

INVESTMENT UNDER LIBERALIZATION Channels of Uncertainty and Liquidity

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Abstract

This paper examines the effects of financial liberalization on investment decisions of manufacturing firms in Turkey. It is hypothesized that such effects operate mainly through the channels of liquidity and uncertainty. Based on the results of a qualitative field research project that involved interviewing the managers of manufacturing firms, a firm level investment model which contains output, liquidity and uncertainty is developed. I test the validity of the model with an original unbalanced data set comprising 165 firms for the period 1985-2003 and use Generalized Method of Moments (GMM) to estimate this dynamic model. Hypotheses are tested by utilizing various aggregate financial deepening indicators to proxy for financial liberalization. Results provide evidence for a negative relationship between firm level investment and uncertainty variables and a positive relationship with liquidity and sales variables. Negative impact of uncertainty on investment is worsened under financial liberalization, while there is no evidence of declining importance of liquidity. Overall, results suggests that financial reform policies did not lead to expected benefits for the investment of real sector firms while producing increased uncertainty that impedes investment further.

Keywords: *Financial liberalization, Investment, Uncertainty, Liquidity*

JEL Classification: *F2, D2, G3, O1, O5*

1. Introduction:

The accumulation of real physical capital is widely recognized as a crucial factor in economic development. With the hope of achieving high and stable growth, economies of developing countries have been integrated into the world financial system by a series of reform policies targeting the liberalization of their financial sectors. Thus far, however, benefits of financial integration appear to have accrued primarily to industrial countries. It has proven difficult to find robust evidence supporting the proposition that financial integration helps developing countries improve growth rates and reduce macroeconomic volatility¹.

It is a long held view of the orthodoxy of the 1970s and early 1980s that liberalizing financial markets would encourage better savings mobilization and greater allocative efficiency of capital as suggested by the McKinnon-Shaw hypothesis (McKinnon 1973; Shaw 1973). The underlying belief in the efficiency of financial markets asserted that with the onset of de-regulation, higher levels of investment and growth would be achieved. Liberalization process was expected to eliminate inefficiencies in financial intermediation and result in greater depth of the financial system. Through “financial deepening,” access to funds would be further enhanced.

As the deregulation of interest rates resulted in high rates, the early critiques of the McKinnon-Shaw hypothesis emphasized that consequence of financial liberalization for the supply of funds at the macro level is theoretically ambiguous.² Rising cost of borrowing may lower economic growth, at least in the short run. In addition, financial liberalization can be destabilizing as it leads to over-lending through credit expansions (Aghion, Bachetta, Banerjee 2004) with limited opportunities to divest risk in developing countries (Stiglitz 2003). In this vein, the issues of new opportunities for disruptive speculative financial activity, and the increase in systemic instability are emphasized as potential reasons for not achieving expected benefits from liberalization policies (Grabel 2003). Clearly, the link between financial liberalization and investment performance is not unequivocal and one needs to analyze suggested benefits of financial liberalization considering the issues of credit availability and volatility.

In this paper, I examine the effects of financial liberalization on investment decisions of manufacturing firms in Turkey. The experience of Turkish economy is quite relevant to the picture depicted above about the controversies surrounding liberalization policies. As one of the early followers of trade and financial liberalization programmes after the 1980s, the Turkish economy had minimal regulation on domestic and external financial intermediation by the 1990s. The case of Turkish economy is also relevant to the experiences of developing countries that were adversely affected by economic and financial crises after opening their capital accounts to international flows. Since the beginning of 1990s, the Turkish economy followed a pattern of

¹ Prasad et al (2003) and Kose et al (2004) provide systematic reviews of recent empirical evidence on this issue. As these reviews show, even the IMF has now concerns about the link between financial integration and volatility.

² In this debate between supporters of the McKinnon-Shaw view and Neo-structuralists, the latter draws attention to the institutional structure of developing countries. For example Taylor (1983) suggests that the final outcome of financial liberalization at the macro level depends heavily on the linkages between the informal and formal credit markets. According to Taylor, the reserve requirements of the formal sector may reduce the total supply of funds to the whole economy as credit flows from the informal to the formal sectors. Just as importantly, the higher real interest rates would result in greater firm distress and a contraction in investment and aggregate demand.

boom-bust cycles, with two major crises in 1994 and 2001, creating greater instability and uncertainty.

Very few studies at the macro level address the issue of financial liberalization's impact on private investment in Turkey. In two aggregate level studies, Guncavdi et al (1998, 1999) suggest that liberalization helped ease the previously binding credit constraints on private investment. At a sectoral level of analysis, results from Ozcan, Voyvoda and Yeldan (2002) suggest that "openness" had very little impact, if any, on the behavior of sectoral investments. These macro studies leave the issue of instability out of their analysis and focus only on a structural change in the investment behavior under liberalization.

In this paper, my approach differs in that I pursue the analysis of investment under liberalization at the firm level and incorporate uncertainty into this analysis. In order to do this, I first develop an investment model, based on the results of interviews with the managers of manufacturing firms in Turkey. Combining theoretical motivations with results of the field research project, this baseline model contains output, liquidity and uncertainty as the determinants of investment. Then I test the validity of the model with an original unbalanced data set from the Turkish economy, comprising 165 manufacturing firms for the period 1985-2003. I review the peculiarities of financial deepening process in the Turkish economy and discuss different indicators to choose a proxy that represents the macroeconomic environment of post-liberalization period in which firms make their investment decisions. Then I investigate the change in the role of internal funds and uncertainty variables in the determination of investment under the impact of liberalization as represented by a deepening indicator.

My results show that firm level investment is negatively related with uncertainty variable and positively related with liquidity and sales variables. I find further evidence that the negative impact of uncertainty on investment got worse under financial liberalization, while there is no evidence for a declining importance of liquidity. I also examine these findings across different firm characteristics of size, export orientation and maturity. Findings show that exporters, large firms and well established firms do not suffer from such worsening impact of uncertainty under liberalization. Overall, results suggest that financial reform policies did not change the positive role of liquidity, while resulting in a worsening of the impact of uncertainty in the determination of investment.

The paper therefore contributes to the literature of the impact of financial liberalization on investment in particular ways. By examining the forms the liberalization and financial deepening process have taken, and by using a financial deepening measure to reflect the macroeconomic regime under liberalization policies, it puts the emphasis on the unique characteristics of single case studies. The current literature on the link between financial liberalization and investment mainly focuses on credit availability as the only channel to examine the impact of liberalization. Hence my work is a contribution that explicitly incorporates uncertainties at the firm level into the discussion of the impact of liberalization policies on investment. It also adds to the broader investment literature, by developing an investment model from qualitative field research. Finally, the study is the first firm level analysis of investment behavior in Turkish economy for the post liberalization period.

The remainder of the paper is organized as follows: the next section provides a literature review on the channels through which financial liberalization might have an impact on investment. The first part of the review focuses on investment under “financing constraints”; the second part presents an approach through which investment-uncertainty relationship can be introduced into the framework of financial liberalization. Section 3 reviews financial liberalization policies and macroeconomic developments in the Turkish economy after 1980. Section 4 presents the findings of field research I undertook to explain the motivation behind the choice of investment variables. Then in the next section, an investment model is developed based on field research results. Section 6 presents the statistical specification, develops the hypotheses to be tested and discusses data and estimation techniques. Section 7 summarizes the results from the regression analysis and discusses their implication for investment under liberalization. The final section concludes with suggestions for policy implementation and directions for future research.

2. Investment under Financial Liberalization:

There is a widespread perception based on a fairly large body of scholarly work that financial liberalization promotes financial development, and that the deepening of the financial system subsequently stimulates economic growth.³ As stressed by Levine (1997), financial systems facilitate the allocation of resources, across space and time, in an uncertain environment. They can affect growth through the channels of capital accumulation and the rate of technological innovation. The former effect is achieved either altering savings rate or by reallocating funds among competing uses of capital. In this framework, both external and domestic liberalization of financial systems are expected to contribute to the capital accumulation.

In consideration of this growth-finance nexus, different aggregate measures of how well the financial system functions are used to gauge the level of financial development.⁴ Among the most commonly utilized indicators of “financial deepening”, the first one addresses concerns about the allocation of credit and measures the credit volume as a ratio of GDP. A positive correlation between this measure and economic growth is expected. Another indicator of depth is the size of financial intermediaries and equals liquid liabilities of the financial system divided by GDP. Likewise, a higher level of this ratio is expected to be correlated with higher growth levels.

In the empirical realm, while some studies focusing on financial depth indicators and their relation with growth find a positive link⁵, evidence seems to be inconclusive, once capital account opening is taken into account. Rodrik (1998) relates the investment/GDP ratio to the IMF’s measure of capital account openness, finding no trace of effect. Kraay (1998) similarly finds no impact on gross domestic investment as a share of GDP, using the IMF index, Quinn index, and inflows and outflows of capital as alternative measures of financial openness. Sorting through this controversy may require more sophisticated measures of financial liberalization or the deepening process, because whether liberalization favors development of the banking system

³ A comprehensive survey of the theoretical and empirical literature on the finance-growth nexus is available in Levine (1997).

⁴ See Levine(1997) for a discussion of different measures of financial development. The literature on financial deepening employ other aggregate indicators then reviewed here, such as broad money aggregates and stock market capitalization

⁵ See Levine, Loayza and Beck(2000), Levine and Zervos (1998).

or the securities markets, and whether it helps stimulate investment plausibly depend on how liberalization proceeds.

On the other hand, the financial crises of the 1990s gave rise to the idea that capital account liberalization especially raises the risk of financial instability and fragility. Looking at the impact of capital market liberalization on the likelihood of an economy having a recession, Easterly et al (1999) confirm these adverse effects. In another cross country study, Demirguc-Kunt and Detragiache (1998) state that the increased frequency of financial and economic crises is related to financial and capital market liberalization. Stiglitz (2003) states that there are reasons to expect that capital market liberalization can have negative effects on growth, because of greater instability and crises through the following channels: First, given the limited ability to divest risk, especially in developing countries, instability increases the “risk premium,” i.e. the returns that investors demand in order to be willing to invest. Second, crises lead to the destruction of firm net worth, reducing the firms’ willingness and ability to invest. There are also important asymmetries and hysteresis effects of crises: the booms do not make up for the losses, nor do the gains by some make up for the losses of others.

In summary, most cross country empirical studies on the relationship between the financial liberalization and investment performance find mixed empirical results and do not suggest much as to particular channels through which the impact can be observed. While investment estimations in single country settings might suggest clues, the specific mechanisms would call for microeconomic investigation of investment behavior at the firm level. As a result, firm-level studies analyzing the impact of financial liberalization on the investment behavior of firms have been produced in the recent past. The most influential vein in this firm-level investment literature puts the emphasis on elimination of financing constraints under liberalization. Next part of this section focuses on financing constraints literature and Table 1 presents a classification of selected works.

2. 1. Investment and Financing Constraints: Impact of Financial Liberalization

Within a framework of information asymmetries, these studies examine the impact of liberalization on investment by investigating financing constraints that firms face in capital markets.⁶ Asymmetric information, managerial agency problems and transaction costs can make external funding more costly than internal financing. Financial liberalization policies are expected to eliminate these problems, and provide firms with better access to external funds by lowering the premium on external funds.

The premium on external finance is assumed to be an inverse function of a firm’s net worth. Hence, numerous works in this literature share the common methodological approach that is based on panel estimation of an investment model containing proxies for both fundamentals and net worth.⁷ Financial variables such as internal funds, debt leverage or interest coverage are

⁶ See Hubbard (1998) for New Keynesian theory of asymmetric information and a comprehensive review on market imperfections and investment models. The work by Fazzari, Hubbard and Peterson (1988) is considered to be the pioneer work of the literature on financing constraints and investment, at a firm level analysis.

⁷ Earlier studies on financing constraints employ a Tobin’s q model for investment in which the q variable stands for future profitability. They also include measures of net worth as explanatory variables Fazzari, Hubbard and Peterson

typically used as net worth indicators (See Table 1).⁸ As the role of financial variables increases, the premium on external finance is assumed to be increasing and the firm to be more financially constrained. Under financial liberalization, this role is expected to decline and the firm to be less financially constrained. However, there is no a priori reason to expect that financial reforms and deepening would reduce these asymmetries. Information asymmetries are inherent to capital markets and cannot be eliminated as long as there is a principal-agent problem. Indeed, given specific institutional settings in developing countries, one can even expect constraints to worsen with the arms-length relations of liberalized markets that are expected to replace the relationship banking type of systems. Hence it is important to pose the argument for financial liberalization across different firm characteristics, rather than for all firms: Small firms might be more constrained than large ones, or firms with group affiliations might face smaller constraints.

Another issue is the interpretation of financing constraints as imposed solely by supply side of the credit markets. Crotty and Goldstein (1992) construct a framework of growth-safety trade-off faced by managers in their investment decisions. In this framework, managers aim to maximize growth of the firm with an eye on safety. They would like to minimize borrowing and rely more on internal funds, since high debt levels might create a threat to their autonomy from financial markets. However, these firms would still need to borrow, if a profitable investment project requires funding beyond their internal funds. In this framework, firm's borrowing is constrained not by creditors, but by manager's willingness to keep the firm independent from financial market pressures. A positive relationship between internal funds and investment can be interpreted as a demand side constraint without any implications for the functioning of financial markets and inherent problems of information asymmetries in financial markets.

Evidence regarding financing constraints under liberalization, as presented in Table 1, is ambiguous and specific to firm categories. There are various ways of testing for the impact of liberalization in this framework: The simplest method is to employ a dummy variable to distinguish between the periods before and after liberalization. However, in most cases reform policies are implemented gradually and it is not quite possible to search for a structural change that will be observable over a year. Another method is to construct a financial liberalization index that can contain information on both gradualness and intensity of reform policies. While the majority of studies presented in Table 1 prefer one of these proxies, Harrison, Love, McMillan (2002) differ from the rest in that they use the aggregate flows of foreign direct investment (FDI) as the indicator for financial openness of the economy. In a similar vein, Harrison and McMillan (2002) use firm level and sectoral FDI as indicators of financial openness. The approach adopted in this paper is similar in that the financial liberalization variable is chosen as an aggregate measure. I believe that an aggregate measure of financial deepening process provides more information on the particular pattern of liberalization and reform policies than an index or dummy variable method does.

(1988) is an example of this approach. Later on analytical foundations of these econometric tests were laid by deriving investment equations from the optimization problem of a firm through Euler equation methodology. See Hubbard, Kashyap and Whited 1992 as an early example of Euler methodology. In this setting, financial frictions are introduced either via a non-negativity constraint on dividends or an upper limit on the amount of debt.

⁸ Note that the Table 1 only focuses on the impact of liberalization policies in developing countries. It does not cover the broad empirical literature on financing constraints.

2.2. Investment and Uncertainty: What Happens under Financial Liberalization?

The role of heightened instabilities and their effect on firm level investment have not received a similar attention in the literature as the impact of liberalization policies per se. While empirical and theoretical knowledge on uncertainty and the irreversibility of investment has been enhanced with the contributions of real options value theory, the issue has never been analyzed within the liberalization framework.⁹ As mentioned above, there is evidence to suggest that financial liberalization might lead to high volatility and this causes uncertainty for the firms that have to make investment decisions. The argument in this paper is that such an increase in uncertainty in post liberalization environment lowers investment, *ceteris paribus*. This section reviews the broader investment literature on uncertainty and develops a framework to analyze the impact of financial liberalization.

Earlier work by Hartman (1972) and Abel (1983) suggested that increased uncertainty, as measured by coefficient of variation of the output price, may increase investment, because of its positive effect on the value of a marginal unit of capital. This result was dependent on the assumptions of perfectly competitive firm and constant returns to scale production function. More recently the option value theory (Dixit and Pindyck 1994 among other examples) has laid the main theoretical foundation to deal with the issues of uncertainty and irreversibility of real investment. This approach treats the not-yet-committed investment project as having a ‘perpetual-call-option’ value and shows that with increasing uncertainty about future, the value of the option to delay increases and thus, the investment decision, is postponed. In this model, the issue of irreversibility is represented by asymmetric adjustment costs. However, the option value theory is not without controversy. In their critical contribution, Bertolla & Caballero (1991) show that it is not the asymmetric adjustment costs, i.e. irreversibility, but imperfect competition and non-constant returns to scale that imply a negative impact of uncertainty. More recently, Abel et al. (1996) developed a more general options model of irreversibility, embodying the call option (a limited ability to expand the capital stock in future) and the put option (a limited ability to contract the capital stock in future.) Since the “put” option is, by nature, more powerful than the “call”, symmetric treatment of these leads to ambiguous predictions for the effect of uncertainty on investment. Theoretically option value models do not tell us whether there is a negative sign to the investment-uncertainty relationship.

In the option value models, uncertainty is conceived as risk and its role is reduced to an addition to the discount factor in net present value calculations: Risk premium raises the cost of capital by a fixed amount. In this setting risk premium is predictable with a certain probability distribution known by the decision maker. Once the distribution is known, risk seems to have very little impact on the specification of investment model. Within the structure of these models, if a variation in uncertainty is allowed, instability in underlying parameters will lead to instability in estimated coefficients. Does a large fluctuation in output price represent an extreme realization or a shift in the underlying stochastic processes? Thus, the option value model requires a stable and predictable uncertainty variable in its structure, which might come as a stringent assumption,

⁹ Carruth, Dickerson, Henley (2000) presents an excellent review of the literature on “investment under uncertainty”, both theoretically and empirically.

especially in the context of a regime shift under liberalization policies.¹⁰ Financial and capital market liberalization experiences are shown to be connected with economic and financial crises: These reform policies may destabilize the economy, inducing chronic phases of growth with capital inflows followed by collapse with capital flight. High volatility in economy implies that uncertainty cannot be treated as predictable, as decision makers do not have the knowledge of stochastic processes.

An alternative approach to uncertainty has been inspired by Keynesian true uncertainty that recognizes social, institutional and psychological aspects of expectation formation. In this approach, expectations formation process is influenced by the perception of the decision maker. The perception is affected by the conditions s/he is facing individually as well as what others think of the future, i.e. conventions. Crotty and Goldstein (1992) discuss the implications of fundamental uncertainty for investment behavior of the firm¹¹. As the uncertainty regarding future outcomes increases, managers have to update their forecasts of expected future profitability. When updated forecast implies a downward change in the mean of expected profitability, managers become reluctant to invest¹². This suggests a potential negative relationship between uncertainty and investment, under the assumption that shift in forecast is not mean-preserving. However, regardless of this assumption, there is a further reason to suggest a negative relationship between uncertainty and investment in this Keynesian framework: Increase in uncertainty causes a change in the perception of managers about their own ability to form expectations about future, i.e. their “state of confidence”. As managers’ state of confidence to form expectations worsens, they become further reluctant to invest, resulting in a definite negative sign for investment-uncertainty relationship.

What causes the state of confidence to decline? Economic and financial crises are likely candidates as they cannot be anticipated by the decision makers in the economy, while rendering most parameters of decision making obsolete. Likewise the lack of credibility problem for government policies would imply higher uncertainties and worsening state of confidence for decision makers. As will be shown in the next section, these are among the characteristics of post liberalization environment in Turkish economy. Hence it will be argued that the negative impact of uncertainty on investment can be further intensified under a crisis-prone environment of post liberalization period.

The broad consensus in the empirical literature is that the relationship between volatility and investment is negative. For instance, in a panel study on 15 developing countries Serven and Solimano (1993) find that the index of uncertainty constructed from inflation instability and volatility in world markets have a negative impact on private investment in these economies. In a

¹⁰ Dixit and Pindyck (1994, p.421) themselves argue that, since option models focus on the threshold at which investment should occur rather than on the long run average rate of investment, these models cannot be directly tested by investigating simple equilibrium relationships between rates of investment and measures of risk and uncertainty. Any test will be a joint test of the option-based approach together with the underlying assumed specification for the capital accumulation process. In practice, many studies aiming to test option value model gloss over this point preferring to investigate simple correlations of rates of investment with proxies for uncertainty

¹¹ While the investment model in this paper is build from a qualitative field research, the treatment of uncertainty by Crotty and Goldstein (1992) provides the theoretical framework adopted here.

¹² In case of a mean-preserving shift of the future profitability forecast, there might not be any negative relationship between uncertainty and investment.

study employing a panel of the US manufacturing firms, Leahey and Whited (1996) find no impact of uncertainty as measured by forecast share return volatility. In a cross-section study of Italian manufacturing firms, Guiso and Parigi (1996) find a negative impact of firm perception about future product demand on firm level investment. Similar studies have been conducted for Turkish economy at the aggregate level. Uygur (1995) employs the expected inflation rate as the macroeconomic uncertainty indicator and finds that there is a negative and significant effect of expected inflation on private sector machinery and equipment investment for the period 1982-1995. On the other hand, Ozatay (2000) cannot find a significant impact of uncertainty variables, measured by volatility in real interest rates and nominal exchange rate on private sector investment in Turkey.

The main argument of the next section is that recurring crises of the liberalized Turkish economy have created an uncertain environment in which decision making about investment became extremely difficult, causing managerial state of confidence to decline. In later sections, I construct a firm-level uncertainty variable to be utilized in an investment specification and analyze whether there has been a change in the sensitivity of investment to this uncertainty variable for the manufacturing firms in Turkish economy. I expect to find both a negative relationship between uncertainty and investment the firm level and a worsening of this relationship under liberalization.

3. Financial Liberalization in Turkish Economy

This section reviews financial liberalization policies implemented in the Turkish economy and their implications for growth and investment. It is argued that due to uncertainties created by the pattern of boom-bust cycle of growth, combined with the peculiar form of financial deepening that has taken place over the same period, the real sector private investment was possibly curbed, rather than enhanced.

From a textbook case of financial repression before the 1980s, by 1990, the Turkish financial system was transformed into one with minimal constraints on domestic and external financial intermediation, with the exception of reserve and liquidity requirements, which remained relatively high until late 1990s. The deregulation of deposit and lending rates in 1980 was a part of the general policy reform package, although it was reversed later on in 1983, with the collapse of financial markets. The Central Bank's regulation over commercial bank interest rates lasted until 1988. In the mean time, foreign exchange regime was liberalized in 1984. Commercial banks were allowed to accept foreign currency deposits from residents and, in 1985 they were free to set their own exchange rates. The Central Bank introduced the interbank money market to facilitate asset-liability management of banks in 1986 and it commenced open market operations in 1987. The Istanbul Stock Exchange opened in 1986. Once the interest rate restrictions on corporate bonds by the Central Bank were eliminated in 1987, new instruments, such as commercial paper, were introduced.¹³ Mutual funds were allowed for the first time in 1987, but commercial banks had the exclusive rights to establish them until 1992. And finally in August

¹³ Commercial code allowed corporations to issue debt instruments up to a certain part of their equity capital. However, in effect, corporations were not allowed to issue debt until they were allowed to revalue their assets in 1983.

1989, capital account was liberalized. The full convertibility of the Turkish lira was realized in 1990.

The overall growth and export performance of the economy improved over the 1980s, as the economy grew at an average annual rate of 6.5% between 1983 and 1987. (See Table 2 for main economic indicators). However, the export led growth path reached its economic and political limits by 1988.¹⁴ With the increasing pressure from public under the new parliamentary regime, government felt the pressure to respond to popular demands for redistribution which in turn caused increasing borrowing needs of the government.¹⁵ This overall increase in government spending brought a rise in Public Sector Borrowing Requirement from 4% of GDP in 1981 to 9% by 1990 (See Table 2).¹⁶

In that respect, capital account liberalization of 1989 was expected to help finance public sector deficits without crowding out financing needs of domestic agents. This date is also accepted as turning point by many scholars, as indicating the end of export-led growth regime and the beginning of speculative-led growth period with distinct cycles of expansion, crisis and adjustment (see Figure 1). From 1990 to 2001, while the average growth rate of GDP was around 3%, its standard deviation was twice as large, reaching 6% points. While exposing the economy to the whims of international capital flows, the period was marked by the spiral of currency appreciation and higher interest rates compared to those in the 1980s. During the 1990s, the government paid high interest rates incorporating a higher spread compared to safer dollar assets, which became easily accessible even for small savers. Especially after the crisis of 1994, the real interest rates on government securities were reaching levels of 30%. (See Table 2)

The last two decades display the rising importance and volatility of short term capital flows. While there has not been a significant change in the behavior of foreign direct investment¹⁷, portfolio investment accounts show high volatility after the opening of capital account. There were large outflows during the 1994 and 2001 crises. Over the period, Turkish economy has been dependent on short term capital flows for growth prospects, as suggested in Figure 2. We see that growth rate of GDP and the ratio of short term capital flows to GDP follow each other very closely and indicate a possible causality between two.

Capital flows may lead to an increase in domestic absorption due to real appreciation of domestic currency.¹⁸ In their study utilizing a VAR analysis, Cimenoglu and Yenturk (2005) conclude that

¹⁴ The underlying feature of the export-led growth strategy was the suppression of the wages in an attempt to lower production costs and reduction in domestic absorption capacity. The same period also brought substantial decline in agricultural incomes. See Yeldan 1995.

¹⁵ Beginning in 1989, organized labor succeeded in attaining significant increases in wages. Between 1989 and 1991 only, real wages in manufacturing increased by 90%. Furthermore, there was an overall increase in public expenditures in social infrastructure.

¹⁶ As discussed in Yeldan (2006), the borrowing needs of state could have been financed by moving toward a more “fair” tax system. Instead, the increasing need for funds was met by complete deregulation of financial markets.

¹⁷ The average annual FDI/GNP ratio was 0.34% for the period 1985-1990 and stayed at 0.33% for the period 1991-2000.

¹⁸ The real exchange rate was quite stable in 1987 and 1988, but after opening capital account, TL started to appreciate significantly in real terms up until 1994 crisis. After depreciating significantly in 1994, TL started to appreciate in real terms again, to drop down by 30% in 2001, due to the crisis in February. Hence it is quite safe to argue that net capital inflows that Turkey enjoyed during crisis-free years caused the TL to appreciate significantly

a surge in capital inflows stimulates economic growth, by first triggering private sector consumption demand as a result of real appreciation.¹⁹ Then continuing capital flows and increasing consumption demand trigger investment demand. However, due to the increase in relative prices of nontradables, which is mainly motivated by the increase in aggregate demand, investments are more heavily channeled to nontradables sectors.²⁰ Since nontradables sectors are not considered as having the capacity to generate foreign currency, the implication is that this particular type of investment increase does not help cover the current account deficit already emerging as a result of higher imports and real appreciation. Similarly Celasun, Denizer and He (1999) find a stronger impact of capital flows on private consumption, while their results do not suggest a robust impact on investment. In a Granger causality framework, Akcoraoglu (2000) finds that liberalization of capital flows have increased the current account instability in Turkey. Overall, these studies suggest that capital account opening and following pattern of boom-bust cycles introduced instabilities into the economy that has considerable implications for private sector real investment.

In addition to heightened instabilities, financial openness also had important effects on the structure of the financial system. Table 3 presents the conventional measures of financial deepening. There is clear evidence of significant financial deepening in the Turkish economy: the Financial Assets to GNP ratio has increased from 19% in 1980 to 102% in 2004, while the M2Y/GNP ratio has increased from 17% to 43% in 2004. The only indicator that does not follow a similar pattern over the period is the Bank Credit/GNP ratio, which declined from 20% in 1985 to 14% by year 2003.

A declining credit ratio suggests a problem in the intermediary role of the banking sector.²¹ Like many other developing countries, banking sector has always been the largest and most important part of the financial system. Ersel and Sak (1997) confirm that bank credits appear to be the major source of external finance for companies in Turkey, since most of the companies mainly rely on bank credits for both their working and investment capital needs. Figure 3 shows that the share of deposits in total assets increased over time, indicating a higher savings mobilization in the economy, as expected by the advocates of liberalization policies. However, Figure 3 also shows that credit ratio has not displayed a similar increase; the Credit/Assets ratio has declined since late 1990s. This gap between deposit and credit ratios of the Turkish banking system signals that the system has failed to play a greater role in reallocating funds to productive investment projects.²²

in real terms. This causality is also supported by findings of Berument and Dincer (2004), based on VAR framework.

¹⁹ Rapid increase in private sector consumption following a surge in capital flows, followed by a severe contraction is commonly cited in the literature on developing countries that have implemented exchange rate based stabilization programs. See the review by Calvo and Vegh (1997) of possible explanations for this phenomenon.

²⁰ The argument that capital inflows cause an increase in the relative prices of nontradables is based on the assumption that producers of nontradables can react to higher consumption demand by increasing prices. Producers in tradables sectors cannot increase their prices as much, since they compete with the rest of the world. Hence, relative price of nontradables to tradables is a proxy for real exchange rates in an open economy macroeconomics framework.

²¹ Edwards and Vegh (1997) argue that banks may play a role in propagating shocks through “bank lending channel”, since the firms mostly rely on bank credits as the source of funds.

²² By using quarterly data for 1987-2001, Cimenoglu and Yenturk (2005) find that real interest rates on government securities have a negative impact on total credits extended to private sector by the banking system. This result

Further investigation of different deepening indicators reveals the true nature of this failure. The first structural feature of this deepening process is the type of securities that have been expanding relative to economic activity. While the ratio of government securities reached 53% of GNP by 2004, the ratio of private securities that include all corporate bonds, stocks and asset backed securities issued by private sector has only increased to 5.9% in 2004, from 1.3% in 1980 (See Figure 4). Financial liberalization policies that were expected to help capital markets develop seemed only to help meet government's financing needs; while they did not create a deepening of stock market, corporate bond market or other money market instruments. As the public sector borrowing requirements grew over the 1990's, government securities began to dominate the whole financial system in Turkey. Against this background, we conclude that the banking system was also allocating funds into government borrowing, given the high interest returns and high volatility in the economy.

The other characteristic of the deepening process is the high degree of currency substitution as indicated by an increasing difference between M2 and M2Y ratios. Figure 5 clearly shows that nearly all increase in the (Total deposits/GNP) ratio came from an increase in the share of foreign exchange deposits. An interesting observation in this respect is that the return on TL denominated government securities, adjusted for the exchange rate, has been higher than those of foreign currency denominated instruments between 1990 and March 2002. Then why do economic agents still prefer to hold a part of their savings in foreign currency? The answer can only be understood as a lack of confidence in the performance of the economy in response to years of high inflation and macroeconomic instability which was built up by crises.²³ The literature on dollarization suggests that institutional structure plays an important role in the agents' incentives to hold foreign currency. For example Savastano (1992) cites the uncertainty regarding future political developments among these institutional features. Hence, increased level of currency substitution in Turkish economy is another indicator of increased uncertainties as perceived by the agents.

Finally we turn our attention to the pattern of the private sector investment behavior under liberalization in Turkish economy. As can be seen from Figure 6, while the overall private Investment/GNP ratio has displayed a substantial volatility over the last two decades, it showed little improvement. The figure also shows a decline in the ratio of manufacturing investment especially towards the end of the period. A further look into the sectoral composition of private investment reveals that slight increase in overall private sector investment is mainly due to rapid increase in construction spending for housing.²⁴ This evidence raises doubts about the expected positive impact of financial openness on productive areas of investment, such as manufacturing.

supports the presence of crowding out. Authors also find that changes in private sector investment expenditures are positively related to the changes in the amount of credits that are extended to the private sector.

²³ The evidence from developing country experiences suggest that dollarization is likely to proceed more rapidly in countries with poorly developed capital markets and limited outlets for domestic investments, in economies where there are formalized and secure channels for holding currency-i.e. foreign currency bank deposits and where there are fewer regulations on the types of transactions that can be legally financed. See Savastano (1992) for the role of institutional factors in the process of dollarization in cases of Bolivia, Mexico, Peru and Uruguay.

²⁴ The share of manufacturing investment in total private investment had declined to 32% in 1985 to 24% in 1994, while the same ratio for housing climbed from 32% in 1985 to 52% in 1994. The share of manufacturing stayed at that level until 2001, while the share of housing investment slowed down for the rest of the 1990s.

As attested by Akyuz (1990) and Balkan and Yeldan (2002), Turkish experience does not appear to conform to the McKinnon-Shaw hypothesis of financial deepening with a shift of portfolio selection from “unproductive” assets to those favoring fixed capital formation and long run growth.

In summary, the financial deepening process that has taken place in the Turkish context is quite peculiar: All indicators signal a deepening that is not accompanied by an expansion of credit to the public by the banking system. This confirms our doubts about reallocation of capital toward productive investment areas under liberalization. In the empirical part of this paper, one of these indicators, government securities-to-GNP ratio will be used to represent macroeconomic environment under financial openness. The empirical inquiry is robust to the choice of the indicator of financial deepening. Government securities ratio is preferred, since it contains more detailed information about the particular form financial liberalization has taken in Turkey.

4. Building an Investment Model from Field Research:

In order to empirically investigate links between the financial deepening process and investment behavior of manufacturing firms, one must first develop an investment function. The investment literature has competing theoretical perspectives with conceptually distinct variables in the investment function. Before the mid-1980s, the standard neoclassical Jorgenson model, the accelerator model, and the q model constituted the main theoretical foundations of empirical investment studies²⁵. More recently issues such as internal funds, treatment of adjustment costs, uncertainty and irreversibilities have become prominent. However, as exemplified by the review of empirical studies in Table 1, competing theories often end up using similar variables in empirical testing. Selecting among this mélange of possible empirical specifications is a mine field in which researchers from different perspectives can pick and choose among variables to get the relevant results.

Here, albeit informed by different theoretical approaches, I adopt a different method by building an investment equation from field research. This field research project, undertaken in 2004 in Turkey, is qualitative in nature and complementary to the statistical inquiry adopted in the following sections. During the project, I interviewed key decision makers in 33 manufacturing firms about their investment projects, the obstacles they are facing and their responses to crises, as well as other issues. More detailed description of the methodology and content of the project are presented in Appendix A.²⁶

The following extracts are derived from these interviews as well as previously undertaken surveys:

- Demand conditions are the most important determinant of investment. 60% of firms that were interviewed report better demand conditions and growth of their market share as the

²⁵ Chirinko (1993) provides an excellent review of different investment modeling strategies, their empirical strength and policy implications. For an empirical comparison of different models see also Kopcke and Brauman (2001). Also Hubbard (1998) provides a good review on issues related with market imperfections in investment theory.

²⁶ Project results are presented in a chapter of my dissertation in greater detail. Only issues that are relevant to the paper are included here.

most important determinant of their investment decisions. They rank other factors as quality improvement, cost reduction, and vertical integration. This finding is also confirmed by another survey of Turkish manufacturing firms, conducted by the Istanbul Chamber of Industry (ISO) in 1991. In this survey 48% of all firms surveyed mention the role of demand conditions as highly important. Expectation of higher future demand is taken as a sign of higher future profitability leading to more investment. This finding suggests an investment framework with sales as an important explanatory variable.

- Internal funds are very important for financing investment projects, while external funds in the form of bank credit are also used in case of insufficient internal funds. 18% of firms use only bank credit to finance investment; 27% use only internal funds and 55% use a combination of both. The ISO survey reports that, in financing fixed capital assets, 34% of these manufacturing firms prefer bank credit, 25.4% prefer retained earnings, 15.2% prefer increasing equity capital, 9.5% prefer trade credit, 5.9% prefer transfer of funds from the affiliated holding company, 0.5% prefer issuance of bonds in the corporate bond market, 0.3% prefer issuing shares in the stock market and 5.8% prefer “other” sources of funds. Given these results, internal funds are the most preferred source of financing for investment. When internal funds are not sufficient, firms mainly use bank credits. Therefore we expect a high sensitivity of investment to internal funds. These results also suggest that firms do not rely on stock market or corporate bond market to raise funds for their investment projects. Evidently capital markets are still perceived to be underdeveloped.
- 97% of firms report that uncertainties either in demand or cost conditions have become impediments to their investment projections. Only 20% of firms cite “cost of finance” as the most important problem, while “insufficient funds” are reported by 10% of firms. According to the results of 1991 survey, 32.4% of manufacturing firms cite high inflation as the most important factor.²⁷ 30.2% of manufacturing firms mention “uncertainties in inflation rate, exchange rate and interest rate”, 19.5% cite high level of interest rate and 17% cite political instability as important factors that negatively effect decisions about investment financing. A similar pattern emerges from the data provided in the Business Tendency Survey (BTS)²⁸: In 2003, 47% of firms report “demand uncertainty” as the most important impediment to their investment project. “Cost of financing” is mentioned by 25%, inadequate net present value by 13%, inadequate internal funds by 13% and inadequate external funds by 1% of all firms. Although cost of external funds and availability of internal funds matter, obtaining those external funds is not perceived as a problem. Finally, since net present value calculations require managers to form expectations about future, the concerns about inadequate net present values might be the result of uncertainty in both demand and cost conditions. As the uncertainty increases, the managers become less confident regarding their ability to form expectations and require higher safety margins. In other words, being more

²⁷ It should be noted that the year this survey was conducted is 1991 and the average inflation rate over the period of 1985-1995 was around 60%, based on WPI.

²⁸ The Business Tendency Survey has been regularly conducted by The Central Bank of the Republic of Turkey (CBRT) since December 1987. The survey is designed to poll senior managers, from the private sector enterprises that are ranked among the “First 500 Industrial Enterprises of Turkey” and the “Next 500 Major Industrial Enterprises of Turkey” lists prepared by the Istanbul Chamber of Industry. Question #27 asks respondents to rank factors that might impede the investment projects that they are planning to undertake within the next 12 months. Figures presented here are annualized by averaging monthly responses over 12 months for the year 2003.

conservative in estimations about profitability of investment projects, firms might face low net present value estimations that prevent from investing.

- When asked to rank the most important sources of uncertainty in their investment decision, firms ranked the following: Uncertainty in demand conditions, uncertainty in overall macro policies, uncertainty in input costs, uncertainty in inflation, uncertainty in interest rates and cost of credit. As supported by the Business Tendency Survey and other anecdotal evidence, demand uncertainty at the firm level and macro uncertainty are the most crucial obstacles on future projections about investment.
- Demand conditions seem to be even more important for investment decisions of those firms with a higher export orientation.²⁹ I, therefore, expect the sensitivity of investment to sales to be higher for these export oriented firms, than that for those firms which sell mostly in domestic markets.
- Firms with better network connections, reputation of financial strength and group affiliation face better terms when they borrow credit from banking sector. Therefore they might rely more on external funds, compared to those firms without reputation or group affiliation. However, the information about the group affiliation is not contained in the balance sheets and firms with reputation can only be identified based on an *a priori* classification. In this study, I use firm size and maturity as proxies. Larger and/or well established firms are expected to have lower cash flow sensitivities to investment.

Given these findings, one concludes that demand conditions, uncertainties and internal funds play an important role in the determination of investment. The roles of these variables are expected to change across different firm categories. Hence with variables chosen, investment function developed in the next section is similar to accelerator models that emphasize demand conditions, Post Keynesian models that emphasize uncertainty and New Keynesian models that emphasize the role of internal funds across different firm categories.

5. Base Model of Investment:

The investment function is specified as:

$$I = f(U, Cash, S, I)$$

where I is investment, U is uncertainty, Cash is internal funds, S is sales, and I is lagged level of investment.

Uncertainty is expected to have a negative relation with investment. A rise in uncertainty does not necessarily imply that expected profits decline accordingly, since the change in the expected profitability forecast might be mean-preserving. However, as uncertainty increases, confidence of the managers in the validity of their own forecast declines. As state of confidence declines *ceteris paribus*, lower investment follows.

²⁹The firms are categorized as export oriented if the ratio of exports in total sales is above 25%, in average over the years the data are available.

There are various methods of constructing an uncertainty variable in the empirical literature.³⁰ One approach is to incorporate some direct measure of uncertainty, generally from business surveys. This requires primary data collection at the firm level which is expensive and difficult. A second approach is to compute the unconditional variance of a particular economics series, (commonly, demand, price or cost related variables derived from balance sheet items) which, managers are presumed to be uncertain about. A third approach is to estimate a statistical model of the process (such as ARCH/GARCH or ARIMA models) determining the conditional variance of the same related series and use this as a proxy for uncertainty. The computation of conditional variance via such models requires high frequency data which are not available in the case of Turkey. Since survey results suggests that uncertainty in demand conditions is the most visible and important source of uncertainty for firms, uncertainty measure in this paper is constructed as the coefficient of variation in the firm level sales-to-capital ratio. Standard deviation and mean of sales variable are computed every year by using all available lagged values of the sales ratio.

Cash represents internal funds available to the firm. While survey results suggest a positive link between the level of internal funds and investment, the reasons for this are not unique across firms. Some firms value their autonomy from creditors, while some others mention a choice dictated by the unfavorable terms of borrowing, because of the problems in their financial worth. The former motivation supports a demand side explanation as suggested by Crotty and Goldstein (1992), while the latter is in line with the New Keynesian concept of financing constraints, as imposed by credit markets. It is not quite possible to detangle these demand and supply side explanations based on a positive correlation between internal funds and investment. Hence, the fact that a firm uses external funds does not necessarily lead to the conclusion that the firm is financially constrained in credit markets. This cautious interpretation is also supported by findings of Kaplan and Zingales (2000) which show that under certain assumptions, investment-cash flow sensitivities may increase as financing constraints are relaxed. Povel and Raith (2002) find a U-shaped relationship between cash flow and investment, further adding to the controversy about the interpretation of cash flow sensitivities.

Another issue in the interpretation of investment-internal funds nexus is the fact that internal funds are highly correlated with current operating profits and may simply reflect future profitability. In order to control for the link between internal funds and future profitability, Love (2003) suggests a narrower definition of internal funds, derived from the most liquid assets of the firm, as shown under the accounts of “cash and checks” and “marketable securities” on the balance sheets. I adopt the same definition in this paper.

Survey findings indicate that there might be differences across firm categories in the borrowing terms these firms face. Hence, regardless of the theoretical explanations, I expect to find different sensitivities of investment to internal funds across these categories.

Sales represent growth opportunities for the firm. As future profits and demand conditions cannot be known under fundamental uncertainty, expectations about future conditions are formed on the basis of current and past sales performance. Investment is expected to be positively related with sales.

³⁰ For a comprehensive review of these methods see Carruth, Dickerson, Henley (2000)

First lag of investment represents dynamic effects such as gestation lags and inertia. Investment projects can take longer than one year to complete; or investment behavior can be path dependent given the structural characteristics of firms or industries. The expected sign of this dynamic effect is positive.

6.1. Empirical Specification of Base Investment Model and Data:

Investment model of the previous section is empirically tested in order to see whether variables in the model have expected relations with investment. The following empirical specification is designed for this purpose.

$$(I/K)_{it} = \beta_0 + \beta_1 U_{it} + \beta_2(\text{Cash}/K)_{it} + \beta_3(S/K)_{it} + \beta_4 (I/K)_{it-1} + \alpha_t \quad (1)$$

where β 's are parameters, the i subscript denotes the firm, and the t subscript denotes the time period.³¹ Since the main purpose of this regression is to test the validity of base model instead of analyzing the impact of liberalization, a dummy α_t is included to capture the effect of time specific factors common to all firms. All regression variables, except uncertainty, are adjusted by beginning-of-period capital stock. Descriptive statistics are given in Table 4 and expected signs for the variables are listed in Table 5.

The data set used in this study is a firm-level unbalanced panel data that is constructed from balance sheets and income statements of 165 manufacturing firms in Turkey for the period of 1985-2003. Construction of an original data set is essential to the analysis in this paper, given our interest in the impact of the financial deepening process that was initiated in mid-1980s, on firm level investment. The widely used Worldscope could not be used for the purposes of this study, since it provides observations on only 23 firms in Turkey, beginning from early 1990's. Hence I construct an original data set by collecting firm level information from the publications of two different sources, Capital Markets Board of Turkey (CMB) for the years 1985-1988 and publications of the Istanbul Stock Exchange (ISE) for the period 1989-2003, in both electronic and paper format. Appendix C presents further details on data construction.

One potential drawback of the constructed data set is that firms issuing bonds in the capital market or those that are publicly traded tend to be larger and stronger compared to other Turkish manufacturing firms. Also, the fact that firms stay in the sample until the end of 2003 from the time they enter, contributes to this survival bias. On the other hand, by only focusing on these firms, we can have access to high quality accounting data thanks to the public disclosure requirements imposed on them.

The base model of investment is estimated for all firms over 1985-2003, as well as for different firm categories. I expect the determinants of investment to differ in coefficients across firm categories. For instance, the survey results suggest that firms with higher export orientation might have higher sensitivity of investment to sales variable. Likewise, firms differing in size or longevity might have different investment responses to the determinants of investment that are

³¹ Further information on the definition of the regression variables are given in Appendix B.

included in the base model. Estimation results are disaggregated in order to see these differences across different groups.³²

6.2. Hypotheses on the Impact of Liberalization on Investment:

Based on the model above, I proceed with the analysis of financial liberalization and its impact on firm level investment behavior. As explained in the previous sections, this study chooses an aggregate indicator to represent the macroeconomic environment of post-liberalization, in which firms make investment decisions. Our discussion in the section on Turkish economy shows that financial deepening occurred mainly in the market for government securities, while not translating into higher ratios of bank credit/asset ratio or a deepening in other equities markets. Meanwhile, the uncertainties brought along with financial crises under liberalized regime worsened the conditions of private real investment. Given this background I choose one indicator of financial deepening, government securities-to-GDP ratio (FIN_t) as the proxy for liberalized environment. However it should be noted that empirical testing is robust to the choice of the financial deepening indicator. Other deepening indicators as given in Table 3, namely M2/GNP, M2Y/GNP, total financial assets/GNP, financial Securities/GNP give the same results as to the investigation of uncertainty and liquidity. As expected, the only exception is the credit ratio, which did not increase under liberalization.³³

$$(I/K)_{it} = \beta_0 + \beta_1(I/K)_{it-1} + \beta_2(S/K)_{it} + \beta_3(Cash/K)_{it} + \beta_4U_{it} + \beta_5(FIN_t)(Cash/K)_{it} + \beta_6(FIN_t)U_{it} + \beta_7(FIN_t) \quad (2)$$

Expected signs for coefficients in the regression are presented in Table 5. Financial liberalization (FIN_t) variable is included in the regression to represent and capture the impact of macroeconomic environment in which firms make investment decisions. Given our discussion of post liberalization environment in Turkish economy, coefficient of this variable (β_7) is expected to be negative³⁴. Changes in two determinants of investment in this macroeconomic environment are of particular interest to our discussion: Sensitivity of investment to internal funds and uncertainty variables respectively. By including interaction terms of internal funds and uncertainty with FIN variable, I test whether the effect of these two determinants of investment change with financial liberalization.

For the internal funds, the coefficient of interest is β_5 . As argued before, as opposed to prediction of financing constraints literature, there is no a priori reason to expect that financial liberalization and deepening would reduce information asymmetries in financial markets for the borrowing firms. Therefore I do not treat any change in the sensitivity of internal funds as a sign of elimination of asymmetries, but as the impact of moving from one system of financial allocation before 1990's into another one. A significantly positive coefficient would imply that manufacturing firms rely even more on internal funds under liberalization, hence the changes in the financial system and the macroeconomic conditions in Turkey results in the allocation of fewer funds into productive investment. A significantly negative coefficient, on the other hand,

³² See Appendix B for a definition of firm categories used.

³³ When other indicators are used in hypothesis testing, the sign and significance of the coefficients derived are the same as those with the government securities ratio. The credit ratio does not give any significant results.

³⁴ It should be noted that FIN_t variable by itself may contain other time-variant information that is not relevant, but correlated with financial liberalization.

would tell us that internal funds lost their importance and possibly other sources of external funding took their place, indicating a better allocation of credit in favor of productive investment. Given the discussion on the credit ratio of Turkish banking system and dependency of non-financial firms on bank credit, I do not expect to find any decline in the importance of internal funds due to financial liberalization

Regarding the interaction term of uncertainty and the financial liberalization, the coefficient of interest is β_6 . Ideally one would expect that the financial deepening would provide non-financial firms with the opportunities and instruments to hedge themselves against uncertainties in future. Assuming that deepening would bring access for firms to these financial markets for options and other hedging instruments both domestically and internationally, we would expect that the impact of uncertainties on investment behavior would be lessened with deepening in financial markets. However given the particular experience of the Turkish economy with heightened volatilities and crises especially after opening of the capital account, I anticipate that the impact of uncertainty on firm level investment has not been reduced, but rather has become more acute under financial liberalization. This anticipation is based on the positive correlation between our uncertainty measure and chosen financial deepening indicator. Figure 7 presents a simple linear fit of annual median firm level uncertainty on the financial deepening indicator over the period 1987-2003. The obvious positive correlation between two measures reaffirms our claim that uncertainty at the firm level is heightened under financial liberalization. Moreover, interviews with firms suggest that formal hedging instruments that could have eased the impact of uncertainties are not commonly used by Turkish manufacturing firms.³⁵ Therefore I expect a significantly negative sign for β_6 .

Equation (2) will be estimated for firm categories based on size, export orientation and years of establishment. As with the base investment model, different types of firms might be affected by the financial deepening process differently.

6.3. Estimation Technique:

The Ordinary Least Square (OLS) estimation of Equation (1) or Equation (2) may yield biased results, as firm level dynamic investment models are likely to be prone to heterogeneity and endogeneity problems in estimation. Heterogeneity is a potential problem, because many firm-specific factors such as production technology and managerial abilities can lead into substantial differences in investment behavior across firms. Endogeneity is expected; the error term may be correlated with explanatory variables since they would all be affected by technology shocks. The problem of heterogeneity can be eliminated by using a fixed effects model in which all variables are first-differenced. However this would not solve the problem of endogeneity, since first-differenced error term would no longer be orthogonal to the first differenced regressors. The presence of the lagged endogenous variable for investment would further bias coefficient estimates for the OLS estimation. Hence an instrumental variable technique is called for.

³⁵ By 2003, forward options were available through banking system, but the institutional structure was not legalized yet. Three firms that I interviewed mentioned that they had to take legal action after the crisis of 2001, because the banks that they purchased the hedging instruments from refused to honor the contracts due to apparent loopholes in the legal framework. Even a decade after these instruments were introduced to Turkish financial system, manufacturing firms were still reluctant to use them despite a highly volatile environment.

I utilize the Generalized Method of Moments (GMM) estimation technique, widely used in empirical literature with dynamic panel data models. After first-differencing explanatory variables to eliminate firm-fixed effects, lagged values of these right hand-side variables are used as instruments. Two specification tests suggested by Arellano and Bond (1991) are used to test for the validity of the empirical model. The first is a Sargan test for over-identifying restrictions, which is used to test for the validity of instruments. It tests the null hypothesis of no correlation between the instruments and the residuals. The second is a test for the presence of serial correlation in differenced residuals. Given the lagged dependent variable in the specification, first order correlation is expected, while no second or higher order correlation should be present in estimated regressions.

In order to check the robustness of GMM results, I estimate Equation (1) and (2) as OLS, fixed effect model. The first columns in Table 6 and Table 7 present fixed effects OLS results from the regression for the group of all firms.

7. Regression Results

7.1. Results from the Base Model of Investment:

Results of the regression analysis for base model are presented in the Table 6 for all firms, as well as different firm categories. Time dummies are included, but not reported. The first column presents results from an OLS fixed effects model, to check for the robustness of results to estimation technique. All coefficients in OLS regression are significant with expected signs. Hence we conclude that results are robust to estimation technique. All GMM regressions pass the specification tests: instruments are valid; correlation structure is as expected with no second order serial correlation. Statistical inference on variables is based on GMM results.

Coefficients of all variables of the base model have the expected signs with statistical significance. Coefficient of sales variable which is reflective of future demand and profitability conditions has a statistically significant and positive effect on investment across all firm categories. Sensitivity of investment to sales is the highest for well established firms, among all firm categories. It is likely that well-established firms are dominant firms with higher market shares in more oligopolistic markets. As suggested by industrial organization literature on dominant firms, capacity building to meet fluctuations in demand can be an important entry deterring strategy for these firms to sustain their dominant position. As a result of this drive to sustain the dominant position in their respective market, investment of well-established firms might be more responsive to sales. Likewise, the investment of exporter firms is more sensitive to sales variable than that of firms with domestic market orientation. This finding supports the evidence from interviews that demand conditions are even more important for firms with higher export orientation.

For most firm categories, except for young firms and firms with domestic market orientation, a significantly positive dynamic component represented by the first lag of the investment to capital ratio is observed. This positive impact is the highest for well established firms, and relatively higher for exporter firms compared to others. Exporter firms have a higher mean investment ratio

compared to other firm categories; hence we can infer that investment project of exporter firms might take longer than a year to complete. For well-established firms, the average investment ratio is not different from that of other firm categories. Then high sensitivity of investment ratio to its lagged value can be taken as a sign of path dependent behavior, resulting from the age of the firm.

While the effect of internal funds on investment is positive in all regressions, it is not statistically significant for small-medium firms, exporters and well established firms. The reasons for not relying on internal funds are more obvious in the case of well established firms. As suggested by interview findings, the maturity of the firm can be a proxy for group affiliation and reputation of the firm. It is quite likely that the size of an investment project is not constrained by the availability of internal funds, since these firms can easily borrow money and pursue the growth objective without worrying about their autonomy from financial markets. They can rely on their network for funding investment. This result is also supported by interviews results. However, we would expect a similar reasoning in case of small-medium firms which is not supported by the results. Considering that these firm categories are a priori classifications, it is possible that size of the firm is not a good proxy to indicate better access to borrowing.

The expected negative impact of uncertainty is supported in the regression for all firms and most firm categories. Specifically, the coefficient of demand uncertainty is negative for all firms and significant for all firm categories, except for firms with higher export orientation. On the other hand, highest negative impact of uncertainty is experienced by firms that mainly sell in domestic markets. The interview results suggest that firms consider export orientation as a way to cope with demand uncertainties. When firms face fluctuation in demand in domestic markets, those that can export could still sell their product and invest accordingly, as long as domestic market fluctuations are not correlated with demand in export markets. Hence those firms that mostly sell in domestic markets would be more prone to negative impact of demand uncertainty.

The negative coefficient of uncertainty is found as -0.390 in the regression for all firms. As can be seen in the Table 4 of descriptive statistics, the uncertainty variable has a standard deviation of 0.19. If uncertainty measure increases by 0.19 for a typical firm in the sample, the overall impact on the investment would be a decline of 0.074 in investment ratio. Given that the median level of investment for the overall sample is given in the same table as 0.169, this change corresponds to 44% decline in the median ratio of investment. If we want to compare this with change over mean investment ratio, which is 0.221 for the overall sample, we still get 34% decline in the mean investment ratio as result of one standard deviation increase in uncertainty. The negative impact of uncertainty is considerably large and as uncertainty increases, *ceteris paribus*, the state of confidence in the reliability of expectations of future profitability erodes and the firm invests less.

7.2. Results on Investment under Financial Liberalization:

Results of the regression analysis for the impact of financial liberalization on investment are presented in the Table 7 for all firms, as well as different firm categories. First column presents results from an OLS fixed effects estimation (2), to check the robustness of results to estimation technique. All coefficients in OLS, fixed effects regression are significant with expected signs,

while the variable for internal funds (Cash) is positive, but not significant in GMM estimations. Since our focus is on the financial liberalization variable and its interaction terms, we can conclude that results are robust to estimation technique. All GMM regressions pass the specification tests: instruments are valid; correlation structure is as expected with no second order serial correlation. Statistical inference on variables is based on GMM results.

Financial liberalization (FIN_t) variable that is included to capture the impact of macroeconomic environment in which firms make investment decisions is negatively related with investment in regression for all firms and most firm categories, except young firms.

The interaction between the financial deepening measure and the internal funds variable is not statistically significant in most of the regressions, except for well-established firms³⁶. Hence there is no evidence of declining importance of liquidity under liberalization for most firm categories, except well-established firms. The overall result supports our claim that despite the anticipations of the literature on “financing constraints” there is no a priori reason to expect that liberalization would eliminate information asymmetries and lead into elimination of financing constraints in the capital markets. When financial liberalization does not lead into increasing credit into productive investment, there is no reason to expect any change in the sensitivity of investment to internal funds. In the exceptional case of well-established firms, the interaction variable is significantly positive indicating that well established manufacturing firms rely more on internal funds under liberalization. However interpretation is inconclusive, given that main internal funds variable for this firm category has a negative and insignificant coefficient.

On the other hand, the interaction between the financial deepening indicator and demand uncertainty is negative in all firm categories and significant in some, except for exporters, well established firms and large firms. For the whole sample as well as the groups of small firms, young firms and firms with domestic market orientation, the negative impact of uncertainty on investment became worse under financial liberalization.

The case of exporters can be understood with a reference to interview results. When asked about how they changed their competitive strategies after the crisis in 2001, many firms mentioned that they try to reposition themselves towards international markets. Although the international markets are not immune from demand uncertainty and similar limitations in demand conditions, in the experience of these firms being more export oriented implies having more opportunities to be flexible against fluctuations in demand conditions. Hence the econometric finding about the lack of worsening effect of uncertainty for exporters might be seen as evidence of the experience they mention in interviews³⁷. The fact that well-established firms and large firms are not adversely affected by financial liberalization via the channel of uncertainty can be understood by their dominant market shares, network connections and financial strength among other possible advantages.

The overall impact of uncertainty on investment under liberalization can be better understood with a simple exercise in which the elasticity of the investment ratio with respect to uncertainty

³⁶ It should be noted that none of the regressions gives a significant result for internal funds variable either.

³⁷ The evidence in previous section on high response to uncertainty for domestically oriented firms also supports this reasoning.

is computed. In order to see the overall impact of uncertainty, we need to consider the aggregate impact of both uncertainty variable per se, and the impact through the interaction term. The negative coefficient of the interaction term of financial liberalization and uncertainty for the group of all firms is found as -0.320, while uncertainty variable itself has a negative coefficient of -0.261 in the same regression. In year 1985 financial liberalization variable takes its minimum value (4.7%), while it reaches its maximum value, (55.2%) by year 2002. Given these figures, one standard deviation increase in uncertainty measure brought 31% decline over median investment ratio in year 1985, when financial liberalization indicator was at its minimum. In year 2002, when financial liberalization variable indicator made its peak, the same standard deviation increase in uncertainty measure implied 49.2% decline in median investment ratio. This clearly shows that, the negative impact of uncertainty on real sector investment is greatly affected by financial deepening process that took place in the economy.

To sum up, I do not find any evidence of a change in sensitivity of investment to internal funds for any group of firms, while I find strong evidence for a worsening negative impact of uncertainty on investment for certain firm categories under financial liberalization in Turkey. Among firm categories exporters, large firms and well-established ones emerge as those that are not adversely affected by financial liberalization via the channel of uncertainty.

8. Concluding Remarks:

This paper analyzed the potential effects of financial liberalization on investment decisions of private manufacturing firms, in a developing country setting. While financial reform policies are expected to stimulate capital accumulation by helping finance productive areas of investment, the experience of the last two decades of crises increased doubts about the potential benefits from liberalization policies. As the economies became exposed to whims of the international capital flows, the new opportunities for disruptive speculative financial activity emerged, leading into heightened systemic instability, with implications for private non-financial investment.

I analyze the impact of liberalization policies on investment through two channels: liquidity and uncertainty. These channels were identified based on the results of interviews with managers of manufacturing firms in Turkey. I used interviews to construct a base investment model and tested the validity of the model with a novel unbalanced data set, comprising 165 manufacturing firms for the period 1985-2003. The results show that investment is positively related with liquidity and sales, while it responds negatively to changes in uncertainty variable. In this model, uncertainty emerges as the most important determinant of investment: one standard deviation increase in uncertainty variable brings 34% decline in the mean investment ratio. Statistical evidence on the model provides support for Post Keynesian model of investment in which the negative influence of uncertainty on investment in a highly uncertain macro environment is intensified through state of confidence.

My review on Turkish economy showed that all measures of financial deepening, except bank credit to public, exhibit an increasing pattern under financial liberalization. In order to answer the question of how liberalization policies affected investment through channels of uncertainty and liquidity, I choose a financial deepening indicator as proxy for financial liberalization. I also provide evidence there is a positive correlation between this financial liberalization policy and

the firm level uncertainty measure. My econometric analysis finds evidence that the negative impact of uncertainty on investment became higher under financial liberalization, while there is no evidence for a declining importance of liquidity. When financial liberalization indicator is at its minimum, one standard deviation increase in uncertainty brings 31% decline in the median investment ratio; when the indicator reaches its maximum level as it happened by year 2002, the same increase in uncertainty brings 49.2% decline in the median investment ratio. These findings are robust to the choice of financial deepening indicator. I also find that exporters, large firms and well established firms do not suffer from such worsening impact of uncertainty under liberalization.

Statistical evidence is also supported by the findings of field research. 97% of firms interviewed in 2003 cite uncertainties as the most important impediment to their investment projections, while only 10% faces problems of credit availability. They rank uncertainty in demand conditions as the most important source of the uncertainty they face. As a response to highly volatile demand conditions in the domestic market, approximately all firms mention a reorientation into export market, both for more stable demand and to eliminate currency mismatch between inputs and outputs. By 2003, we see that 91% of the firms had more than 10% of their sales income from exports. Furthermore, in open-ended interviews managers mention that economic crises of the last decade brought unanticipated losses, and resulted in a more “conservative” or “overly careful” attitude in forming expectations about future, i.e. declining state of confidence. Many interviewees mentioned that after the crises, time horizon for future planning in their own industries shrunk from 5 years to 3 years in average, as firms were not able to anticipate future changes. Therefore, results from the field research are in line with our findings from the econometric inquiry.

Financial liberalization might not lead to a smaller reliance on internal funds by firms, despite bringing an increase in financial depth in the economy. As in the case of Turkey, the banking system might fail to channel funds to productive areas of investment due to other opportunities, such as government bonds or speculative assets that emerged in the process. Since the particular path liberalization process proceeds matters, the indicators to proxy for financial liberalization should be chosen as cautiously and case-specific as possible.

Furthermore, the expected benefits for investment may be curbed, due to high instability introduced to these economies as a result of external financial liberalization. Uncertainty is one of the main determinants of investment and investment decisions are further prone to negative impacts through the link of declining state of confidence. In Turkish case, the post liberalization environment is marked by boom-bust cycles with two significant economic crises in 1994 and 2001, and smaller fluctuations in other years. Such volatile environments worsen the investment prospects by causing a decline in decision makers’ confidence in their ability to make future predictions.

Firm level studies on the impact of liberalization policies on investment have not yet incorporated uncertainty into their framework. Given the rising concerns about the potential benefits and costs of liberalization policies, the arguments and evidence in this paper suggest that these studies should pay much more attention to the role of uncertainty.

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TABLES

Table 1: A Classification of Empirical Literature on the impact of Liberalization on Financing Constraints:

Study	Data coverage	Model of Fundamentals	Proxies for Net Worth	Liberalization indicator	Estimation Technique	Firm Categories	Results
Harrison, Love, McMillan (2002)	40 countries 1988-1998, 7000 firms	Euler investment equation with sales ratio	-Cash stock ratio and its interaction with FDI	Aggregate FDI flows	-GMM	Ownership (multinational)	Multinationals, not constrained. FDI reduces constraints for domestic firms.
Laeven (2003)	13 developing countries	Euler investment equation with sales ratio	-Cash flow ratio	Index of domestic deregulation	GMM	Size	Constraints on large firms increase, those on small firms decrease
Wang (2003)	Taiwan 1989-1996 184 firms	Q model with sales ratio	-Cash flow ratio -Total assets	Gradual domestic deregulation (over years)	-Stochastic Frontier with fixed effect dummies	Size	Reduction of constraints for all, whereas small firms gained most
Laeven (2002)	Korea 1991-1997 198 firms	Both Tobin's Q and Euler investment equations	Cash flow ratio	Comparison with result from pre reform studies	-OLS -GMM	-Size -Ownership and its concentration (chaebol) -Bank affiliation (for chaebol)	Large, chaebol affiliated firms, firms with concentrated ownership face greater constraints after liberalization
Harris, Schiantarelli, Siregar (1994)	Indonesia 1981-88 523 firms	Accelerator model	-Cash flow ratio -Debt leverage	Year dummy for post banking deregulation	-OLS -GMM	Size	Large firms are not constrained at all, constraints on small firms are reduced.

Jaramillo, Schiantarelli, Weiss (2003)	Ecuador 1983-1988 420 firms	Euler investment equation with sales ratio	Linear and quadratic term in debt leverage	Structural change in estimations by year 1986 of interest deregulation	GMM	-Size -Age	Small/young firms face constraints, liberalization does not help
Koo and Shin (2004)	Korea 1981-2000 348 firms	An ad-hoc Q model with debt leverage	Cash flow ratio	Financial liberalization index based on 7 measures	-OLS -GMM	-Size -Age -Ownership (Chaebol)	Small, non-chaebol and established firms gained most from reduction in constraints
Harrison and McMillan (2002)	Ivory Coast 1974-1987 399 firms	Euler investment equation with sales ratio	-Debt to asset ratio -interest coverage as ratio of coverage plus cash flow	-Firm level FDI -Sectoral foreign borrowing -sectoral foreign sales	GMM	-Size -Ownership (foreign and state)	-Domestic firms are more constrained due to crowding out by foreign firms -State firms are not constrained
Gelos and Werner (2002)	Mexico 1984-94 1046 plants	Accelerator model	Cash flow ratio	Time dummies after 1989	OLS GMM	-Size -Exports -Ownership (foreign and state)	-Small nonexporter firms face smaller, Large domestic firms face higher constraints -State firms are not constrained
Gallego and Loayza (2000)	Chile 1985-95 79 firms	Q model	Cash flow ratio Debt leverage	-Structural change in the sample -financial liberalization index	OLS GMM	-Stock market valuation -conglomerate affiliation	Constraints were reduced for all firm types

Table 2: Main Economic Indicators 1980-2003

	1980	1985	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
GNP growth (%)	-2.8	4.3	9.4	0.3	6.4	8.1	-6.1	8.0	7.1	8.3	3.9	-6.1	6.3	-9.5	7.9	5.9
Savings (% of GNP)	16.0	18.9	22.0	21.4	21.6	22.7	23.1	22.1	19.9	21.3	22.7	21.2	18.2	17.5	19.2	19.3
Investment (% of GNP)	21.8	20.1	22.6	23.7	23.4	26.3	24.5	24.0	25.1	26.3	24.3	22.1	22.8	19.0	17.3	16.1
Current Acc Balance (% of GNP)	4.9	1.5	-1.7	0.2	-0.6	-3.5	2.0	-1.4	-1.3	-1.4	1.0	-0.7	-4.9	2.3	-0.8	-3.4
Stock of Foreign Debt (% of GNP)	--	37.4	32.2	33.2	34.6	37.0	49.6	43.1	43.2	43.8	46.7	55.6	59.3	78.0	72.0	60.8
PSBR (% of GNP)	8.8	3.6	7.3	10.1	10.5	10.2	6.2	5.0	8.6	7.7	9.4	15.6	11.8	16.4	12.7	9.4
Inflation (% change in WPI)	107	43.2	52.3	55.3	62.1	58.4	121	86.0	75.9	81.8	71.8	53.1	51.4	61.6	50.1	25.6
Real Interest on govern' bonds^b	--	--	-4.0	5.3	13.9	9.9	28.6	18.1	31.1	22.1	29.5	36.8	4.5	31.8	13.0	17.0
Real Exchange Rate Index^c	--	83.2	94.5	91.4	87.4	86.6	66.7	75.9	74.4	74.0	74.9	71.2	71.5	59.4	71.1	84.0

Notes: Source for all series is the "Economic and Social Indicators, 1950-2004" published by the State Planning Organization (SPO) of Turkey.

b: Average annual compounded interest rates on domestic borrowing, adjusted fro the average maturity of securities issued in a year.

c: Index = 100 in January1982. The weights in the currency basket are 0.75 for US\$ and 0.25 for euro. In relative price calculations, producer prices for USA, producer prices for Euro area and wholesale prices for Turkey are used (source: ifs, sis)

Table 3: Indicators of Financial Deepening : 1980-2003

	1980	1985	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
DEPOSITS/GNP	14.1	24.8	21.5	24.4	24.3	21.2	28.4	28.1	36.2	37.1	38.3	51.2	44.6	28.0	48.5	42.1
TL Deposits/GNP	14.1	22.6	16.6	16.7	15.6	12.6	14.5	14.2	18.7	18.4	20.4	27.7	24.4	11.9	21.2	22.0
FX Deposits/GNP	--	2.2	5.0	7.6	8.7	8.6	13.9	13.9	17.5	18.7	17.9	23.5	20.2	16.1	27.3	20.0
SECURITIES/GNP	4.9	6.5	10.4	12.5	17.7	19.2	18.0	19.1	22.0	23.9	25.6	34.6	34.8	35.6	60.0	60.0
Public Securities/GNP	3.6	4.7	6.4	7.0	12.2	13.6	15.4	15.3	19.0	20.7	22.0	29.8	29.3	32.8	55.2	55.0
Private Securities/GNP	1.3	1.7	4.0	5.4	5.5	5.6	3.4	3.8	2.9	3.2	3.5	4.8	5.5	2.8	4.8	5.0
FINANCIAL ASSETS/GNP^a	19.0	31.3	32.0	36.9	42.0	40.3	46.4	47.2	58.2	61.0	63.9	85.9	79.4	63.4	109	102
BANK CREDIT/GNP^b	--	20.3	16.4	15.9	16.8	17.1	14.8	17.1	20.7	24.5	20.8	20.2	21.5	17.3	11.9	14
M2/GNP	17.4	24.2	18.0	18.5	17.3	14.1	16.2	16.0	2.0	19.2	21.3	28.1	26.0	26.2	22.6	23.2
M2Y/GNP	17.4	26.3	23.5	26.5	26.6	23.7	30.7	30.7	35.9	36.3	37.8	51.3	43.8	58.0	48.9	42.3

Note: All figures are expressed as percent of GNP

^a: The sum of Deposits and Securities

^b: Bank Credit includes to credit to public by depository institutions.

Source: State Planning Organization

Table 4: Descriptive Statistics for Regression Variables

Variable		Median	Std. Dev.	Min	Max	Observations
I/K	overall	0.168	0.237	-0.478	2.897	N =2005
	between		0.09	-0.019	0.746	n =165
	within		0.221	-0.493	2.760	T-bar = 12.151
S/K	overall	1.873	5.163	0.001	138.205	N =2005
	between		3.818	0.349	37.001	n =165
	within		3.34	-26.132	104.198	T-bar = 12.151
Cash/K	overall	0.077	0.371	0.000	3.862	N = 2005
	between		0.230	0.004	1.302	n =165
	within		0.303	-0.993	3.259	T-bar = 12.151
U	overall	0.305	0.188	0.003	1.412	N =1830
	between		0.157	0.076	0.772	n =165
	within		0.110	-0.232	1.167	T-bar = 11.090
FIN	overall	0.190	0.148	0.047	0.552	N=2180
	between		0.061	0.149	0.409	N=165
	within		0.138	0.038	0.604	T-bar=13.21

Table 5: Regression Variables and Their Expected Signs

<u>Dependent Variable: Investment Ratio(I/K)_{it}</u>		
<u>Explanatory Variables</u>	<u>Symbol</u>	<u>Expected Sign</u>
Lagged investment ratio	$(I/K)_{it-1}$	(+)
Sales Ratio	$(S/K)_{it}$	(+)
Cash stock ratio	$(Cash/K)_{it}$	(+)
Uncertainty	U_{it}	(-)
Financial Liberalization_Cash Stock Ratio	$(FIN_t)(Cash/K)_{it}$	(-) in financing constraints literature OR none as argued in the paper
Financial Liberalization_Uncertainty	$(FIN_t)U_{it}$	(-)
Financial Liberalization	(FIN_t)	(-)

Table 6: Estimation Results from Base Model of Investment (1985-2003)

Dependent variable (I/K) _{it} (Robust standard errors are in parentheses for regression coefficients)								
	All firms (OLS)	All firms	Large firms	Small- medium firms	Exporter firms	Domestic market oriented	Established firms	Young firms
(I/K)_{it-1}	0.091*** (0.034)	0.094** (0.038)	0.091* (0.053)	0.054 (0.059)	0.101* (0.052)	0.067 (0.047)	0.146** (0.058)	0.018 (0.044)
(S/K)_{it}	0.012*** (0.003)	0.009*** (0.002)	0.010*** (0.002)	0.020** (0.007)	0.022** (0.010)	0.009*** (0.001)	0.023** (0.009)	0.009*** (0.002)
(Cash/K)_{it}	0.080*** (0.030)	0.075* (0.039)	0.096** (0.046)	0.010 (0.036)	0.027 (0.040)	0.096* (0.053)	0.034 (0.033)	0.116* (0.071)
U_{it}	-0.221*** (0.084)	-0.390*** (0.126)	-0.403** (0.198)	-0.262** (0.125)	-0.179 (0.138)	-0.537*** (0.166)	-0.273** (0.152)	-0.340** (0.187)
# of obs	1828	1651	950	701	701	950	865	786
# of firms	165	165	88	77	73	92	83	82
m1	--	-4.18 (0.000)	-2.99 (0.002)	-3.01 (0.003)	-2.79 (0.005)	-3.30 (0.001)	-3.04 (0.002)	-2.88 (0.004)
m2	--	1.02 (0.309)	1.09 (0.277)	-0.52 (0.606)	-0.84 (0.399)	1.06 (0.288)	0.98 (0.328)	-0.21 (0.834)
Sargan Test	--	152.21 (1.000)	65.28 (1.000)	70.17 (1.000)	40.91 (1.000)	66.39 (1.000)	65.64 (1.000)	69.04 (1.000)

Notes:

1. Estimation results in the first column are obtained from OLS, fixed effects model with time dummies, while the other columns present results of one-step GMM. For the OLS regression, $F(20,1643) = 16.52$ and significant at 1% confidence level, while R^2 (within) = 0.198.
2. Coefficients for constant term and time dummies are not reported.
3. * indicates significance at 10%, ** significance at 5% and *** significance at 1%
4. The instruments in GMM regressions include all available lagged values of variables, beginning from t-2.
5. m1 and m2 are tests for first and second order serial correlation, respectively. Under the null hypothesis of no serial correlation, these test statistics are normally distributed. Sargan test statistic is obtained from GMM two-step estimations. Under the null hypothesis that instruments are valid, Sargan test statistics has a χ^2 distribution. Values in parentheses for m1, m2 and Sargan test are p-values.

Table 7: Estimation Results of Investment Under Financial Liberalization (1985-2003)

	Dependent variable (I/K)_{it}							
	(Robust standard errors are in parentheses for regression coefficients)							
	All firms (OLS)	All firms	Large firms	Small- medium firms	Exporter firms	Domestic market sellers	Established firms	Young firms
(I/K)_{it-1}	0.129*** (0.033)	0.129*** (0.036)	0.108** (0.050)	0.104** (0.052)	0.142*** (0.055)	0.094** (0.042)	0.191*** (0.052)	0.063 (0.043)
(S/K)_{it}	0.014*** (0.004)	0.011*** (0.003)	0.011*** (0.004)	0.024** (0.012)	0.027** (0.013)	0.010*** (0.002)	0.031*** (0.009)	0.011*** (0.003)
(Cash/K)_{it}	0.084* (0.048)	0.081 (0.064)	0.095 (0.073)	0.027 (0.071)	0.037 (0.061)	0.065 (0.084)	-0.027 (0.036)	0.195 (0.125)
U_{it}	-0.161** (0.081)	-0.261*** (0.101)	-0.321** (0.147)	-0.132 (0.148)	-0.149 (0.104)	-0.365** (0.167)	-0.104 (0.119)	-0.259* (0.155)
FIN_t	-0.054* (0.061)	-0.166* (0.092)	-0.270** (0.119)	-0.145* (0.098)	-0.159* (0.092)	-0.372*** (0.134)	-0.427*** (0.108)	-0.051 (0.109)
FIN_t(Cash/K)_{it}	0.076 (0.129)	0.149 (0.182)	-0.086 (0.190)	0.093 (0.268)	-0.031 (0.109)	-0.316 (0.287)	0.407** (0.407)	-0.142 (0.237)
FIN_tU_{it}	-0.282* (0.182)	-0.320* (0.174)	-0.249 (0.277)	-0.374* (0.204)	-0.072 (0.208)	-0.209* (0.198)	-0.010 (0.225)	-0.404* (0.241)
# of obs	1828	1651	950	701	701	950	865	786
# of firms	165	165	88	77	73	92	83	82
m1	--	-4.18 (0.000)	-2.95 (0.003)	-2.99 (0.003)	-2.88 (0.004)	-3.20 (0.001)	-3.01 (0.003)	-2.93 (0.003)
m2	--	1.14 (0.255)	1.04 (0.301)	-0.14 (0.887)	-0.20 (0.845)	1.11 (0.267)	1.05 (0.293)	0.26 (0.798)
Sargan Test	--	160.38 (1.000)	82.41 (1.000)	75.00 (1.000)	67.87 (1.000)	88.01 (1.000)	71.04 (1.000)	78.23 (1.000)

Notes:

1. Estimations results in the first column are obtained from OLS, fixed effects model, while the other columns present results of one-step GMM. For the OLS regression, $F(7,1657) = 27.24$ and significant at 1% confidence level, while R^2 (within) = 0.152.
2. Coefficients for constant term are not reported.
3. * indicates significance at 10%, ** significance at 5% and *** significance at 1%.
4. The instruments in GMM regressions include all available lagged values of variables, beginning from t-2.
5. Interaction terms $FIN_t(Cash/K)_{it}$ and FIN_tU_{it} are assumed to be exogenous.
6. m1 and m2 are tests for first and second order serial correlation, respectively. Under the null hypothesis of no serial correlation, these test statistics are normally distributed. Sargan test statistic is obtained from GMM two-step estimations. Under the null hypothesis that instruments are valid, Sargan test statistics has a χ^2 distribution. Values in parentheses for m1, m2 and Sargan test are p-values.

--FIGURES--

Figure 1: Growth Performance of Turkish Economy

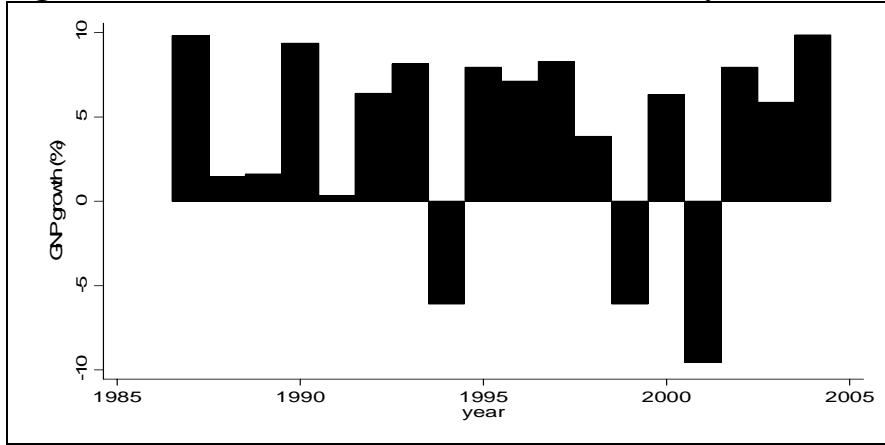


Figure 2: Pattern of Short Term Capital Inflows (STCF) and Growth

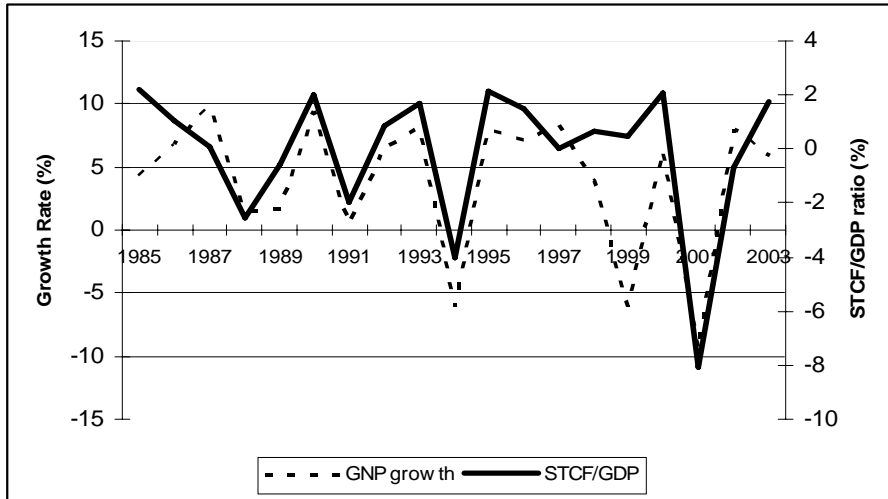


Figure 3: Mobilization of Savings – Currency Composition of Total Deposits

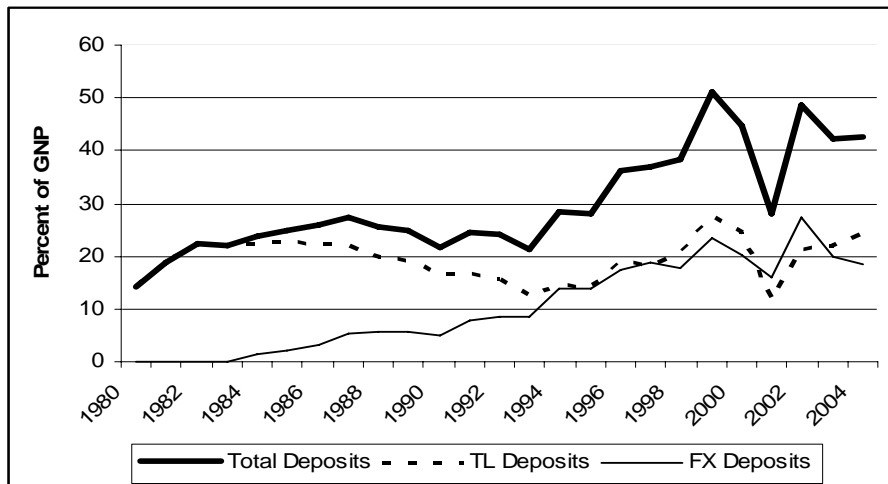


Figure 4: Pattern and Composition of Financial Securities

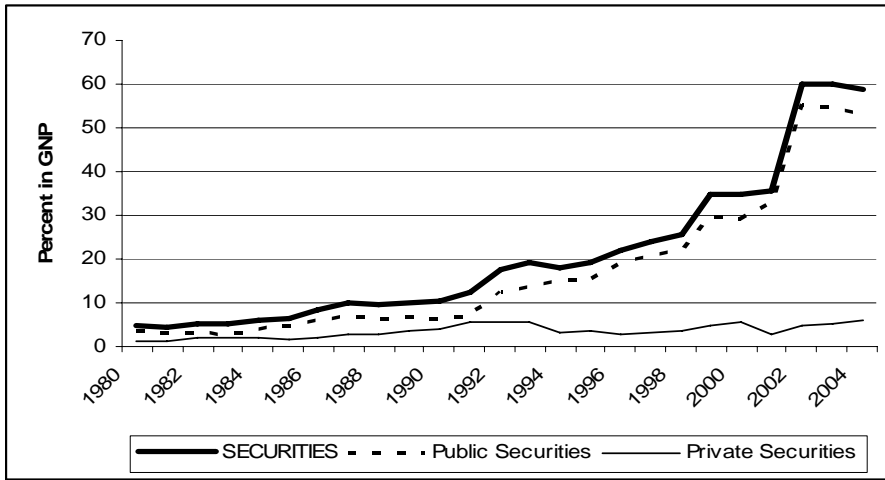


Figure 5: Deposit and Credit Ratios of Banking Industry

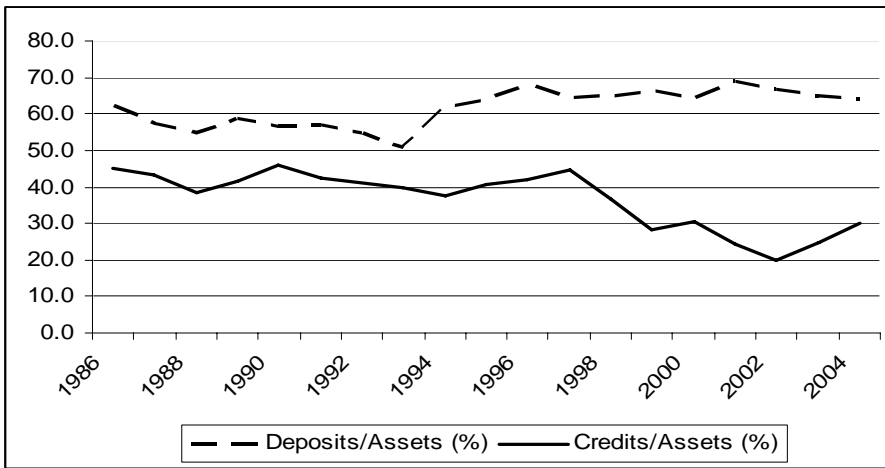


Figure 6: Investment and Saving Patterns

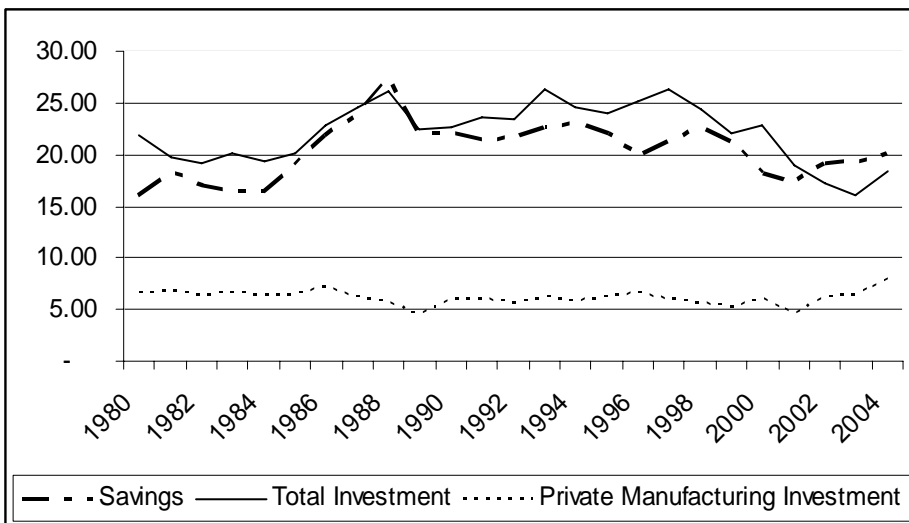
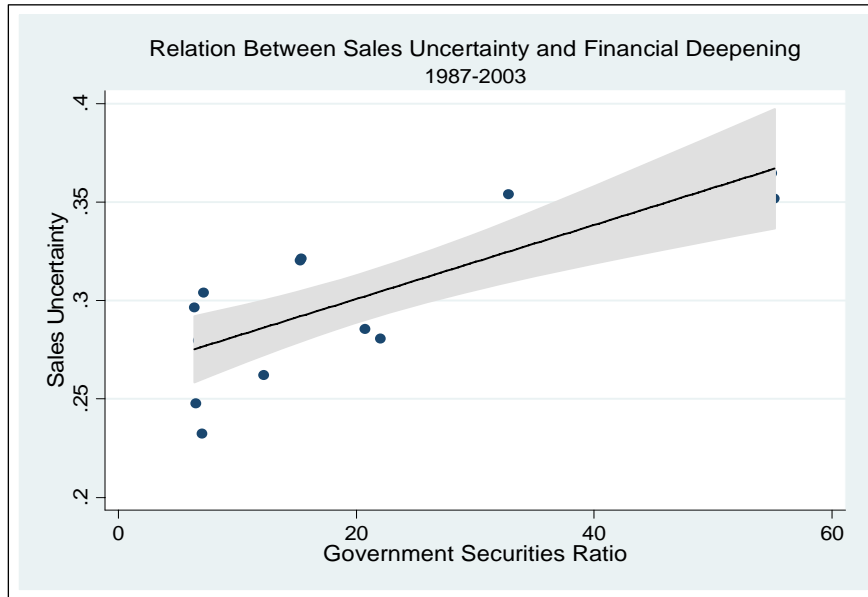


Figure 7:
Median of Firm Level Uncertainty and Indicator of Financial Liberalization



Note:

- Sales uncertainty is calculated as coefficient of variation in sales ratio.
- The line is derived from simple linear regression of sales uncertainty on liberalization indicator.
- The shaded area shows the confidence interval.

Appendix A: Field Research

This field research project that was supported by the Social Science Research Council Program in Applied Economics, Risk and Development Field Research Grant, with funds provided by the John D. and Catherine T. MacArthur Foundation.

I conducted 50 days of field work in Turkey, over the period of September-October 2004 Initial weeks also included interviews with the representatives from Turkish Industrialists' and Businessmen's Association (TUSIAD), The Union of Chambers and Commodity Exchanges of Turkey (TOBB). Their feedback was used to revise the interview design.

Methodology: The research is qualitative in nature and conducted through in-depth semi-structured interviews with CFO's (Chief Financial Officer) of manufacturing firms in Turkey. Companies were selected from the data set constructed to be used in econometric analysis. Since the data set is an unbalanced panel, although the total number of firms included is 165 for the whole period, the data were available for only 108 firms in year 2003, which was the last year of the data set coverage. To obtain the most recent contact information and achieve a higher response rate, "The Industrial Data Base" kept by The Union of Chambers and Commodity Exchanges of Turkey (TOBB) was used. 96 firms with available and updated information were contacted by phone to arrange for face-to-face interviews. During these phone calls, CFOs were informed about the nature and scope of the interviews and ensured about the academic use of the results as well as the condition of anonymity for their responses. Given the time limitations and the concern of CFOs regarding public disclosure of information, 33 CFOs accepted being interviewed.

Companies interviewed are located in 8 different cities: 11 firms in Istanbul, 6 in Izmir, 5 in Bursa, 4 in Kayseri, 1 in Bolu, 1 in Kutahya, 1 in Nigde and 1 in Ankara. Each interview with the company CFOs lasted around 2 hours.

In the first part of the interview, information on firm demographics, including age of the firm, number of employees, products produced, market shares, group affiliation and foreign ownership was captured by closed questions. Majority of firms are medium and large sized, with market shares ranging from 5% to 85% in particular markets and employment figures from 89 to 1864 employees. All firms are publicly traded with an average of 20% publicly traded shares. 9 firms are owned by well known *holding* companies, i.e. Turkish conglomerates.

The table below shows firm specific categories both for the firms interviewed and total number of firms included in the data set.

	Data set in 2003	Interviewed
SIZE DISTRIBUTION^a		
Small	8%	9%
Medium	46%	42%
Large	46%	49%
SECTORAL DISTRIBUTION		
Food, drinks and tobacco (ISIC 2)	12%	12%
Textiles, clothing, leather (ISIC 3)	27%	24%
Wood/furniture + paper/printing (ISIC 4+5)	7%	12%
Petroleum, plastic and rubber products (ISIC 6)	16%	12%
Cement, glass, ceramics (ISIC 7)	14%	9%
Basic metals (ISIC 8)	8%	9%
Machinery and metal goods +automotive (ISIC 9+10)	17%	21%
Established after 1980	19%	12%
Exports more than 10% of net sales	68%	91%
More than 10% foreign ownership	16%	21%
TOTAL # OF FIRMS	108	33

^aSize distribution categories above follow the definitions in CBRT Sectoral Balance Sheets for 2003 and are based on net sales of the firms. According to CBRT definitions, firms with net sales of less than 11797.1 billion TL are small, firms with net sales of less than 67412 billion TL are medium and those with net sales above this level are large in 2003. Net sales based classification is preferred here, since the similar information is available for all firms included in the main data set at that date.

CFOs were then asked about the nature of specific investment projects undertaken within the last 10 years. For these questions, a semi-structured interview design was adopted. The following specific issues were investigated:

- Sources of investment funding
- Determinants of Investment
- Impediments to Investment
- Sources of Uncertainty
- Impact of 2001 Economic Crisis
- Strategies to cope with uncertainty/instability in the post crisis period

Appendix B: Definition of Firm Level Variables and Categories

Variables:

Capital Stock (K): The item “Tangible Fixed Assets” on the balance sheets. It includes accumulated depreciation. Specifically it is the sum of machinery, plants, equipment, buildings, land, property, other tangible assets and construction-in-progress.

Investment (I): Change in capital stock by the end of the accounting year, net of depreciation. i.e. $I_t = K_t - K_{t-1} - \text{Depreciation}_t$ (Depreciation in each year is calculated as the difference between calculated depreciation of current year and last year.)

Sales (S): The item of net sales, net of “sales deductions”

Cash: The sum of “cash” and “marketable securities” under “Current Assets”.

Uncertainty (U): Coefficient of variation in sales ratio, i.e. mean adjusted standard deviation

All variables, except uncertainty, are adjusted by the beginning period capital.

Categories:

Size: It is a time-invariant identifier for firms, constructed based on net sales. It follows the definitions given in the Sectoral Balance Sheets published by Central Bank of Turkey. According to these definitions in 1999, firms with sales of less than 17,824,600 million TL are classified as small and medium, while those with sales above this level are considered large. In the literature, most common way of classification is a self-referential method based on mean or the median of sales. However our sample is not randomly selected. It is possible that over time, smaller firms enter the sample by issuing bonds in the capital markets or selling shares in the stock exchange. This pulls the median size levels down, causing a categorization of more firms as “large”, without any substantial change in the size of manufacturing firms in the overall economy. Hence we prefer this method to reflect the size of the firms in the overall economy.

Export Orientation: It is a time-invariant identifier for firms, based on the ratio of foreign sales-to-total sales of the firm. If the average of the foreign sales ratio over all the years that data are available is higher than 25%, the firm is classified as an exporter. If the average of the ratio is below 25%, the firm is considered to be domestic market oriented.

Age: The data on age are derived from company publications and the web-sites. The median and the mean of the age of firms in the sample are both 31. Firms that are younger are classified as young, while those which are older are considered as established firms.

Appendix C: Construction of Data Set

The firm level variables have been drawn from two different sources: publications of the Capital Markets Board of Turkey (CMB) for the years 1985-1988 and publications of the Istanbul Stock Exchange (ISE) for 1989-2003. While the CMB data contain financial statements of both publicly traded firms and those issuing corporate bonds as an alternative source of funding, the ISE data include that of publicly traded firms only. The forms and rules of reporting are different between these two sources, since General Accounting Principles were only introduced in 1994 in Turkey. Although financial statements from the ISE data set report more disaggregated accounts, as ones from CMB have fewer details, I merge certain accounts into one, in line with the accounting practices followed in CMB publications.

The data set only includes manufacturing firms, since the physical capital accumulation framework of this study is most relevant to a focus on investment in manufacturing. Exclusion of financial and insurance firms which are subject to different accounting standards and of those in diverse sectors such as commerce and agriculture have helped the analysis while keeping the firm heterogeneity in the sample under control. Finally only those firms with less than 50% government ownership are included in the sample. ‘State Owned Enterprises’ have been subject to different managerial procedures than privately owned ones. Since these enterprises should be understood as a part of country’s long term development plans, their financing and investment decision are not necessarily expected to follow the precedents of their private competitors.

The lack of full inflation accounting in Turkey is likely to cause some measurement error in the variables. Although, the country had a highly inflationary environment, inflation adjusted accounting techniques are still yet to be implemented. Since certain balance sheet categories that represent stock items are more prone to the price level changes than others, comparing these items might cause distortions in the analysis. Although the accounting reports have employed certain revaluation methods only for tangible fixed assets, revaluation ratios used for this purpose might not closely follow the relevant inflation rate³⁸. This issue is common to empirical research using firm level accounting data from developing countries. After calculating the relevant variables from accounting reports, this study uses a Private Manufacturing Industry Wholesale Price Index to express all values in 1984 prices³⁹.

For the period before liberalization the CMB publications are the main source of information for 66 firms; by 2003 there are observations for 165 firms. Hence the data set is an unbalanced panel with at least five years of coverage for each firm.

³⁸ These ratios are announced by the Ministry of Finance towards the end of every fiscal period and they are based on a method that takes the average of General Wholesale Price Index for that period. The ideal method would require the use of specific price indices for each item listed under the tangible fixed assets. However, these price indices are not available for Turkish economy.

³⁹ Alternative indices have been tried in the analysis and it is concluded that results do not depend on the choice of price index, possibly because of the use of ratios in regression specifications.