2.76	2.64	2.81	2.89	2.68
	(0.93)	(1.04)	(0.71)	(1.05)	(0.92)	(1.00)
Some of the characteristics of households (in percentages)						
Households	Type A	Type B	Type C	Type D	Type E	Total
Ethnic	13.6	10.4	5.7	8.8	9.4	10.5
Volunteer in organizations	15.7	12.6	5.7	23.1	29.7	16.3
Migrated	70.7	66.7	68.6	56	54.7	64.8
In debt	60.7	54.1	94.2	82.4	90.6	66.2
Receiving monthly help	12.9	7	2.9	9.9	10.9	9
Sources of formal loans in percentages						
Households	Type A	Type B	Type C	Type D	Type E	Total
Loan from bank			88.6	82.4	82.8	83.7
Loan from credit card			31.4	24.2	23.4	25.3
Loan from money lenders			2.9	1.1	0	1.1
Sources of money transfers in percentages						
Households	Type A	Type B	Type C	Type D	Type E	Total
Family/Relatives	81.8	78.1	66.7	85.7	78.4	79.5
Friends	45.5	43.8	33.3	39.3	32.4	41.7
Colocality	1.8	1.6	0	3.6	0	1.6
Political	3.6	0	0	0	0	0.8
Religious	0	0.8	0	0	0	0.4
Money transfers from networks in percentages						
Households	Type A	Type B	Type C	Type D	Type E	Total
Unavailability of networks	39.3	15.2	57.1	14.3	14.1	23.1
Not use networks	21.4	37.4	25.7	54.9	28.1	34.6
Use networks	39.3	47.4	17.2	30.8	57.8	42.3
Sources of network help for obtaining credit						
Households	Type A	Type B	Type C	Type D	Type E	Total
Family/Relatives					62.5	62.5
Friends					37.5	37.5
Political					3.1	3.1

Table 2: Data on household types

	[1]	[2]
Constant	3.4479*	3.6775*
	(1.0959)	(1.0910)
Number of income earners	0.2125***	0.2346***
	(0.1261)	(0.1269)
Education per capita	0.0179	0.0151
	(0.0493)	(0.0491)
Income per capita	0.0005	0.0005
	(0.0003)	(0.0003)
Number of children	-0.0605	-0.0286
	(0.1041)	(0.1036)
Material security	0.5803*	0.6666*
	(0.1564)	(0.1534)
Social Networks Index	0.0964	0.1531
	(0.1201)	(0.1174)
Network Usage Index	-0.2801**	0.0051
	(0.1179)	(0.1084)
Reciprocity	0.1216	0.3108
	(0.1356)	(0.2885)
LR Chi-Square (coeffs equal zero):	266.6462	260.8025
d.f.	9	9
p-value =	0	0
Adjusted percent correctly predicted:	0.1000	0.1500
McFadden's pseudo R-square:	0.1331	0.1242

Table 3: Stage 1 estimation results. Dependent variable is Y_0. Standard errors are in parentheses. Models [1] and [2] correspond to the first and second sets of regressions explained in Section 4. *, **, and *** denote significance at 1%, 5% and 10%, respectively.

	[1]	[2]
Constant	1.8881**	1.6284***
	(0.9568)	(0.9521)
Definition of shock	-0.7949*	-0.8140*
	(0.2447)	(0.2445)
Number of income earners	0.1418	0.1171
	(0.1071)	(0.1067)
Education per capita	0.0295	0.0328
	(0.0433)	(0.0438)
Income per capita	-0.0001	-0.0001
	(0.0001)	(0.0001)
Number of children	-0.1553	-0.1409
	(0.1150)	(0.1157)
Material security	0.3356**	0.2526***
	(0.1376)	(0.1349)
Social Networks Index	0.0084	-0.0177
	(0.1085)	(0.1071)
Network Usage Index	0.2368**	0.1811***
	(0.1073)	(0.1008)
Reciprocity	-0.2019***	-0.4785**
	(0.1096)	(0.2351)
Usage of own resources	-0.5557**	-0.6578*
	(0.2167)	(0.2216)
LR Test for joint significance	57.9775	56.4756
d.f.	11	11
p-value =	0	0
Adjusted percent correctly predicted	0.1684	0.1684
McFadden's pseudo R-square	0.0705	0.0681

Table 4: Stage 2 estimation results. Dependent variable is Y_1. Standard errors are in parentheses. Models [1] and [2] correspond to the first and second sets of regressions explained in Section 4. *, **, and *** denote significance at 1%, 5% and 10%, respectively.

	[1]		[2]	
	Type D/Type C	Type E/Type C	Type D/Type C	Type E/Type C
Constant	3.7339	1.6351	3.1418	1.7235
	(2.4322)	(2.4103)	(2.3158)	(2.4006)
Definition of shock	3.0745*	2.3247**	2.6402*	2.2059**
	(0.9563)	(0.9398)	(0.9053)	(0.9179)
Number of income earners	-0.0459	-0.0941	0.1001	0.057
	(0.2368)	(0.2339)	(0.2451)	(0.2489)
Education per capita	-0.0355	0.0229	0.0145	0.0575
	(0.1100)	(0.1086)	(0.1028)	(0.1056)
Income per capita	0.0017**	0.0012	0.0015***	0.0009
	(0.0008)	(0.0008)	(0.0008)	(0.0008)
Number of children	0.3222	0.5405***	0.3672	0.4717
	(0.3191)	(0.3129)	(0.3245)	(0.3274)
Material security	0.9917*	0.6473**	1.0341*	0.7789**
	(0.3361)	(0.3277)	(0.3223)	(0.3305)
Social Networks Index	-0.2448	0.0502	-0.0353	0.1662
	(0.2973)	(0.2956)	(0.2875)	(0.2932)
Network Usage Index	-0.8633*	-0.4829***	-0.2066	-0.7137*
	(0.2825)	(0.2808)	(0.2616)	(0.2658)
Reciprocity	-0.1133	0.0209	0.2206	0.3317
	(0.2909)	(0.2853)	(0.5931)	(0.6058)
Usage of own resources	1.5435*	1.3658*	1.3973*	1.2021**
	(0.5242)	(0.5155)	(0.5013)	(0.5138)
Percent of loan request approved	1.0809**	0.5153	0.9744***	0.5020
	(0.5264)	(0.5133)	(0.5079)	(0.5098)
LR Test for joint significance	89.5317		89.917	
d.f.	24		24	
p-value =	0		0	
Adjusted percent correctly predicted	0.1212		0.2121	
McFadden's pseudo R-square	0.1627		0.1637	

Table 5: Stage 3 estimation results. Dependent variable is Y_2. Column "Type D/Type C" corresponds to coefficient estimates of $Y_2=1$ relative to those of $Y_2=0$, and Column "Type E/Type C" corresponds to coefficient estimates of $Y_2=2$ relative to those of $Y_2=0$. Standard errors are in parentheses. Models [1] and [2] correspond to the first and second sets of regressions explained in Section 4. *, **, and *** denote significance at 1%, 5% and 10%, respectively.