INVESTMENT UNDER FINANCIAL LIBERALIZATION: CHANNELS OF LIQUIDITY AND UNCERTAINTY

A Dissertation Presented

by

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ABSTRACT

INVESTMENT UNDER FINANCIAL LIBERALIZATION: CHANNELS OF LIQUIDITY AND UNCERTAINTY

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This dissertation examines the effects of financial liberalization on investment decisions of manufacturing firms in Turkey, through the channels of liquidity and uncertainty. While the former channel is analyzed in the literature on financing constraints, the latter is left out of the studies investigating investment behavior under liberalization. As suggested by literature on financing constraints, the positive role of liquidity in determination of investment is expected to be eliminated with liberalization, since firms would have better access to capital markets. I argue that with the consideration of heightened instabilities, the expected change in the importance of liquidity may not take place, as investment is impeded by uncertainty.

Based on the results of a qualitative field research project that involved interviewing the managers of manufacturing firms in Turkey, a firm level investment model which contains output, liquidity and uncertainty as the determinants of investment, is developed in the dissertation. I test the validity of the model with a novel unbalanced data set from Turkish economy, comprising 165 manufacturing firms for the

period 1985-2003. The econometric estimation technique adopted estimating this dynamic model is Generalized Moment of Methods (GMM). Based on this benchmark, hypotheses regarding the role of internal funds and uncertainty under the impact of financial liberalization are tested by utilizing various aggregate financial deepening indicators. I also identify different effects across the different firm categories of size, export orientation and maturity.

Econometric tests and survey results provide evidence for a negative relationship between firm level investment and uncertainty variables, and a positive relationship with liquidity and sales variables. The negative impact of uncertainty on investment is worsened under financial liberalization due to nonlinearities in investment-uncertainty relationship as suggested by Post Keynesian theory. There is no evidence for a declining importance of liquidity. Overall, results suggest that financial reform policies did not lead to the expected benefits for the investment of real sector firms while producing increased uncertainty that impedes investment further.

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CHAPTER 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, the 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 volatility.[1]

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 led many to assert that with the onset of de-regulation, higher levels of investment and growth would be achieved. The 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.

[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 now has concerns about the link between financial integration and volatility.

As the deregulation of interest rates resulted in high rates, the early critiques of the McKinnon-Shaw hypothesis emphasized that the effect of financial liberalization on the supply of funds at the macro level is theoretically ambiguous. A 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 *et al* 2004), with limited opportunities to divest risk in developing countries (Stiglitz 2003). In this vein, the existence 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 the suggested benefits of financial liberalization taking the issues of credit availability and volatility into consideration.

In this dissertation, I examine the effects of financial liberalization on the investment decisions of manufacturing firms in Turkey. The experience of the Turkish economy is quite relevant to the picture depicted above regarding the controversies surrounding liberalization policies. As one of the early followers of trade and financial liberalization programs after the 1980s, the Turkish economy had minimal regulation on domestic and external financial intermediation by the 1990s. The case of the 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 the 1990s, the Turkish economy followed a pattern of boom-bust cycles, with major crises in 1994 and 2001 which created greater instability.

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

In this dissertation, my approach differs from previous research 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 managers of manufacturing firms in Turkey. Combining theoretical motivations with results of a field research project, this baseline model contains output, liquidity and uncertainty as determinants of investment. I then 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 the financial deepening process in the Turkish economy and discuss different indicators to choose as a proxy that represents the macroeconomic environment of the post-liberalization period in which firms make their investment decisions. I then investigate the change in the role of the 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 the uncertainty variable and positively related with the liquidity and output 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 the impact of uncertainty worsens under liberalization for small and medium size firms as well as firms with a domestic market orientation. Overall, my results suggest that financial reform policies did not change the positive role of liquidity. Contrary to the expectations of the advocates of reform policies, there is no evidence showing any benefits from liberalization in terms of a change in the financing pattern of investment or an easening of financing constraints. On other hand, I show that financial reforms had a harmful affect on investment by inducing a liquidity preference for firms caused by heightened volatility. In this environment of heightened volatility, I find that reform policies worsen the negative impact of uncertainty on investment,

The dissertation contributes to the literature of the impact of financial liberalization on investment in several ways. By examining the forms the liberalization and financial deepening processes 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 impacts 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 the Turkish economy for the post-liberalization period.

The dissertation is organized as follows. In chapter 2, I provide a critical review of the different perspectives on the liberalization's impacts on investment. In this part I identify credit availability and instability as the main channels through which these impacts are observed. In the second part of the chapter, different investment theories are critically reviewed and a Post Keynesian investment theory is identified as the realistic and adequate one on which to base my analysis of the impacts of liberalization on investment. In Chapter 3, I review financial liberalization policies and macroeconomic developments in the Turkish economy after 1980. In this chapter, I first evaluate the growth and investment performance of the Turkish economy under liberalization at the macroeconomic level. Then I present evidence on the possible links among investment, financial deepening and high macroeconomic instability. I argue that real sector private investment was curbed, rather than enhanced, by the particular form of financial deepening combined with instability created by the boom-bust cyclical growth pattern that has taken place in Turkey during the liberalization period. Chapter 4 presents the findings of the field research I undertook to explain the motivation behind the choice of investment variables. The results of the field work also provide important insights as to how investment variables might vary across different firm categories. Then in chapter 5, I present an investment framework and develop empirical specification for a model of investment. The hypotheses as to the impact of financial liberalization on firm level

investment are presented in the second part of this chapter. In chapter 6, I describe the construction of the novel firm level data set and regression variables. Chapter 7 discusses various estimation techniques, presents regression results and discusses their implications for both investment theory and changing investment behavior under liberalization. The final chapter summarizes the main findings of the dissertation and concludes with suggestions for future research.

CHAPTER 2

PERSPECTIVES ON LIBERALIZATION AND INVESTMENT

This chapter reviews the literature on investment under liberalization in two parts: In the first part, possible channels through which financial liberalization may have an impact on investment are investigated. Credit availability and instability are identified as the main channels for the effects to be operational, although in opposite directions. The empirical literature on the impact of liberalization on investment is also reviewed in this section. In the second part, different investment theories are critically reviewed and a Post Keynesian investment theory is identified as the most realistic theory on which to base my analysis of the impacts of liberalization on investment.

2.1 What Happens to Investment under Financial Liberalization?

The first section of this chapter provides a review of the arguments about the positive impact of financial liberalization on investment. The main channel identified here is the availability of credit. After a short presentation of cross country level empirical evidence regarding the relationship between investment and liberalization, the second section reviews the financing constraints literature and firm-level empirical evidence regarding the impact of liberalization through credit availability. The third section introduces potential problems brought by a liberalized environment and reviews arguments that financial liberalization may increase economic volatility and instability. Evidence provided in this last section is limited to macro level studies, because the role of heightened instability and its effect on firm-level investment have not received sufficient attention in the literature as the impact of liberalization policies per se. This

dissertation is an attempt to fill this gap. I incorporate the negative impact of financial liberalization through instability into a firm-level analysis of investment.

2.1.1 Access to Credit and Investment

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). Following this view, 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.[2] As stressed by Levine (1997), financial systems can affect growth through the channels of capital accumulation and the rate of technological innovation. The former effect is achieved either by altering the savings rate or by reallocating funds among competing uses of capital. In addition to this deepening of the domestic financial system, external opening is expected to fill the "savings gap" of a capital-scarce country thanks to the net inflow of capital, or simply provide access to international credit markets by private agents. The disciplinary effect of international capital markets is also mentioned as another factor that contributes to a better allocation of credit across different uses. Hence, both external and domestic liberalization of financial systems are expected to contribute to capital accumulation mainly through better access to credit. These reform policies are expected to generate financial

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

deepening, reduce agency costs and asymmetric information, and eliminate rent seeking.[3] In turn, these achievements are expected to boost private investment and promote growth in the long run.[4]

The expectation of better access to credit under liberalization has been challenged by many scholars from different perspectives. As the deregulation of interest rates resulted in high rates, the early critiques of the McKinnon-Shaw hypothesis emphasized that the effect of financial liberalization on the supply of funds at the macro level is theoretically ambiguous. In a debate between supporters of the McKinnon-Shaw view and the Neo-structuralists, the latter draw 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 sector. Just as importantly, higher real interest rates would result in greater firm distress and a contraction in investment and aggregate demand. A rising cost of borrowing may lower economic growth, at least in the short run.

Another view questioning the promise of better access to credit under liberalization points to the fact that when financial liberalization includes capital

[3] These expectations are mainly based on the assumption of efficient financial markets. I will discuss controversial aspects of this assumption in the second part of this chapter on q theory of investment.

[4] See Bekaert et al (2001) for the growth benefits of liberalization.

account liberalization, there is no guarantee that capital inflows will outweigh capital outflows by the residents. Montiel and Reinhart (2001), for instance, argue that when an economy is opened up financially in the midst of a "domestic debt overhang" problem, it should be expected to experience capital outflows.

Possible domestic misallocation of capital flows is also considered among the reasons for liberalization's negative impacts on investment. In these cases, even when credit expansion at the aggregate level is achieved, credit might not be allocated towards productive areas of investment, such as manufacturing. If capital inflows are used to finance speculative or low quality domestic investments, such as real estate, their impact on long-run growth would be limited. Agenor (2003) cites pre-existing distortions and asymmetries in the domestic financial system as the main cause of this 'perverse' result of financial liberalization.

A similar critique has been posed by scholars investigating the links between liberalization policies and balance of payments crises in developing countries. A 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.[5] Ocampo and Taylor (1998) and Frenkel and Rozada (1996) show that combined with pegged exchange rate policy and trade liberalization, uncontrolled financial liberalization lead to a bias against tradable goods sectors as a result of changes in relative prices, induced by an appreciation of domestic currencies. The argument that capital inflows cause an increase

[5] See the review by Calvo and Vegh (1997) for possible explanations of this phenomenon.

in the relative prices of non-tradable goods is based on the assumption that the producers of non-tradable goods can react to higher consumption demand by increasing prices. Producers in tradable goods sectors cannot increase their prices as much, since they compete with the rest of the world.[6]

In the empirical literature on the impact of liberalization on investment and growth, we see two distinct empirical approaches to measuring financial liberalization. One approach is to proxy financial liberalization by explicit policy measures, such as the use of year dummies or indices of reform implementations. By construction, these measures do not distinguish between *de facto* and *de jure* implications of liberalization. The second approach focuses on outcome variables and uses macroeconomic measures of financial sector or financial openness to proxy for liberalization. In chapter 5 of this dissertation, I adopt the latter approach in constructing a financial liberalization variable to asses the impact on investment in the Turkish economy.

Empirical studies are mostly cross country aggregate studies and the results are mixed. In an event-study of 95 countries from 1980 to 1997, Bekaert *et al*., (2001) find that the impact of equity market opening on investment is positive and significant, while its impact on consumption is negative. An IMF study (2001) finds that financial

[6] Here, the relative price of non-tradable to tradable goods is a proxy for the real exchange rate in an open economy macroeconomics framework.

openness as measured by the IMF index[7] has a positive significant impact on investment in 57 countries over the period of 1980-1999. While some other studies focusing on financial depth indicators and their relation with growth find a positive link,[8] the evidence is to be inconclusive once the openness of the capital account is taken into account. Rodrik (1998), for instance, relates the investment/GDP ratio to the IMF's measure of capital account openness and finds no effect. Kraay (1998) similarly finds no impact of financial openness on gross domestic investment as a share of GDP, using the IMF index, the Quinn index,[9] and inflows and outflows of capital as alternative measures of financial openness. While these empirical studies do not address particular channels through which the impacts of liberalization can be observed, they indicate a lack of clear evidence supporting the orthodox expectation of positive impacts of financial liberalization, raising controversy about the purported benefits.

For the reasons above, improved access to credit, especially for productive areas of investment, might not be achieved in a liberalized country. While aggregate investment equations might offer some clues as to the reason for this, an attempt to unearth specific mechanisms would call for a microeconomic investigation of

[7] The IMF Index is a binary indicator that captures only two regimes: "liberalized" regime and" restricted" regime. It is constructed from the annual reports of International Monetary Fund on "Exchange Arrangements and Exchange Restriction". The liberalization dates are determined based on whether foreigners are allowed to purchase shares of listed companies in the domestic stock exchange and whether there is free repatriation of capital and remittance of dividends and capital gains. See Kaminsky and Schmukler (2001).

[8] See Levine, Loayza, and Beck (2000), and Levine and Zervos (1998).

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 emphasizes the elimination of financing constraints under liberalization. The next section focuses on the financing constraints literature.

2.1.2 Financing Constraints under Liberalization

The only theoretical framework adopted in the literature to analyze the impact of liberalization on firm level investment through the channel of credit availability has been the New Keynesian market imperfections approach. In this framework of information asymmetries and principal-agent conflict, financial liberalization policies are expected to mitigate financing constraints, and provide firms with better access to external funds by lowering the premium on external funds. Hence, numerous works in this literature share a common methodological approach that is based on the panel estimation of an investment model containing proxies for both fundamentals and net worth. Financial variables such as internal funds, leverage or interest coverage are typically used as net worth indicators (See Table 1).[10] As the positive coefficient on internal funds increases, the premium on external finance is assumed to be increasing and the firm to be more financially constrained. Likewise as the negative coefficients of

[9] The Quinn Index distinguishes seven categories of statutory measures, including four current account restrictions, two capital account restrictions and one measure of constraints by international agreements against controlling capital flows. Compared to the IMF index, the Quinn index is accepted as a more nuanced and informative measure.

[10] Note that Table 3 only focuses on the impact of liberalization policies in developing countries. It does not cover the broad empirical literature on financing constraints.

leverage or interest coverage increase in magnitude, firms are assumed to face higher constraints.

The view is problematic for several reasons. From a Post Keynesian perspective the positive relationship between internal funds and investment does not originate solely from information asymmetries, but from self-imposed restrictions by managers that lead into a preference for internal funds for investment finance. This theoretical issue will be explained in the next section of this chapter in which I review different investment theories. If the positive sign is not indicative of information asymmetries only, then it is not possible to predict the impact of elimination of imperfections under liberalization. Moreover, there is no *a priori* reason to expect that financial reforms and deepening would reduce information asymmetries. Information asymmetries are inherent to capital markets and cannot be eliminated as long as there is a principal-agent problem. Indeed, given the specific institutional settings prevalent in developing countries, one can even expect constraints to worsen with the arms-length relationships of liberalized markets that are expected to replace the relationship-banking type of systems. This might be especially relevant for large, well established firms or firms with group affiliation.[11] 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

[11] The Korean 'high debt model" *a lá* Wade and Veneroso (1998) exemplifies this case of changing patterns of financing under liberalization. As an example of the financing constraints literature Laeven (2002) states that large and *chaebol* affiliated Korean firms "face greater financial constraints after liberalization." Hence the financing constraints literature would suggest that the pre-liberalization credit allocation system in Korea had fewer problems of information asymmetries.

than large ones; firms with group affiliation might face smaller constraints then those without group affiliation.

Table 3 categorically summarizes the firm level empirical literature on financing constraints under liberalization. As in the case of aggregate cross country studies mentioned above, various measures of financial liberalization are utilized in this firm level literature. 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 feasible to search for a structural change that will be observable in or after a specific year. Another method is to construct a financial liberalization index that can contain information on both the gradual implementation and intensity of reform policies. While the majority of studies presented in Table 3 prefer one of these two methods, Harrison *et al* (2004) differ from the rest in that they use the aggregate flows of foreign direct investment (FDI) as an indicator of the financial openness of the economy. In a similar vein, Harrison and McMillan (2003) use firm-level FDI and FDI by sector as indicators of financial openness. These are measures that focus on the outcome of liberalization policies rather than their legal implementation. These aggregate, time-variant measures of the liberalization process provide more information about the particular pattern of liberalization and reform policies than an index or dummy-variable method does.

Once the liberalization indicator is chosen, the coefficient of the interaction term between this indicator and the net worth variables (mainly cash flow ratio, leverage and interest coverage) are taken to determine the impact of liberalization on financing constraints. Commonly utilized firm categories to determine *a priori* which firms might

be constrained are size, bank and group affiliation, age, export orientation, foreign or public ownership and concentration of ownership. Evidence regarding the elimination of financing constraints is mixed and specific to firm categories.

Three considerations emerge from the review of literature on financing constraints under liberalization. First, theoretically it is problematic to interpret a change in the sensitivity of investment to net worth variables as sign of elimination of information asymmetries. Sensitivity to net worth can also be explained by other concerns such as liquidity preference. Documenting the specific institutional settings and their transformation might shed light on the causes underlying such changes, if changes ever occur. For this purpose in chapter 3 of the dissertation I investigate the specific institutional setting of the Turkish economy in which access to credit took place prior to and under liberalization. Second, any empirical assessment of the impact of liberalization on firm level investment should be pursued considering different firm categories, since the results from empirical analysis are firm specific. In order to be able to categorize firms into groups, I construct an original firm level data set of Turkish firms.[12] The construction of this data set is essential to an analysis that is specific to firm categories as the only other available source of data (Worldscope data base) provides observations on only 23 firms in Turkey. Third, the measurement of liberalization matters. Liberalization indices might be preferred for cross country studies, since the level of aggregation across countries might not allow inclusion of specific outcomes of the liberalization process. However in this dissertation, a country case study, I prefer

[12] Construction of the data set is explained in chapter 6.

using aggregate variables to measure liberalization outcomes since they are likely to provide more information about the particular experience of the Turkish economy.

While focusing only on the issue of access to credit, the firm level financing constraints literature leaves out other possible channels through which the impacts of financial liberalization might be operational. In the next section I introduce the issue of potential problems brought by a liberalized environment by focusing on the impact of heightened instability on investment. I review the arguments about the ways financial liberalization might increase economic volatility and instability and provide empirical evidence. The evidence provided is limited to macro level studies since, as noted above, the role of heightened instability and its effect on firm-level investment has not received a great deal of attention in the literature. I attempt to fill this gap in the following sections of this dissertation by analyzing the negative impact of financial liberalization through instability at the firm level.

2.1.3 High Volatility and Instability under Liberalization

The recent experiences of developing countries that suffered financial and economic crises brought the issue of the links between liberalization and volatility to the attention of scholars. While there seems to be broad consensus that economic volatility has increased drastically in the age of financial liberalization, scholars differ in their analysis of the underlying mechanisms.

The theoretical impact of financial integration on output volatility depends on various factors such as the composition of these flows, patterns of specialization and the sources of shocks. In mainstream theory it is argued that financial integration may

diminish volatility in macroeconomic performance by providing access to capital that can help developing countries diversify their production base. However, even within this framework it is recognized that rising financial integration with the rest of the world, could also lead to increasing specialization of production based on comparative advantage considerations, thereby making these economies more vulnerable to industry specific shocks (Kalemli-Ozcan, Sorensen and Yosha 2003). In line with this mainstream framework a number of theoretical studies using dynamic stochastic general equilibrium business cycle models suggest that increased access to international financial markets should dampen the volatility of consumption while inducing an increase in investment volatility (Mendoza 1994, Baxter and Crucini 1995).

Some studies focus particularly on capital account liberalization and capital flows as a source of heightened volatility in liberalized economies. A high degree of financial openness may be conducive to a high degree of volatility in capital movements. Sudden changes in the direction of capital flows could induce boom-bust cycles in developing countries, most of which do not have sufficiently deep financial sectors to cope with volatile capital flows.[13] For example, Caballero and Krishnamurthy (2005) present an overlapping-generations-model of developing country bubbles and show that when capital flows are reversed, domestic credit and investment fall in a typical developing country setting. Chang and Velasco (2001) discuss the possibility that large reversals of short term capital flows raise the risk that borrowers may face

[13] It is argued empirically that short term capital flows are more volatile than long-term capital in the form of FDI. See, for example, Brewer and Nollan's (2000) study on 17 developing countries.

costly "liquidity runs". The higher the level of short-term debt relative to the borrowing country's international reserves, the greater the risk of such runs will be. High levels of short term liabilities intermediated by the financial system also create risk of bank runs and systemic financial crises. Short-term capital flows tend to be very sensitive to herding, which translates into large movements into and out of certain types of assets and exacerbates fluctuations in asset prices and capital movement. Volatility of capital movement can also result from contagion effects. Developments outside of a country can cause a loss of confidence in the country's economic prospects and trigger massive capital outflows.[14] Overall these studies suggest that capital account opening might lead to higher instability through different mechanisms. Higher instability following capital account opening might be one of the reasons why aggregate empirical studies fail to produce robust results on liberalization's impacts on investment once the openness of the capital account is taken into account (Rodrik 1998, Kraay 1998).

Stiglitz (2003) states that there are reasons to expect that capital market liberalization may have negative effects on growth because of greater instability and crises through the following channels. First, given the limited ability to diversify risk, especially in developing countries, instability increases the "risk premium," i.e. the return 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. Hence

[14] Contagion can also occur through terms of trade shocks or competitiveness effects.

in Stiglitz's view the crises that follow capital market liberalization and specific institutional setting of developing countries are reasons for liberalization's negative impact on growth.

Another view emphasizes that financial liberalization may be destabilizing, as it can lead to over-lending through credit expansions (Aghion *et al* 2004). Obstfeld (1994) argues that financial liberalization increases total funds available for more risky projects as a result of increased risk sharing across borders. This reasoning was also used by the IMF to explain the increase in commercial bank credit as well as non performing loans in the banking sector in Mexico during the course of the 1990s (IMF 1995). On the other hand, Stiglitz emphasizes the limited opportunities to diversify risk in developing countries as an institutional factor to aggravate problems of over-lending (Stiglitz 2003).

Inspired mostly by Keynesian insights, heterodox economists try to understand the phenomenon of over borrowing and erratic shifts of capital flows, not based on market distortions either in the liberalized country or in international capital markets, but as a systematic outcome that the current system produces.[15] Erturk (2005) provides a recent example of this Post Keynesian literature.[16] He seeks to explain economic volatility as being caused by an asset price bubble that comes into existence not as a deviation from market rationality, but as its very expression. In his view, two stylized

[15] This market imperfectionist approach is prevalent in different arguments: Various moral hazard problems are argued to cause excessive risk taking in the domestic economy that leads to an unwarranted build up of debt, currency mismatch and an exceedingly fragile financial situation. Likewise the arguments around herd behavior or contagion effects are about malfunctioning international markets.

[16] See also Arestis and Glickman (2002) and Grabel (1995, 1996) among others.

facts associated with the aftermath of financial liberalization are important for the production of volatility according to a Keynesian macro framework. First, liquidity preference becomes intertwined with currency substitution,[17] producing a macroeconomic destabilizer that explains procyclical changes in bank credit. Second, asset prices become fairly easy to predict, stimulating destabilizing speculation by foreign and domestic investors.[18]

While there seems to be some consensus about the link between financial openness and higher economic volatility, cross country empirical studies do not provide clear support in this direction. Easterly *et al* (2001) find no significant effect of either financial openness or volatility of capital flows on output volatility in a sample of 74 countries between 1960 and 1997. Buch *et al* (2002) found that there exists no consistent empirical relationship between financial openness and volatility of output for 25 OECD countries. However, Prasad *et al* (2004) report that, for 76 countries over the period of 1960-1999, increasing financial openness is associated with increasing relative volatility of consumption up to a threshold level, after which increasing openness is found to decrease volatility. The same study also finds that when trade openness and FDI flows are taken into account, portfolio flows of capital tend to intensify an already

[17] It is now well established that currency substitution is quite extensive in many developing countries. See Prock *et al*. (2003) for Latin America and Civcir (2003) for Turkey. Because of various problems of high inflation, credibility, exchange rate risk, etc., agents in developing countries try to keep a part of their idle money balances in foreign currency.

existing negative relationship between volatility and growth. Hence it is important to distinguish between different types of capital flows, as the short-term capital flows tend to be more volatile than long-term flows in the form of FDI. Rodrik & Velasco (2000) show that much of the short term capital inflows into developing countries is comprised of speculative positions in developing country financial instruments. If the source of volatility is the speculative and short term nature of these flows, as suggested by Erturk (2005) and other Post Keynesian scholars, the inclusion of FDI in empirical analysis may result in an understatement of the volatility of capital flows.

While these cross-country empirical studies on the relationship between financial liberalization and macro volatility do not offer much insight into particular channels through which the impact can be observed, other studies focus on the links between crises and recessions on the one hand and the capital account liberalization on the other. Examining the impact of capital market liberalization on the likelihood of an economy having a recession, Easterly *et al*. (2001) observe an adverse effect. In another cross-country study, Demirguc-Kunt and Detragiache (1998) find that the increased frequency of financial and economic crises is positively related to financial and capital market liberalization. More conclusive evidence from these studies might suggest that financial and economic crises and recessions are the main ways through which the negative impacts of capital account liberalization are experienced.

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[18] With the development of secondary asset markets following liberalization in developing countries, variable price assets rather than bank loans have become the main conduit of capital inflows. See Grabel (1995, 1996) and Singh (2003). This has paved the way for speculative positions in developing country financial instruments to comprise much of short term capital inflows into these countries. See Rodrik and Velasco (2000).

As shown by Eichengreen (2001), cross-country studies have their own limitations, such as the difficulty of developing a common measure of liberalization, the difficulty of incorporating the specific design of institutions and policy implementations across countries, and the potential problem of omitted explanatory variables. The results revealed by cross-country analyses should be substantiated by case studies of countries that look at the particular institutional and political setting in which these policies have been implemented. As a case study of the Turkish economy, this dissertation aims to develop case specific measures of financial liberalization to better represent the particular institutional and political setting. The choice of specific measures is based on an analysis of the Turkish economy's experience with liberalization developed in chapter 3.

While aggregate investment estimations in single country settings might offer some clues, an attempt to unearth specific mechanisms calls for a microeconomic investigation of investment behavior at the firm level. From this review of liberalization literature, the main channels through which liberalization's impacts are expected to be operational are identified as credit availability and heightened instability. Therefore an investment theory that explicitly focuses on the issues of liquidity and uncertainty is needed to pursue the analysis. While the micro dynamics of the former channel are theorized only in the literature on financing constraints, the macro studies mentioned above do not suggest an explicit firm level mechanism to explain why investment might be curbed by heightened instability under liberalization. A theory that provides insight into why responsiveness of investment to its determinants changes under liberalization and how these determinants are related to uncertainty and liquidity is needed. Hence in

the second part of this chapter I review various investment theories to lay the theoretical groundwork for my analysis of the impact of liberalization on investment.

2.2 Theories of Investment

The investment literature has competing theoretical perspectives with conceptually distinct variables in the investment function. Prior to the mid-1980s, the standard neoclassical Jorgenson model, the accelerator model, and the q model constituted the main theoretical foundations of empirical investment studies.[19] More recently, issues such as internal funds, uncertainty and irreversibility have become prominent. In this section, the relevant theories will be reviewed in order to establish the theoretical framework of this dissertation with a focus on studies of firm level investment.

2.2.1 Accelerator Theory

Accelerator models focus on output growth as the key determinant of investment decisions and are usually seen as "Keynesian" given their focus on quantity adjustments and extrapolations of current levels to develop future expectations. Matthews (1959) explains accelerator theory's emphasis on simple quantity factors by describing the connection between profits and output growth: in an uncertain world, the trajectory of output growth is assumed to signal growth of future profitability. In deciding their

[19] Chirinko (1993) provides an excellent review of different investment modeling strategies, their empirical strengths, and policy implications. For an empirical comparison of different models, see also Kopcke and Brauman (2001). Hubbard (1998) provides a good review of issues related to market imperfections in investment theory.

desired capital stock, firms will proxy future profit expectations by looking at current and past levels of output. In addition, investors will invest to augment capital stock according to expectations of future output. Assume that a firm's capital stock is not at its desired level in the preceding periods, an accelerator model will typically use the level of output as the primary determinant of change in investment. On the other hand, if the capital stock were at its desired level in the previous period, the investment specification would be defined by the growth of output rather than the level.

Simple accelerator models include only one output growth term within their specifications and imply that the capital stock reaches its desired level in each period of time, ignoring long-term expectations. In response to some of the shortcomings of simple accelerator models Goodwin (1948) and Chenery (1952) formulated flexible accelerator models. In flexible accelerator models, adjustment to the desired capital stock is assumed to take place over many periods. Expected future output is included as a weighted distributed lag function of past output, allowing partial, delayed adjustment within the investment decision making process. The effects of past output growth over time reflect decision, financing, ordering, delivery, installation and adjustment lags.

The application of a distributed lag structure into the accelerator models is consistent with models of investment, incorporating adaptive, extrapolative, or regressive expectations. The process of forming expectations creates relationships between current and lagged variables, if current expectations are based on past events. For example, firms may look at a series of lags on past output in forming expectations of future profitability. For these reasons, investment will respond sluggishly to current conditions.

Accelerator theory embodies a key insight from Keynes: that expectations are the crucial and dynamic link that brings past, present and future together in the determination of capital stock. The uncertainty of demand movements is the very reason for predicting future from the past in these models. The notion of uncertainty is implicit in this theorization, yet is not explicitly handled as an independent influence in the structural framework of accelerator models. The dynamics of expectations formation are not explored and it is unclear how changes in the degree of uncertainty would affect these dynamics. In my discussion of the heightened instability and volatility under liberalization, I suggested that the chosen investment theory should sufficiently explain how these developments can be linked with investment through the notion of uncertainty. This requires a framework that explicitly focuses on the process of expectation formation. Therefore I conclude that the accelerator models offer an inadequate treatment of uncertainty; they do not provide the tools to investigate the links among uncertainty, investment and liberalization.

Accelerator models are also criticized for neglecting the cost related variables in the investment equation. From a neoclassical perspective, critics of accelerator theory propose that investment is driven by profit maximization behavior of business; thus cost variables should have an impact on investment. I review an example of this approach (Jorgenson's model) in the next section to asses whether neoclassical models are more suitable for an analysis of investment with a focus on liquidity and uncertainty.

2.2.2 Jorgenson's Model

In Jorgenson's (1963) early neoclassical model, investment is described as a process of optimal capital stock adjustment. The optimal capital stock is derived through maximization of discounted profit flows over an infinite time horizon. Jorgenson assumes that capital-labor ratios adapt to relative factor price changes, where the relative factor price of capital is measured as the user or rental cost of capital. At the end of the optimization problem, the main determinants of investment emerge as the user cost of capital (essentially the relative cost of capital inputs) and output. In this neoclassical approach, policy prescriptions center around allowing the market to operate freely and efficiently by promoting the flexibility of prices.

In his early work, Jorgenson assumes that capital stock adjustment is instantaneous, adjustment costs are zero, and investment decisions are completely reversible. This means that investors do not have to look to the future in Jorgenson's world because they can respond quickly and effectively when the time comes; their expectations are essentially static. Following widespread criticism, *ad hoc* lags are introduced into later specifications of Jorgensonian models to capture expectations. However, the introduction of these specifications converts the Jorgensonian model from a neoclassical investment model to a modified accelerator model.

Regarding his treatment of uncertainty, Jorgenson's model was even less useful than accelerator models, which at least implicitly recognized there are consequences to uncertainty in demand conditions. For the purposes of analyzing the role of liquidity and uncertainty in an explicit investment framework, neoclassical theory does not provide any insight. Moreover, empirical modeling of Jorgenson's theory was not fully

successful in the sense that there was little agreement about the impact of the user cost of capital on investment, which is at the core of neoclassical theory. Chirinko, for example, concludes that "output (sales) is clearly the dominant determinant of investment spending with user cost of capital having a modest effect" (Chirinko 1993: 1881). Also, the estimated lag parameters were difficult to interpret because the influence of expectations cannot be separated from the other factors captured by the lag structure, such as delivery, adjustment and installation lags.

The *ad hoc* treatment of lag structures in Jorgensonian models led to attempts by orthodox theorists to capture the future more effectively using a more rigorous approach to specify expectations. While the notion of sluggish adjustment was considered in earlier accelerator models, these attempts brought along investment models based on explicit and elaborate adjustment cost equations. Eisener and Strotz (1963) give an early example of these adjustment costs. Models with explicit adjustment costs generally share the same set of assumptions with Jorgensonian models, such as profit maximizing behavior by firms and the reversibility of investment. For example, Abel (1983) derives an investment function in which the investment rate is a function of the shadow price of capital, i.e. the discounted stream of future marginal revenue products from an investment.

As the emphasis on explicit adjustment dynamics increased with these models, investment is more widely conceived as the 'adjustment to equilibrium' and thus the optimal amount of investment becomes a decision of the optimal speed of adjustment. However my framework in this dissertation requires an approach that theorizes investment as a behavioral relation as much as an adjustment.

In these versions of adjustment cost models, the problem remains how to identify future marginal revenue products. Ironically the attempt to capture the future more effectively is still not able to solve the problem of forecasting the future under uncertainty. One attempt to solve the problem of relating unobservable expected variables to observables is known as the Euler Equation models of investment and is widely adopted by the most recent research on investment including the literature on financing constraints. Another solution is suggested by q theory of investment. In contrast to the accelerator and Jorgensonian models, both the Euler Equation and q theory models include dynamic elements and expectation parameters that appear explicitly in the optimization problem. In the following sections, I review these models to asses whether they provide an adequate theoretical framework for my analysis of the links among investment, uncertainty and liquidity.

2.2.3 q Models

The q theory of investment established by Brainard and Tobin (1968) uses information in financial markets to relate unobservables to observables. According to this theory investment is positively related to the ratio of the financial value of the firm (for the demand price of a firm) to the replacement cost of its existing capital. Expectations about future unobservables are captured by the financial market valuation of the firm.

In early formal derivations of q theory as exemplified by Abel (1980), adjustment cost technology is coupled with optimizing behavior giving a relation between investment and marginal q, the ratio of discounted future revenues from an

additional unit of capital to its purchase price. Because marginal q is unobservable, empirical researchers made the transition to average q. The main assumptions of this transition are 1) competitive product and factor markets, 2) linear homogeneous production and adjustment cost technologies, 3) homogeneous capital in the production function, and 4) the separation of financial and real decisions from each other as well as from investment decisions (Hayashi 1982).[20] If the market capitalization of a firm exceeds the current replacement cost for firm's capital stock, average q will be greater than one and net investment will take place.

If we leave the issue of stringent assumptions underlying the use of average q aside, one advantage of q theory models seems to be that the q investment equation will not be affected by instability in the expectations parameter because expectations enter the equation directly through q and are forward-looking in nature. Financial market data are assumed to reflect correct expectations about future variables, i.e. fundamentals. Evidently, this efficient markets assumption is essential to q theory.[21] Asset prices fully reflect all available information, respond completely and instantaneously to news and therefore provide an indicator of rational agents' assessments of the fundamental values

[20] Additional restrictions are that delivery, expenditure and gestation lags are nonexistent or highly restrictive and that capital depreciates geometrically. See Chrinko (1993).

of firms. However many studies have questioned the reliability of financial asset prices in evaluating the underlying fundamentals.[22] Even in the more mainstream literature, excess volatility, mean reversion, fads and speculative bubbles in financial markets are seen as likely occurrences that violate the premises of the efficient market hypothesis. Given these problems, it is not surprising that the q model's empirical performance has been generally unsatisfactory. The problems of q theory would only be aggravated in the context of developing countries with less-than-perfect factor, output and financial markets. For example, in the Turkish economy the stock market valuations were not even available for the first five years of the period under investigation (1984-2003); the Turkish stock exchange became fully functional only after 1988. Hence q theory of investment is not a suitable framework for the analysis in this dissertation.

2.2.4 Euler Equation Models

As mentioned above, Euler Equation models differ only in the manner in which they solve the problem of unobservable expectations. In this section I review Euler

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[21] The Summer 1990 issue of Journal of Post Keynesian Economics contains an insightful exchange between Tobin and Crotty on q theory. In their response to Crotty's critique of q theory, Tobin and Brainard (1990) recognize that the "stock market does not grind out values by mirroring the rational optimizations of informed managements, but generates values of its own." Nevertheless they think that these values still "provide incentives and disincentives for investment." In this case the problem lies in their view of managerial behavior in making investment decisions. Brainard and Tobin's preference for 'stock market q' over 'formal implicit q' does not change the fact that 'formal implicit q' models, as reviewed here, embody the assumption of efficient financial markets.

[22] For an early review of the critiques of efficient market hypothesis see Summers (1986). Shiller (2003) is an excellent updated review of different critiques, coming from a behavioral finance perspective. Malkiel (2003) reviews the empirical literature and its supporting evidence against efficient market hypothesis.

equation models of investment and the way they are used in the literature on financing constraints to asses whether they provide an adequate framework to analyze the links among investment, uncertainty and liquidity.

The Euler equation model of investment posits a relation between investment rates in successive periods, which are derived from dynamic optimization under certainty in the presence of costs of adjustment. In this framework, the optimal policy is characterized as a comparison of net benefits of investing today versus investing tomorrow. With any Euler equation derived from firm's maximization problem, the intuition is the following: the marginal cost of investing today (given by the sum of adjustment costs and the price of investment goods) is equal to the discounted marginal cost of postponing investment until tomorrow. The latter is equal to the sum of the foregone marginal benefit of an extra unit of capital, plus the adjustment cost and the price of investment tomorrow. The Euler equation indicates that, along the optimal capital accumulation path, the firm will be indifferent to an increase in capital today only if there is a decrease by an equivalent amount in the next period, thus leaving the capital stock unaffected from the next period onward. Hence the difference in an investment equation derived through the Euler methodology is that an infinite or an unknown number of successive future periods is reduced to just the next period. This reduction is possible thanks to the assumption of reversibility of investment. While the Euler equation models might consider sunk costs due to adjustment costs,[23] they do not take the irreversibility of real investment into account. The irreversibility of real

[23] Chirinko (1993) develops an explicit model of investment with Euler equations in which the marginal costs are the sum of purchase costs and the sunk adjustment costs.

investment is a crucial matter that should be considered to analyze the role of expectations and uncertainty in investment theory.[24]

The Euler investment equation still involves future variables which are incorporated with an expectations operator. The usual assumption to eliminate this expectations operator has been to assume rational expectations. Hence actual realized values plus an expectation error that is orthogonal to all information available at the time that the investment decision is made, replace the expectations in the model. In other words, the Euler equation models do not address the unobservable expectation problem at all. Only if one maintains that the sample period contains no changes in factors affecting the stochastic environment, will the solutions through Euler equations be strictly valid. Many scholars have criticized this over reliance of neoclassical investment theory on the assumptions of certainty and rational expectations.[25] Businesses operate in a 'fundamentally uncertain' environment that is incompatible with rational expectations theory.

Theorists using New Keynesian investment models of changing financing constraints under liberalization generally prefer to use Euler equations given their explicit if unrealistic theoretical dynamics. In the next section I review this particular literature to see if it provides a suitable framework for the analysis in this dissertation.

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[24] Option value models combine the most recent literature taking irreversibility and uncertainty into account. I review these models in the next section of this chapter.

[25] To name only a few among many Post Keynesian scholars who spelled out major inconsistencies of neoclassical investment theory, Davidson (1991), Crotty (1992, 1990) and Minsky (1975) constitute good references on this topic.

2.2.5 Financing Constraints and Euler Equations

Although liquidity variables are frequently included in econometric studies of investment, the theoretical basis for doing so was largely absent in the early mainstream investment literature. At a theoretical level, Miller and Modigliani (1958) demonstrated the conditions under which the real and financial decisions of firms would be strictly independent.[26] In the 1980s however, the research agenda of New Keynesian economics placed emphasis on asymmetric information and incomplete contracts as the source of market imperfections.[27] In the context of credit markets, sometimes lenders cannot distinguish between borrowers with low-risk projects and borrowers with high-risk projects (the adverse selection problem). At other times, they cannot monitor and control the allocation of borrowed funds between good and bad projects (the moral hazard problem). In either case, even low-risk borrowers would be required to pay a lemons premium; credit would be rationed; excessive collateral may be required; and equity capital might be excessively risky (Crotty 1994: 335). These problems would

[26] The basic theorem states that, in the absence of taxes, bankruptcy costs, and asymmetric information, and in an efficient market, the value of a firm is unaffected by how that firm is financed. It does not matter if the firm's capital is raised by issuing stock or selling debt. On the other hand, the Pecking Order Theory of finance developed by Myers (1984) states that companies prioritize their sources of financing (from internal financing to equity) according to the law of least effort, or of least resistance, preferring to raise equity as a financing means "of last resort". This theory maintains that businesses adhere to a hierarchy of financing sources and prefer internal financing when available, and debt is preferred over equity if external financing is required.

[27] See Hubbard (1998) for a study of the New Keynesian theory of asymmetric information and a comprehensive review of market imperfections and investment models. There is also an interesting and insightful exchange between Crotty and Fazzari and Variato in Spring 1994 issue of The Journal of Post Keynesian Economics on New Keynesian versus Post Keynesian investment theories.

cause the borrower to face a higher cost of external funds either in the form of debt or equity.

If a firm is credit-rationed due to problems of asymmetric information then investment spending depends on the availability of internal funds. Thus, incorporating a cash flow variable in the investment specification has been viewed as one way of capturing the constraint. For instance in one set of studies, the effects of cash flow on investment spending are assessed by employing a Tobin's q model for fundamentals (Fazzari, Hubbard, and Peterson, 1988). In this paper, firms are sorted by retention ratios under the hypothesis that firms retaining a higher percentage of their equity income must face higher costs of external funds. Therefore the sensitivity of investment to liquidity should be statistically different from zero and greater than that for low retention and presumably unconstrained firms.[28]

The use of cash flow sensitivities as a sign of financing constraints has been controversial. The findings of Kaplan and Zingales (2000) suggest that under certain assumptions investment-cash flow sensitivities may increase as financing constraints are relaxed and that investment-cash flow sensitivities are not necessarily monotonic in the degree of financing constraints. Almeida (1999) shows that firms with more liquid assets borrow more and therefore are more sensitive to profitability shocks because of the leverage effect. Less financially constrained firms then exhibit bigger investment-cash flow sensitivities than similar firms, which have less liquid assets, and are more

[28] See Table 3 for a review of literature on financing constraints with various investment theories and variables employed. Note that Table 3 focuses on the impact of liberalization policies in developing countries. It does not cover the broad empirical literature on financing constraints.

financially constrained. 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. Critics of the use of the cash flow variable as a proxy for internal funds note that since cash flow might be closely related to operating profits and therefore to the marginal product of capital, it may not be picking up the desired liquidity effect but may be proxying either an accelerator effect or information about future investment opportunities not captured by variables of fundamentals.

To circumvent this problem, a second set of studies have preferred including variables of net worth into the investment function. In the presence of information asymmetries, a firm's net worth is assumed to signal that the firm is a good borrower; hence the premium on external finance is assumed to be an inverse function of the firm's net worth, which is proxied by financial ratios such as leverage or interest coverage (See Table 3 for examples).[29]

Some of these studies also examined the finance constraints hypothesis using Euler equations supplemented with a borrowing constraint.[30] Hubbard *et al* (1992) is an early example of this methodology.[31] In this setting, financial frictions are introduced

[29] Leverage is a stock variable that contains information about the long term indebtedness of a firm given its equity value. On the other hand, interest coverage is a flow variable that shows the net interest payments generally expressed as ratio of cash flow or profits and it is a short term indicator. The studies using these indicators do not derive them through explicit modeling methods and they do not discuss the different implications that the use of these two different indicators might have.

[30] It should be noted that later studies utilizing Euler technique have also incorporated availability of internal funds as another constraint and therefore emphasize cash flow sensitivities within the Euler equation framework. See Leaven (2003) as an example.

[31] For other examples see Whited (1992), Gilchrist and Himmelberg (1998), Bond and Meghir (1994).

either via a non-negativity constraint on dividends or an upper limit on the amount of debt. When this constraint is binding, a multiplier obtained from the constraint is expected to enter the error term of the investment specification derived from the Euler equation. When this happens, it causes a correlation between the instruments and residuals in the over-identified model. Firms believed *a priori* to be constrained in financial markets tend to fail this specification test, while remaining firms tend to pass.

Chirinko (1993) points out that while Euler equation studies have the advantage of explicit modeling dynamics, they are not immune to other problems: The borrowing constraint is imposed exogenously, and the endogenous variables that parameterize the constraint -such as cash flow and net worth sensitivities to the firm's decisions- are not explicitly accounted for in specifying the econometric equation. Since the empirical finding showing which firms are financially constrained relies solely on statistical testing, economic interpretations of these tests are not clear. It remains uncertain whether significant liquidity and net worth variables are capturing a previously missing structural element in the investment equation or are merely reflecting a general misspecification.

For the purpose of testing for financing constraints, given its elaborate and unrealistic assumption set, the Euler methodology suffers from another drawback due to its intertemporal structure. With an Euler equation method, the test for financing constraints may not pick up the effect of imperfections of decisions by firms for which the overall level of investment is constrained, but only for those firms that do not appear constrained this period relative to the next. Since the method examines only marginal decisions, the possibility of not investing at all is not handled in its framework.

However, common intuition suggests that financing constraints may either cause a postponement of investment or a complete abandonment of the project. For the purposes of modeling, we can say that financing constraints ought to have lumpy as well as smooth effects. Loosely speaking, although finance constraints could affect a firm's decision to spread out the building of a new plant over an extra month (a "marginal" intertemporal decision), they are more likely to affect a firm's decision to delay the entire new-plant project (a "lumpy" intertemporal decision). Hence a two-period reduced form of the Euler equation is an inadequate framework for capturing lumpy investment behavior.

Another unrealistic assumption of the rigorous Euler equation models is the reversibility of investment. As mentioned above, with the assumption of liquid capital, the future is not particularly relevant beyond the next period. In this case the degree uncertainty does not matter either. These neoclassical assumptions have been challenged by an emerging literature that emphasizes the issues of irreversibility and uncertainty that give value to postponing investment decisions similar to a financial call option. I review the main framework of option value theory in the next section.

2.2.6 Uncertainty and Option Value Models

As can be seen from the review above, there is nothing new in suggesting that investment behavior will be sensitive to the degree of investor uncertainty about future prices, market conditions and rate of returns.[32] In fact, the role of uncertainty and

[32] For an excellent review of the literature on investment under uncertainty see Carruth, Dickerson, Henley (2000).

expectation has been one of the distinguishing themes across various investment theories. Earlier work by Hartman (1972) and Abel (1983) suggests that increased uncertainty, as measured by the 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 is dependent on the assumptions of perfectly competitive firms and constant returns to scale production functions. In contrast, other authors emphasize the irreversibility of fixed capital investment, which may lead to the postponement of investment decisions under uncertainty (McDonald and Siegel 1986). Similarly, Pindyck (1988) showed that, if the adjustment cost function of capital is asymmetric (implying irreversibility), uncertainty affects investment negatively. In their critical contribution, Bertolla and 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 in most models.

Within this new vein of investment literature, irreversibility of investment is the main assumption that links investment and uncertainty. Capital goods have a very limited resale value. The inability to reverse investment decisions by reselling capital goods at market value imposes additional costs on investors if there is an adverse change in circumstances and investors will accordingly be more cautious in the face of down-side uncertainty.

More recently option value theory explored by Dixit and Pyndick (1994), among others, laid the main theoretical foundation to deal with issues related to uncertainty and the irreversibility of real investment. This approach treats not-yet-committed investment projects as having a ‘perpetual-call-option’ value. This value is determined by the value

of future investment opportunities that can exploit a firm's existing capacity, skills, and technology. Increasing uncertainty increases the value of the option to delay investment. While the firm will hold less capital by not investing today, the market value of existing capital will be greater, reflecting the value of future options to invest. Thus, the firms decide to postpone investment. In this model, the irreversible character of investment is represented by asymmetric adjustment costs. 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 the future) and the put option (a limited ability to contract the capital stock in the 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 or not there is a negative sign to the investment-uncertainty relationship unless many additional assumptions about the firm's existing capacity, skill and technology are made.

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. The risk premium raises the cost of capital by a fixed amount. In this setting, the 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 models. Within the structure of these models, if a variation in uncertainty is allowed, instability in underlying parameters will lead to instability in estimated coefficients, and in turn render their interpretation difficult. Does a large fluctuation in output price represent an extreme realization or a shift in the underlying stochastic

process? Assuming the latter might lead to a 'free-parameter' problem and the consequences of explaining the data without uncovering the structure. Thus, the option value model requires a stable and predictable uncertainty variable in its structure. The assumption of a stable and predictable uncertainty variable is a form of assuming compete knowledge of the future, which might come as a stringent assumption, especially in the context of 'fundamental uncertainty'.

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 the option value model gloss over this point, preferring to investigate simple correlations of rates of investment with proxies for uncertainty.

Tables 1 and 2 summarize the key features of various empirical studies using aggregated and disaggregated data on the investment-uncertainty relationship. While the aggregated studies, which attempt to correlate investment with a proxy measure of uncertainty, appear to be in broad consensus that the relationship is negative, the results obtained are far less conclusive in disaggregated studies. Given this inconsistency, Carruth, Dickerson and Henley (2000) point to the crucial importance of disaggregation and highlight the need for appropriate econometric techniques that can integrate both time series and cross-section information. For a sound inquiry of uncertainty-investment relationship, they recommend utilizing firm-level longitudinal data.

Hence there is one major problem with using an option value model of investment for the purposes of analyzing investment behavior of Turkish manufacturing firms under liberalization: because of its treatment of uncertainty as risk, the option value model relies on the assumption of time-invariant stochastic processes. This implies a stable and predictable uncertainty variable. Due to this assumption, the option value model is neither useful nor relevant for the analysis of a country undergoing economic shocks and regime changes. Financial and capital market liberalization experiences are shown to be linked to economic and financial crises and heightened instability.[33] Reform policies may destabilize the economy, inducing cycles of growth with capital inflows followed by collapse and capital flight. The degree of volatility in liberalized economies makes it clear that uncertainty cannot be treated as predictable or stable. Decision-makers do not know the specific stochastic processes at work because the processes themselves are changing.

Due to their unrealistic assumptions about the knowledge of future and the process of decision making, none of the investment theories and models reviewed above is able to provide an adequate framework to analyze changing investment behavior under liberalization. In the next section I introduce and review the main tenets of Post Keynesian theory, the main framework of the investment model I construct in Chapter 5, to explain the how responsiveness of investment might change under liberalization.

[33] See Demirguc-Kunt and Detragiache (1998) for empirical evidence and Erturk (2005) for a theoretical framework.

2.2.7 A Post Keynesian Investment Theory

In most studies of Post Keynesian theory the primary objectives of a firm are depicted as growth and acquisition of power, as opposed to the profit or market value maximization motive of neoclassical theory (Lavoie 1992). Hence optimal investment spending is not derived from a typical profit function as it is in the case of neoclassical models. Post Keynesians have consistently asserted that firms maximize their rate of growth, subject to various constraints. For instance, Robinson (1962: 38) indicates that "the central mechanism of accumulation is the urge of firms to survive and grow." A similar view can be found in Kaldor (1978: xvi) for whom "the individual enterprise – for reasons first perceived by Marx – must go on expanding so as to keep its share in the market."

The consensus opinion among Post Keynesians is that profits are means which allow firms to finance growth. As pointed out by Kaldor (1978: xvi) "Finance raised externally – whether in the form of loans or of equity capital – is complementary to, not a substitute for retained earnings."

The relationship between profits and growth in the Post Keynesian firm is based on the hypothesis that firms will borrow only to the extent that they have been accumulating inadequate internal funds to finance investment. Similarly, banks will grant loans to firms only to the extent that their customers have been profitable in the past. The fact that a firm is willing to borrow only limited amounts, related to its previously accumulated internal funds, is known as Kalecki's principle of increasing risk. In general, the higher the proportion of outside funds financing investment, the stricter the limits the management of the firm will self-impose, becoming more cautious

in its borrowing. Based on the conventions in their own industries and their own perceptions managers conceive a 'safe' level of leverage that they would get 'too close' with new borrowing. This concern of management over the safety of the firm has implications of nonlinearity in the response of the management to leverage.[34]

This general trend might be reversed according to the cycles of the economy. During expansion times, when perspective on expected demand and profits are very positive, firms might increase their leverage to very high levels mainly due the euphoric expectations. During these times, credit is abundant and internal funds lose their importance in the determination of investment as the safe of level of leverage that managers conceive is higher. Then in crises, it would be impossible for a firm to borrow as much as they would like, since they will be constrained by the leverage ratio judged acceptable by the banks which reduce their own desires loan ratios out of collected funds. In this phase of the cycle internal funds will be used more, as there is a credit crunch in the economy. It should be noted that none of these issues of demand side constraints, nonlinearities or reversals of constraints is considered in New Keynesian models which focus on leverage. If the changes in these desired or safe ratios are not already considered in the framework of an investment theory, they might lead to a shift of the investment equations over the cycles, rendering the analysis inadequate.

A similar perspective can be found in Keynes' General Theory as follows:

> "Two types of risk which affect the volume of investment have not commonly been distinguished. The first is the entrepreneur's or

[34] There might be a low range of leverage over which the management feels 'safe' up to a certain threshold beyond which borrowing would be 'threatening' to the management. See Crotty and Goldstein (1992) for an example.

> borrower's risk and arises out of doubts in his own mind as to the probability/minds of his actually earning the prospective yield for which he hopes. If a man is venturing his own money, this is the only risk which is relevant. But where a system of borrowing and lending exists, by which I mean the granting of loans with a margin of real or personal security, a second type of risk is relevant and which we may call the lender's risk." (Keynes, 1936: 44)

Finally, a very similar prescription is suggested by Paul Davidson:

> "In an uncertain world, firms must guard against illiquidity while creditors fear the inability of firms to meet long term obligations. Thus both entrepreneurs and lenders are anxious to see that some proportion of investment is funded internally. In an uncertain world, therefore, internal and external finance are complements rather then substitutes and a firm's access to the new issue market will normally be limited by institutional rules about gearing ratios." (Davidson 1972:348).

An example of these Post Keynesian insights can be found in Crotty and Goldstein (1992), who construct a model with a growth-safety trade-off faced by managers in their investment decisions. In this framework, managers aim to maximize the 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, firms would still need to borrow if a profitable investment project requires funding beyond their internal funds. In this framework, a firm's borrowing is constrained not by creditors, but by its managers' willingness to keep the firm independent from financial market pressures.

Hence, a finance constraint is a crucial and intrinsic aspect of Post Keynesian investment theory but the interpretation is different from that of mainstream theories. In the Post Keynesian framework, firms are always constrained by availability of finance. A positive relationship between internal funds and investment is expected as opposed to

being interpreted as a sign of problems in credit markets. A positive relationship does not necessarily tell us about the presence of supply side credit constraints caused by asymmetric information problems, but can be interpreted as a demand-side constraint without any implications for the functioning of financial markets and the inherent problems of information asymmetries plaguing them. Even if there are supply side credit constraints imposed on the firm, they may have more to do with overall credit availability in the economy rather than asymmetric information problems.

Clearly, the crucial assumption that allows this different interpretation of finance constraints is the combination of fundamental uncertainty irreversibilities prevailing in the decision making environment. Under fundamental uncertainty, the individual is either ignorant of the available courses of action or of the future states of the world or both. Regarding investment decisions, future financial commitments to creditors are relatively certain while expected profits are not. The unknown aspect of future cash flows makes managers cautious about their reliance on financial markets and leads into a preference for internal funds.

To make sensible investment decisions, firms must form expectations of future returns. Expectation formation under fundamental uncertainty and irreversibility has social, institutional and psychological dimensions, and is influenced by the perceptions of the managers. For Post Keynesians, the role of perceptions in decision making is the distinguishing factor between risky and fundamentally uncertain situations. In his early

work Keynes formulated this issue as the 'weight of an argument', while the concept gets translated later on in General Theory by the 'state of confidence':[35]

> "The state of long term expectations, upon which our decisions are based, does not solely depend, therefore, on the most probable forecast we can make. It also depends on the confidence with which we make this forecast- on how highly we rate the likelihood of our best forecast turning out quite wrong." (Keynes 1936: 148)[36]

A relevant factor in the Post Keynesian theory is the quality and relative quantity of information which has led to estimates of outcomes and probabilities. The implication of Keynesian true uncertainty for economic modeling is that models based on rules of thumb, such as mark-ups, target return pricing, normal financial ratios, standard rates of utilization and so on, are perfectly legitimate. The models built on rules of thumb are not *ad hoc* constructions. Rather they reflect the rationality of reasonable agents in an uncertain and threatening environment. As such they have microeconomic foundations which are just as solid, if not more from a realist point of view, as those of the standard mainstream models (See Crotty 1994).

In order to further explain the importance of confidence in investment decisions, let's suppose that a manager has to make a forecast about the future profitability of an investment project. The expected profitability of the project is the main indicator that manager has to generate. While considering future demand and cost conditions, our

[35] It should be noted that Knight used the phrase 'the degree of certainty' or of confidence earlier and Keynes later adopted Knight's terminology.

manager is aware that she does not have the full knowledge of these, as the future is fundamentally unknown.[37] One factor that will influence her degree of confidence in her ability to form these expectations is the volatility that her firm faces.[38] Instability of demand or cost conditions would change the way she thinks about the reliability of her future forecasts. When the volatility in cost or demand conditions increases, the manager's confidence in her forecasts declines. As the manager's state of confidence in the expectations she forms worsens, she becomes reluctant to invest, establishing a definite negative sign for the investment-volatility relationship.

The Post Keynesian notion of "degree of confidence" is the key to understanding how the negative impact on investment in enhanced under liberalization. A higher level of volatility is associated with a lower level of confidence and thus lower level of investment. As mentioned above, financial and capital market liberalization experiences are shown to be linked directly to higher volatility. In a country going through regime changes and shocks, it is likely that the confidence of decision-makers will be more responsive to the same changes in the volatility they face. Suppose that in normal times without shocks or cycles of growth, a 10% increase in the volatility of a key variable makes the manager less confident about her future forecasts and causes a decline of 10%

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[36] In some cases, the standard error and the weight of an argument may be closely related. Where the law of large numbers applies, an increase in relative knowledge tends to decrease the standard error, without the probabilities of various outcomes being modified. This is why in these cases once can associate the standard error with the weight of an argument.

[37] To be precise, there can be no knowledge of future. We cannot know something yet to be determined.

in investment spending. In times of turmoil, as in the case of the liberalization experience of the Turkish economy, the same 10% increase in the volatility variable might trigger a significantly greater loss of confidence, since the environment might be perceived as 'unsafe'. Thus a greater decline in investment spending follows. Obviously this argument suggests nonlinearity as in the case of leverage mentioned above.

In sum, Post Keynesian investment theory suggests that investment is always positively related to internal funds as internal funds are the safest means of financing. The reliance on internal funds cannot be understood as a result of information asymmetries; and therefore there is no reason to expect a change in this behavior due to the liberalization of financial markets. A positive impact of liberalization on investment through this channel of credit availability might not be observed.

$$\partial I / \partial(Cash) > 0 \qquad \text{and} \qquad \partial I_{Cash} / \partial FL = 0$$

where I is investment, Cash is internal funds, I_{Cash} is the responsiveness of investment to internal funds and FL is financial liberalization.

The other important determinant of investment is the state of confidence that can be crudely proxied by the volatility that firm faces. The higher the volatility or unpredictability, the more cautious the firm becomes in its investment decisions.

$\partial I / \partial V < 0$, where V is volatility

Under the turmoil brought along by financial liberalization, managers' confidence become ever more sensitive to changes in volatility, rendering firms'

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[38] The relationship between volatility and confidence is a complex one that cannot be easily reduced to a positive linear function. As suggested above, many other factors might be considered by the agents to form expectations.

investment more responsive to changes in volatility. As volatility rises, managers become less confidence that past data is a reliable source of information about the future. It becomes impossible to decide whether tail observations from the current distribution are being observed whether a new and more dangerously volatile distribution or a regime has been observed. In that case, confidence declines as volatility rises significantly.

$$\partial I_{volatility} / \partial FL < 0$$

and $I_{volatility}$ is the responsiveness of investment to volatility. The expression above indicates that financial liberalization might have a negative impact on investment by intensifying the negative impact of uncertainty on investment.

Post Keynesian investment theory, with its realistic assumptions about expectation formation and the decision making process, emerges as an adequate approach to analyze the impact of liberalization on investment. It provides a framework in which not only positive impacts but harmful affects can be formulated. I rely on the Post Keynesian theory of investment to construct an empirical specification of investment in the following chapters of this dissertation.

In the next chapter, I show that financial liberalization is associated with heightened instability and insufficient credit availability for productive investment in the Turkish economy. By reviewing such developments at the aggregate level, I aim to show that the Turkish economy under liberalization was one with shocks and regime changes in which decision makers' confidence level became more responsive to changes in volatility.

CHAPTER 3

FINANCIAL LIBERALIZATION IN THE TURKISH ECONOMY

This chapter reviews the important aspects of the financial liberalization policies implemented in the Turkish economy, and assesses liberalization's implications for growth and investment. It is argued that real sector private investment was curbed, rather than enhanced, by the particular form of financial deepening combined with instability created by the boom-bust cyclical growth pattern that has taken place in Turkey during the liberalization period.

3.1 Policy and Developments before 1980

Turkey's development strategy for the pre-1980 era, based mainly on the industrialization drive and an inward looking import substitution strategy (ISI), was supported by a high degree of protectionism. The accumulation process during the years of the import substitution strategy was highly dependent on policy and politics rather than markets. Entrepreneurs commonly relied on the state and bureaucracy and the subsidies provided in addition to exploiting market opportunities. The system encouraged and generated serious moral hazard problems and rent-seeking behavior on a systematic basis in both public and private spheres (Balkan and Yeldan 2002; Boratav 1993).

Before the 1980s, the Turkish economy was a typical developing country with conditions of 'financial repression'.[39] Typically in a financially repressed regime, interest rates are regulated below their market rate, at times leading to negative real interest rates. Low interest rates can result in excess demand for investment and create an opportunity for the economically and politically privileged to borrow at this regulated rate and loan out at the high market demand rate. This can cause a massive misallocation of financial resources. In Turkey, interest rates had been set by the state since the 1940s and seldom changed. Because of rising inflation during the 1970s, real interest rates became increasingly negative; deposit rates were almost -40% in the late 1970s. At the same time, disintermediation became a serious issue: The M2-to-GDP ratio declined from 29% in 1970 to 19% in 1980. Preferential credits to priority sectors were almost 75% of total bank credit by 1979. Under these conditions, large corporations which are left out of preferential credit schemes either formed their own banks to secure access to financial resources or borrowed from the regulated and inefficient commercial banking system at a higher cost.[40]

The conditions of financial repression together with high inflation had negative consequences for growth and investment. The insufficiency of foreign exchange earnings was the main constraint on investment and growth over the 1970s. The foreign

[39] See Anand and Wijnbergen (1988) for financial repression. Akyuz (1990), Atiyas and Ersel (1994) provide a detailed survey of the issue of financial repression in the Turkish context.

[40] While real deposit rates reached negative levels due to controls on nominal deposit rates, lending rates by commercial banks were not controlled outside of the subsidized credit allocation schemes. Although there is no reliable data series on the lending rates in Turkey, I conclude that the spread was very high in case of unregulated lending transactions.

exchange bottleneck arose basically from the low level of exports and the heavy dependence on imports of raw materials and investment goods by the manufacturing sector. External financing of the industrialization drive was based partly on the remittances of Turkish workers in the Western European countries and on foreign borrowing (Uygur, 1993).

During the mid-1970s, the Turkish economy recorded a high growth rate. The main stimulus to growth was a rise in the level of investment, especially in the public sector. This investment boom was financed mainly through a large inflow of workers' remittances and foreign borrowing. The investment drive continued until 1978, and thus imports of investment goods also continued to rise (Uygur, 1993).

The growth boom began to slow in 1977. There were two factors that caused this. First, foreign lenders became worried about the size and the structure of Turkey's rapidly growing debt, and thus they stopped their credits. Second, the upward trend in remittances was reversed after the mid-1970s. Between 1975 and 1977, rising current account deficits were financed mainly by short-term borrowing. The share of short-term borrowing in foreign debt increased from 8.3% in 1973 to 54% in 1977 (Celasun and Rodrik, 1989).

During the period of 1978-80, the economy suffered greatly. Real output in the industrial sector and investment drastically declined and unemployment increased. Average GDP growth was -0.4% in 1979 and 1980. The rate of inflation, which averaged about 18% during 1970-75, accelerated and reached its historically highest level of over 100%.

3.2 Liberalization and Financial Reforms since 1980

In January 1980 Turkey undertook a very comprehensive and far-reaching liberalization program under the auspices of the World Bank and the IMF. The structural shift from an ISI regime towards a free market model was launched under a military regime that, during the years of 1980-83, imposed strict restrictions on labor rights as well as political and civil rights in the country.

The initial steps of the program involved trade and financial reforms. On the trade side, all quantitative controls on imports, such as quotas and licensing systems, as well as strict exchange rate controls were removed (Guncavdi *et al* 1998). Various measures, such as tax rebates and subsidized credit, were implemented to promote exports. An improvement in the balance of payments was the main objective of the implementation of this export-led growth based policy.

On the financial side, reforms initially aimed at eliminating exogenous financial constraints which had been created mainly by a regime of financial repression. Various reforms were gradually implemented over the 1980s. By 1990, the Turkish economy had only minimal constraints on external and domestic financial intermediation, with the exception of reserves and liquidity requirements, which endured until the late 1990s.

The deregulation of deposit and lending rates in 1980 was a part of the general policy reform package, although it followed a stop-and-go pattern. The policy of deregulation was suspended in 1983, after the collapse of the financial markets that was triggered by the well-documented brokerage-house crisis (Akyuz 1990; Atiyas 1990). The lack of an established legal and institutional framework for banking activities enabled the brokerage firms to offer high interest rates that they could not afford. The

Central Bank's regulation over commercial bank interest rates lasted until 1988. With the reversal of deregulation, the reduction in interest rates over this controlled period resulted again in negative real interest rates due to accelerating inflation starting at the end of 1987. Therefore monetary authorities decided to allow commercial banks to freely set their interest rates in 1988.

In the 1984-1988 period, several new financial instruments were introduced along with institutional reforms to support the banking sector. The Banks Act legislation of 1985 was the first major attempt to regulate the banking sector and a clear response to the bank failures of 1982. These reforms included "provisions regarding the capital structure of the banks, the protection of deposits through an insurance plan and deposit insurance fund, the treatment of nonperforming funds and a standardized accounting system" (Inselbag and Gultekin 1988: 133). With this Act, the Treasury became the principal institution responsible for bank supervision and regulation until the second major regulatory change in 1999.[41]

In addition to the liberalization measures deregulating interest rates and banking system, there were other important reforms related to capital markets. The Capital Market Board of Turkey (CMB) was established in 1982 to regulate and supervise the primary and secondary markets of stocks and bonds.

The Central Bank introduced an interbank money market to facilitate the asset-liability management of banks in 1986. The sale of government securities through

[41] In 1999, the Banking Regulation and Supervision Agency (BRSA) was formed as the key regulatory institution. However, the full operation of BRSA could not take place until the beginning of September 2000.

auctions conducted on a weekly basis started in 1985 and the Central Bank started to conduct open market operations in 1987.

The Istanbul Stock Exchange opened in 1986 with approximately 80 companies' stocks being traded. Tax incentives were provided to companies and stockholders to encourage participation in the stock market (Odekon 2005).

Once the interest rate restrictions on corporate bonds by the Central Bank were eliminated in 1987, new instruments, such as commercial paper, were introduced.[42] Mutual funds were allowed for the first time in 1987, but commercial banks had the exclusive rights to establish them until 1992.

The first steps of external financial liberalization were implemented in the mid-1980s. The foreign exchange regime was partially liberalized in 1984; commercial banks were allowed to accept foreign currency deposits from residents, and in 1985 they were made free to set their own exchange rates.

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

All these financial sector reforms and policies created an enormous impact on the Turkish financial system. However, it is widely argued that 'the mode and pace of financial reforms progressed in leaps and bounds, mostly following pragmatic, on-site solutions to the emerging problems' (Yeldan 1997, p.82). Also, the public sector's share in the financial markets remained high and financial deepening did not progress at a

[42] The 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.

constant rate. In the next section I review the growth and investment performance of the economy under liberalization. The following sections examine different indicators of financial deepening in the Turkish economy and derive the main characteristics of the particular deepening process as it has taken place.

3.3 Growth and Investment Outcomes of Liberalization

The overall growth and export performance of the economy improved through the 1980s; and the GNP growth was realized at an average annual rate of 6.5% between 1983 and 1987 (See Table 4 for the main economic indicators). However, the export-led growth path reached its economic and political limits by 1988. In an attempt to lower production costs and reduce the domestic absorption capacity, an underlying feature of the export-let growth strategy was the suppression of wages. The same period also brought substantial decline in agricultural incomes (See Yeldan 1995). Pressure from the public increased under the new parliamentary regime and the government was compelled to respond to popular demands for redistribution, which, in turn, caused increasing borrowing needs for the government. Beginning in 1989, organized labor succeeded in attaining significant increases in wages.[43] Furthermore, there was an overall increase in public expenditure on social infrastructure. This generalized increase in government spending entailed a rise in the Public Sector Borrowing Requirement from 4% of GDP in 1981 to 9% by 1990 (See Table 4).[44]

[43] Between 1989 and 1991, real wages in manufacturing increased by 90%.

[44] 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 a complete deregulation of financial markets.

The capital account liberalization of 1989 was expected to help finance public sector deficits without crowding out the financing needs of domestic agents. This date is also accepted as a turning point by many scholars;[45] an indication of the demise of the export-led growth regime and the beginning of a speculative-led growth period with distinct cycles of expansion, crisis and adjustment.

Over this period, the rate of economic growth fluctuated dramatically as the economy was trapped within mini-cycles of growth-crisis-stabilization and renewed growth (see Figure 1). Between 1990 and 2001, while the average growth rate of GDP was around 3%, its standard deviation was twice as large, reaching 6%. The recovery following the 1994 crisis was short-lived, and Turkey has been subject to a wave of external and domestic shocks since 1998. The adverse economic effects of the 1998 Russian crisis, and then the devastating earthquake in 1999 culminated in a series of financial and banking crises in 1999 and 2001. Since the last major crisis of 2001, the Turkish economy has again been undergoing another boom period with an average growth of 5%.

During the 1990s, the economy was exposed to the whims of international capital flows, and there was a spiral of currency appreciation and higher interest rates compared to those in the 1980s, in a now highly dollarized economy. 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,

[45] Among many see Onis and Aysan (2000), Boratav, Yeldan and Kose (2000).

real interest rates on government securities stood over 30% for some years (See the series of real interest rate on government bonds in Table 4).

The erratic macroeconomic performance of the 1980s and 1990s can also be observed in the investment performance of the economy. Figure 2 presents the percentage shares of national savings and national investment in GNP. The ratio of total domestic savings in the economy displayed an upward trend in the early years of liberalization and peaked in 1989 with 27%. Since then it fluctuated with an overall declining trend over the 1990s, and by 2004 the ratio was 20%. While there has been some improvement in terms of overall savings as a response to higher real interest rates, the financial liberalization process has not created the expected results in terms of mobilization of savings at the national level, as pointed to by Neostructuralist scholars.[46] The same figure shows a similar pattern of improvement for the share of total investment in the early years of liberalization. After 1988, the ratio of total investment is very volatile with a drastic fall towards the end of the period. In 2003, the ratio reaches its lowest level of 16.3%. Considering the whole period, both of these ratios display little improvement, while they are substantially volatile over the last two decades.

Figure 3 presents the pattern of private manufacturing investment as a share of GNP over the period of 1970-2004. The share of private manufacturing reached its peak of 10% in 1977 and was never able to rise beyond 7% over the period under liberalization. Expected improvement in private manufacturing investment under liberalization did not take place in the Turkish economy, as there is no sign of recovery

[46] For examples of Neostructuralist theories see Taylor (1983), and Van Wjinbergen (1983).

in the ratio. A further look into the sectoral composition of private investment reveals that the slight increase in overall private sector investment is mainly due to the rapid increase in construction spending for housing (See Table 5 for the sectoral composition of private investment). The share of manufacturing investment in total private investment had declined from 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 investment stayed at that level until 2001, while the share of housing investment slowed down for the rest of the 1990s.[47]

High volatility of economic growth and lack of improvement in investment raises doubts about the expected positive impact of financial openness on the productive areas of investment, such as manufacturing.[48] As attested by Akyuz (1990) and Balkan and Yeldan (2002), the 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.

Among the studies that focus specifically on the impact of financial liberalization on investment behavior, Rittenberg (1991) presents evidence of a downward shift in the investment function during the early years of liberalization, which

[47] Rapid increase in housing from the beginning of 1980s was a result of special subsidies provided to the sector by the government.

[48] The phrase 'productive investment' is widely used in the literature on development economics and policy circles to distinguish real physical investment from financial investment. Specifically it refers to investment in technologies that will improve productivity and expand capacity in a way to generate at least normal returns. Investment in machinery and equipment in particular and manufacturing investment in general are considered productive areas of investment.

"may have resulted from heightened relative price uncertainty during the period." As another work that explicitly addresses the issue of the impact of financial liberalization on private investment, Uygur (1993) examines the extent of the stimulus of domestic saving and increased availability of funds for investment. He finds that the availability of credit to the private sector has a significant positive effect on non-housing private investment in Turkey. On the particular issue of credit constraints, Guncavdi *et al* (1998, 1999) employ standard neoclassical models and macro level data to test whether liberalization policies have helped with credit constraints. In the 1998 article, they find that credit variables become much less important after liberalization, although constraints were binding in both periods. This evidence is interpreted by authors as a positive impact of liberalization on investment. Findings from Guncavdi *et al* (1999) are slightly modified: They find that financial liberalization has had an adverse effect on private investment by raising the relative cost of capital, while it had the positive effect of largely eliminating credit constraints on investment. On the other hand, Cimenoglu and Yenturk (2005) find that changes in private sector investment expenditures are positively related to the changes in the amount of bank credit that is extended to the private sector

At a more disaggregated level, using various panel data techniques over 29 sub-sectors of the Turkish manufacturing industry, Metin-Ozcan, Voyvoda and Yeldan (2002) focus on the behavior of sectoral real investments (by destination) in relation to the profit margins, real wage costs, and the openness indicator for the post-1980 Turkish economy. Their results suggest that "openness" had no impact on the behavior of sectoral investments.

Some of these studies with aggregate data describe a below-expectation performance in investment particularly in a heavily indebted developing country setting, but they explain little with respect to why and how firms respond to the macroeconomic environment. Macro variables such as the size of the public sector, external debt, budget and trade deficits and the structure of commodity and financial markets, characterize the external environment within which firms function. Changes in these aggregates result from variations in policy variables such as exchange rates, interest rates and the like to which firms respond. Ironically, while the volatility of economic growth has been quite high under liberalization, the impact of high volatility on investment did received little attention in this literature, with two exceptions. Uygur (1995) employs the expected inflation rate as a 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 the nominal exchange rate, on private sector investment in Turkey.

What is unclear in these studies is how and through which channels firms respond to their external environment. To examine particular channels, a firm level analysis is needed. The absence of a firm level data set with continuous coverage from at least the beginning of the1980s has been an important obstacle for undertaking firm level investment studies of the Turkish economy. Construction of a data set for the purpose of analyzing the investment under liberalization is one of the main contributions of this dissertation.

3.4 The Impact of Reforms on the Financial System

As explained in the literature review chapter, there is a widespread perception that financial liberalization promotes financial development, and that the deepening of the financial system subsequently stimulates economic growth. To asses whether financial deepening and development are achieved in Turkey at the macro level, I first examine financial depth indicators. Then changes in the financial sector (mainly banking) behavior are analyzed to better understand the main characteristics of this deepening process. Finally the sources of high volatility of economic growth in particular and instability in the macroeconomic environment in general will be investigated.

3.4.1 Financial Deepening

There are several indicators of the extent of financial depth that are used to evaluate the financial liberalization experiences. Different indicators proxy for different aspects of the financial system.

Monetary aggregates such as M1 and M2 were widely used initially, as those aggregates are the main source of finance for bank lending and can indicate the banking system's scope of credit expansion and financial savings. However as Khan and Senhadji (2000) pointed out they may be a poor proxy for financial development, since they are more related to the ability of the system to provide transaction services. Moreover these measures focus on domestic deregulation and do not take count of capital flows that follow external financial liberalization.

More recently credit given to the private sector has been favored as an alternative measure of financial intermediation (See Levine *et al,* 2000). Likewise, the ratio of deposits-to-economic activity is chosen to measure the success in savings mobilization (Levine and Zervos 1998). In these studies, the ratio of financial assets or financial securities-to-economic activity are also taken into consideration as proxies of financial depth.

These measures of financial depth for the Turkish economy are presented in Figure 4 and Table 6. Some of the indicators of depth display evidence of significant financial deepening in the Turkish economy: the Financial Assets to GNP ratio has increased from 19% in 1980 to 102% in 2003, while financial securities reached 60% of GNP from 5% over the same period. Deposits have displayed an increase from the mid 1980s, with an exceptional decline in the year of the 2001 crisis. While the M2 ratio does not indicate a secular increase, an increasing trend is obvious when we look at the M2Y ratio that includes foreign currency in the economy. 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 the year 2003.[49] While a very low credit ratio of 14% in 2003 might be mostly an artifact of the immediate aftermath of the 2001 crisis, based on the overall trend of the credit ratio it is fair to conclude that financial reform

[49] Bank Credit to Public is the credit given to public by all commercial banks and development and investment banks. It includes the credit received by local governments. It does not include the Central Bank credits to either government or private agents. This is the only available series of banking sector credit that goes back to before 1987.

policies have not lead into a sustainable expansion in the credit to the public by the banking system.

3.4.2 Changes in Banking Sector

Since credit given to the public by the banking system is an indicator of financial intermediation, analyzing the changes in the banking sector should help us better understand the reasons for the lack of improvement in the credit ratio in the Turkish economy in the post liberalization period.

As in many other developing countries, the banking sector has always been the largest and most important part of the financial system, both for households and firms. Ersel and Sak (1997) confirm that among other sources of external finance bank credit appears to be the major source for companies in Turkey, as most of the companies mainly rely on bank credit for both their working and investment capital needs.[50] Edwards and Vegh (1997) argue that banks may play a role in propagating shocks through a "bank lending channel", since firms mostly rely on bank credits as the source of funds. Given this dependence, the performance of the banking system with its

[50] Odekon (2005) reports that after the opening of Istanbul Stock Exchange in 1987, the market reached a peak level of trading in 1990, when the ratio of stocks traded to total volume of financial securities in the economy was 35%. Since then this ratio steadily declined. Odekon points to couple of factors as the reasons contributing to this limited development of capital markets in Turkey: large family owned companies have not rushed to go public; there has been a lack of large number of small financial investors who evaluate corporate financial statements and participate in the market. This statement was also confirmed during the field research of which the results are presented in Chapter 4 of the dissertation. Concerns about the control of the company were mentioned during the interviews among reasons for not increasing the public share of the company.

intermediary role is extremely important to the realization of the expected growth benefits from liberalization.

Figure 5 shows the shares of deposits and credits in the total assets of the banking sector in Turkey. The share of deposits in assets increased over time, indicating a higher savings mobilization in the economy, as expected by the advocates of liberalization policies.[51] However, the credit-to-assets ratio has declined since the late 1990s. The widened gap between deposit and credit ratios signals an intermediation problem in the Turkish banking system. Table 7 compares different aggregates of Turkish banking sector across different periods. While we observe a similar decline in banking sector credit-to-asset ratio between early and late periods of liberalization (from an average of 40% over the period of 1986-1994, to an average of 35.4% over the period of 1995-2000), the same decline is not visible in the credit-to-GDP ratio. In comparison to economic activity, the credit ratio displays a slight increase in the late 1990s. This difference in the pattern of credit ratios scaled by banking sector assets and GNP renders an assessment of disintermediation difficult. The distinction is important to understand the conditions of financing for real investment. Was the investment rate not rising due to unavailability of credit, or were there other reasons in the Turkish economy that curbed bank credit as well as private investment? Hence, instead of simply concluding

[51] The increase in the deposit ratio started mainly after 1994, the year of the first financial crisis after capital account liberalization. As the crisis resulted in a lower Turkish credit rating and a general pessimism about the economy, many small banks found it difficult to raise funds abroad. Hence they focused on collecting deposits as the main source of funding. In return, the share of purchased funds declined among sources of funding. Purchased funds refer to funds borrowed from the interbank market, the Central Bank, domestic and foreign banks, and funds raised issuing securities.

that the problem lies with intermediation, we need to look further into the behavior of the banking system.

To get a general profile of the Turkish banking system, we start with the trends in the profitability. Because of entry restrictions prior to 1980, Turkish commercial banks enjoyed an oligopolistic environment and faced almost no competition. As a result these banks were highly profitable (Denizer 1997). However when we look at the profitability of the banking sector after liberalization, we see that despite a decline in concentration ratios, the profitability picture has not changed much. Shirref, in a 1997 article in *Euromoney,* claimed that Turkish banks were the most profitable in the world, because "the Turkish government rewarded them royally for making the Turkish citizens pay for the public debt." This was a reference to how the Turkish banks were using their funds to purchase government securities that offered high real interest rates.[52] In addition, chronic inflation raised the demand for banks' transaction services and contributed to their reported accounting profits (Odekon 2005). According to the IMF Staff Country Report (2000), Turkish banks' 1994-96 profits before taxes, scaled by average assets, were the highest in Europe with 5.3%.[53] In the same time period, the Turkish banking system was also leading with a net interest margin of 8.6%, again

[52] As Denizer *et al.* (2000) wrote "By the end of the 1990s, the sole function of the financial system in Turkey was nearly reduced to transferring funds from the domestic and international markets to the Treasury."

[53] The Turkish banking system was followed by Poland (3.7%) and Germany (1%). It is a foregone conclusion that inflation leads to an overstatement of profits in the banks' income statements, but the report claims to have reached these numbers after adjusting for inflation.

scaled by assets.[54] Hence, banks have been highly profitable thanks to high interest earnings from public debt instruments.[55] This portfolio choice of the banking system was the main reason behind a lack of sustainable expansion in the credit given to the public after liberalization. In support of this argument Cimenoglu and Yenturk (2005) find that over the period of 1987-2001, real interest rates on government securities have a negative impact on total credits extended to the private sector by the banking system. High interest rate on government securities squeezes the private sector out of the credit market that is dominated by the banking sector.[56]

At the same time the Turkish banking system was quite fragile because of both high costs of operation and short positions they have taken. According to the same IMF (2000) report, over the 1994-96 period, banks in Turkey had the highest operating costs in Europe, mainly because of high staff costs. But more importantly, with liberalization

[54] Denizer *et al.* (2000) also argue that based on bank profit measures such as return on assets (ROA) and return on equity (ROE) the Turkish banks were very profitable throughout the 1980s and the 1990s. However they also sound a note of caution that the lax accounting regulations in Turkey that were in place during this period could result in unrealistically high ROA and ROE figures.

[55] While the reliability of profitability figures has been questioned the fact that acquiring a banking license became very attractive during the period should indicate the attractiveness of banking business. During the 1990s, most of the new domestic entry into the banking sector was from large industrial conglomerates founding their own banks. There is evidence suggesting that some of these industrial groups were granted banking licenses due to their political connections. Founding their own banks were attractive to these conglomerates, as the poor regulatory structure allowed for large amounts of lending from the banks to in-group companies. Although most of these companies were well-established enough to have access to equity markets, connected lending from an in-group bank provided cheap and easy access to credit (Denizer, *et al.*, 2000).

[56] However it is still not obvious whether the argument can be posed as a crowding out hypothesis. A crowding out type of hypothesis presumes the existence of profitable investment opportunities that are not funded due to the unavailability of loanable funds. Whether private sector had these investment opportunities that were not funded, cannot be told solely from these credit figures.

of the foreign exchange regime and access to international finance capital in the 1980s and 1990s, the banks exposed themselves to high exchange risks. They borrowed heavily in international markets to use foreign currency to buy the government debt instruments offering high domestic yields. However, they thereby exposed themselves to exchange risk (in the case of devaluation/depreciation) and interest rate risk (in the case of deflation/falling interest rates). This particular nature of the banking system portfolio could propagate any shocks to the economy through a bank lending channel as mentioned by Edwards and Vegh (1997).

When the first financial crisis of the 1990s hit the economy in 1994, the Turkish Lira depreciated by more than 60% within one month. This sudden loss of value forced banks with short-term open positions in foreign currency to lose large amounts of their capital (OECD Economic Survey 1995, 23). After the crisis, new reserve and liquidity requirements, new financial instruments to compete with foreign exchange accounts, and full deposit insurance by the government for individual accounts were among the new policy measures taken in 1994. Together with previously introduced reforms, these measures aimed to strengthen the financial system by increasing supervision in the financial market in line with international norms, and liquidating or merging insolvent financial institutions. These measures implicitly assume that big private financial institutions are more efficient and more desirable. However it is not obvious how these measures should help reduce the risks that the banking system has been exposed to. The sources of fragility lie not with the behavior of banking system, but with the macroeconomic environment these banks have been functioning in. The banking system

is not the source of crisis, but contributes to propagating mechanisms. In this sense, prudential regulation is important, but not sufficient.

By investigating the figures of banking sector intermediation we see that the Turkish banks preferred purchasing government securities instead of lending to the productive investment projects of the private sector. The lending behavior of the banking sector should have consequences for private sector investment. If the behavior of the banking sector causes a credit crunch in the economy, private investment might be reduced. However it is still not clear that the lack of improvement in private sector investment rate as shown above is solely due to the unavailability of credit. Hence in the remaining of this chapter I focus on the other main characteristics of the macro environment that might have created the conditions unfavorable to investment.

3. 5 Dominance of Public Securities

Further investigation of different deepening indicators reveals the true nature of the problem in the banking sector. The first relevant structural feature of the 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 the private sector had only increased to 5.9% by 2004, from 1.3% in 1980 (See Figure 6). Financial liberalization policies that were expected to help capital markets develop seemed only to help the government meet its financing needs; they did not create a deepening of the stock market, the corporate bond market or other money market instruments. As the public sector's borrowing requirements grew over the 1990s,

government securities began to dominate the whole financial system in Turkey. Against this background, we conclude that the banking system was allocating funds into government securities, given the high interest returns and high volatility in the economy.

Increasing issuance of government securities certainly was a sign of increasing borrowing requirements of the government. While the commonly shared belief is that the growing debt burden was mainly due to constantly increasing level of government expenditures, a closer look at the consolidated budget of the government gives a different picture. Figure 7 presents public sector borrowing requirement (PSBR) with and without interest payments on accumulated debt. The first period over which the PSBR increased after 1980 was the period of 1987-1992. As mentioned above, with increasing pressure from the losers of the export led growth regime, the government felt compelled to respond to popular demands for redistribution and the share of the current government expenditures in the consolidated budget increased from 37% to 56% over 5 years. However the redistributional pressures did not last long as the same ratio of current expenditures had declined to 25% by 2001. After the 1994 crisis, the public sector always had a primary surplus (though unwillingly), a trend that can be observed in the Figure 7. Hence the public sector debt-trap of the Turkish economy started to evolve mostly because of the increasing interest burden despite decreasing public spending.[57]

High interest returns combined with high volatility had a similar impact on the real sector of the economy. Firms directed their resources from fixed investment in real

[57] Banking sector crises and subsequent bailout costs also contributed to public sector deficits especially in the late 1990s.

sectors to financial arbitrage gains via Treasury bills. This is visible in the ratio of financial revenues to net profit before tax (of top 500 manufacturing firms) that has increased from around 24% in 1985, to 219% in 1999 (Yeldan 2001, p.156).[58] This evidence seems to be in line with the discussions on financialization and real capital accumulation. For example, Crotty (2005) describes a form of financialization in which non-financial corporations have started to increase their investment in financial assets, and they purchased financial subsidiaries.[59]

The deepening in the government securities market is one of the most important characteristics of the liberalization experience of the Turkish economy. In this highly unstable economy, high returns on government securities created incentives to hold government securities not only for the banking system, but also for non-financial firms. In the empirical section of the dissertation, I use the ratio of government securities to economic activity as one of the proxies for the post liberalization macroeconomic environment and asses its impact on firm level investment.

3.6 Financial Dollarization

Another notable characteristic of the deepening process is the high degree of currency substitution, as indicated by an increasing difference between the M2 and M2Y

[58] The source of data is the publications of the Istanbul Chamber of Commerce (ICC). ICC has collected data on certain balance sheet items from the top 500 manufacturing firms in Turkey since 1982. They release the data in consolidated form; hence the data are not publicly available at the firm level. Since the firms listed as top 500 might change every year, the sample of firms is not constant over time.

[59] Stockhammer (2004) argues that investment in financial assets by non-financial corporations indicates a change in management objectives towards 'rentier preferences'.

ratios.[60] Figure 8 clearly shows that nearly all the increase in the total-deposits-to-GNP ratio came from an increase in the share of foreign exchange deposits.[61] While mobilization of savings was achieved under financial liberalization, the ongoing 'deepening' process encouraged savings in foreign currency, instead of domestic currency.

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 to the question 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.[62] The literature on dollarization suggests that the institutional structure plays an important role in agents' incentives to hold foreign

[60] M2 includes currency in circulation + demand and time deposits. M2Y includes M2 + foreign exchange deposits. Hence the difference in these figures indicates a certain type of currency substitution, called "financial dollarization". Financial dollarization is the holding by residents of a significant share of their assets or liabilities in foreign currency. See Ize and Levi-Yeyati (2003).

[61] Drastic increase in the deposit ratio started mainly after 1994, the year of the first financial crisis after the capital account liberalization. As mentioned above after the crisis having many banks found it difficult to raise funds abroad and focused on collecting deposits as the main source of funding. Isik and Hassan (2003) provide evidence that after the crisis the Turkish banks were forced to expand their branch network to be able to better collect deposits.

[62] 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 an analysis of the role of institutional factors in the process of dollarization in the cases of Bolivia, Mexico, Peru and Uruguay.

currency. For example, Savastano (1992) cites uncertainty regarding future political developments among these institutional features. Ize and Levi-Yeyati (2003) address the issue of dollarization as a portfolio choice problem and explain in a formal modeling framework that the currency substitution of the portfolio is determined on both sides of a bank's balance sheet by hedging against inflation and foreign exchange risk. Their model provides a natural benchmark to measure financial dollarization and relate it to macroeconomic instability. In an empirical study Levi-Yeyati (2006) shows that financially dollarized economies display a more unstable demand for money, a greater propensity to suffer from banking crises after a depreciation of the local currency, and slower and more volatile output growth, without significant gains in terms of domestic financial depth.

Hence, an increased level of currency substitution in the Turkish economy in the form of increased holdings of assets in foreign currency is another indicator of increased macroeconomic instability as perceived by agents. In the empirical section of the dissertation, I use an indicator of deposit dollarization as one of the proxies for the post liberalization macroeconomic environment and asses its impact on firm level investment. In the next section, I further look into the sources of macroeconomic instability.

3.7 Capital Flows and Volatility

Over the last two decades, the Turkish economy has reflected the rising importance and volatility of short-term capital flows. While there has not been a

significant change in the behavior of foreign direct investment,[63] portfolio investment accounts show high volatility after the opening of the capital account. There were large outflows during the 1994 and 2001 crises. Over the period, the Turkish economy has been dependent on short-term capital flows for growth prospects, as suggested in Figure 9. We see that the growth rate of GNP and the ratio of short-term capital flows to GNP follow each other very closely, which indicates a possible causality between the two.[64]

Capital flows may lead to an increase in aggregate demand if they generate a real appreciation of the domestic currency.[65] In their study utilizing a VAR analysis, Cimenoglu and Yenturk (2005) conclude that a surge in capital inflows stimulates economic growth by first triggering private sector consumption demand as a result of real appreciation.[66] Figure 9 provides evidence for this finding after 1990: After this date current account balance and capital inflows move in opposite directions. A surge in inflows is accompanied by a worsening of current account balance as a result of currency appreciation, as imports are stimulated. Cimenoglu and Yenturk (2005) also

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

[64] The simple correlation coefficient between these two series over the period is 0.77.

[65] The real exchange rate was quite stable in 1987 and 1988, but after opening the capital account, the TL started to appreciate significantly in real terms until the 1994 crisis. After depreciating significantly in 1994, the TL started to appreciate in real terms again, to fall by 45% in 2001 due to the crisis in February. Hence it is quite safe to argue that the net capital inflows that Turkey enjoyed during the crisis-free years caused the TL to appreciate significantly in real terms. This causality is also supported by the findings of Berument and Dincer (2004), based on a VAR framework.

[66] A 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) for possible explanations of this phenomenon.

find that continuing capital flows and increasing consumption demand trigger investment demand. However, due to the increase in the relative prices of non-tradable goods, which is mainly caused by the increase in aggregate demand, investment is more heavily channeled to non-tradable goods sectors.[67] Since non-tradable goods 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 the liberalization of capital flows has increased the current account instability in Turkey.

3.8 Summary and Concluding Remarks

Turkey's financial liberalization program was launched as a part of a comprehensive structural adjustment program to eliminate the external and internal constraints that the economy was facing. Deregulation of interest rates, liberalization of foreign exchange regime, opening of the stock market and the liberalization of the capital account were the milestones of financial liberalization program that was implemented gradually over the 1980s. The primary aim of financial reforms was to fill

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

the resource gap between investment and savings by increasing the availability of credit and financial securities in the economy and to allow the country to reach high economic growth rates.

The performance of the Turkish economy has been far from impressive in the twenty five years since the launching of the financial liberalization program. Neither the expected financial deepening nor the greater availability of funds for productive investment was achieved. The share of private manufacturing investment in GNP stayed below its levels in the 1970s, while the Turkish banking system was using its funds to purchase government securities that offered high real interest rates, instead of lending to the real sector.

After the opening of the capital account in 1989, the economy was trapped in boom-bust cycles of growth, with high real interest rates, and the overvalued currency. In this decade of heightened instability, the growth of the economy became highly dependent on capital flows. With highly volatile portfolio flows of capital, the Turkish economy went through three significant crises in 1994, 1999 and 2001, with growth rates of -6.1%, -6% and -9.5% respectively. During these crises, volatility in growth rates was accompanied by sudden surges of interest rates, overnight devaluation of the domestic currency and the sudden outflows of capital.

The heightened volatility of key economic variables encouraged financial dollarization in the economy. In order to hedge themselves against high risks of interest rate and exchange rate fluctuations, both households and nonfinancial firms preferred holding part of their liquid assets in foreign exchange deposits.

The stylized facts of the Turkish economy after liberalization fit well into the Post Keynesian framework suggested by Erturk (2005) to explain the increased economic volatility after the capital account opening. Erturk proposes that two developments are typical of an economic structure that leads into the result of macroeconomic volatility. 1) liquidity preference that is intertwined with currency substitution, and 2) an asset market which is the main conduit of capital inflows, with the direction of price changes relatively easy to predict. The liberalization experience of the Turkish economy follows this pattern with financial dollarization, the expanding market for government securities, and extreme volatility in key economic variables. In order to exploit the advantages of this country level study, I choose to focus on the real outcomes of liberalization in my empirical analysis of the impacts on investment. Therefore I use the first two characteristics of the period as the proxies for the liberalization. As I explain further in chapter 7, four financial deepening indicators focusing on these characteristics are used as proxies in the empirical analysis.

High macroeconomic instability has implications for private real investment. As reviewed in Chapter 2, Post Keynesian investment theory suggests that a higher level of volatility in the key conditions that a firm is facing is associated with lower level of confidence of the managers about the reliability of future forecasts. As the level of confidence declines, lower levels of investment follow. I suggest that the lack of improvement in the private manufacturing investment in the economy can be explained to a substantial degree by the high macroeconomic instability.

Macro level evidence in this chapter supports my hypothesis that the liberalization experience of Turkey has failed to achieve the conditions needed to

enhance private investment due to high instability, while not providing any improvement in credit availability. The remainder of this dissertation will empirically analyze how these impacts became operational at the firm level. In order to better pose the hypothesis at the level of manufacturing firm, the next chapter presents the results of a field work conducted through interviews with managers of manufacturing firms in Turkey.

CHAPTER 4

FIELD RESEARCH ON INVESTMENT UNDER UNCERTAINTY

In my review of the investment literature in Chapter 2, I showed that competing theories of investment often end up using similar variables in empirical testing. For instance while the reliance on internal funds is a sign of information asymmetries for New Keynesian theory, it is the result of risk averse behavior by firm managers and bankers for Post Keynesians. While a sales variable captures future investment opportunities as a proxy for the marginal product of capital for neoclassicals, Keynesians use it as a measure of expected demand since the future is fundamentally uncertain and the best agents can do is to extrapolate the relevant past. Selecting among this mélange of possible empirical specifications is a minefield in which researchers from different perspectives can pick and choose among variables to get desired results.

In Chapter 3, I reviewed the main characteristics of the Turkish economy's liberalization experience and arrived at four distinctive features to explain the lack of improvement in real sector investment: insufficient credit, high macro instability, high real interest rates driven by an expanding government securities market, and liquidity preference reflected in financial dollarization. In the following chapters of the dissertation I will incorporate these features into a formal framework of investment and empirically analyze how investment responds to these developments. In choosing an investment function on which to base my empirical analysis I adopt the method of

building an investment equation from field research.[68] The results of these interviews with key decision makers in the Turkish manufacturing firms helped me choose the appropriate theoretical framework for understanding the investment behavior of these firms and how it has responded to changes in their business environment.

Results from the interviews confirm the Post Keynesian intuitions and contradict with neoclassical assumptions. In Chapter 5 of the dissertation, I develop a simple investment model with Keynesian properties that can account for the potential affects of liberalization derived from the results of the field work, the previous review of the Turkish economy, and the relevant literature. I use this model to develop statistical specifications and empirically test my hypotheses about investment theory and financial liberalization. This field research project, undertaken in Turkey in 2004, is qualitative in nature and complementary to the methodology I adopt for the empirical analysis in the following chapters. Since I use a novel firm level data set in my econometric analysis, the results of this qualitative field research are crucial for explaining and interpreting the findings of my quantitative analysis.

4.1 Objectives and Methodology

The project has two primary objectives. The first is to shed light on the conflicts among neoclassical, New Keynesian and Post Keynesian theories of investment. Different investment theories have conflicting propositions on firm level investment

[68] The field research project was supported by SSRC Program in Applied Economics, Risk and Development Field Research Grant, with funds provided by the John D. and Catherine T. MacArthur Foundation.

behavior that lead theorists to highlight different determinants of investment. Given the macroeconomic context of the Turkish economy, I focus on the relative importance of financing constraints and uncertainty among these determinants. The second objective is to reveal how the role of these determinants changed in the context of liberalization. Within this framework I explore the sources of uncertainty, the effect of financial crises on firm behavior, and the firm's strategies to cope with crises.

The qualitative research in this chapter was conducted through in-depth, semi-structured interviews with CFOs (Chief Financial Officers) of manufacturing firms in Turkey. Companies selected for interview were taken from the set of companies to be used in econometric analysis. There are 165 manufacturing firms in this broader data set, while the number of firms for which data were available in 2003 is only 108.[69] Therefore the number of companies selected for interviews was 108. To obtain the most recent contact information and achieve a higher response rate, I contacted The Union of Chambers and Commodity Exchanges of Turkey (TOBB) and used "The Industrial Data Base" kept by TOBB. This data base has information on all registered industrial companies in Turkey, due to their mandatory membership with local Chambers of Commerce. The data base provided me with available and updated information on 96 firms[70], which I contacted by phone to arrange face-to-face interviews. During these phone calls, the CFOs were informed about the nature and scope of the interviews and I

[69] This unbalanced firm level data set I construct has observations over the period of 1985-2003. Due to its unbalanced structure, the number of firms changes across years.

[70] Ten firms in the initial set selected did not have any contact information except a general phone number. Updating contact information is the responsibility of the member firms, thus elimination of these 10 firms does not introduce bias to my research.

ensured them of the strictly academic use of the results as well as the condition of anonymity for their responses. Given time limitations and the concern of CFOs regarding the public disclosure of information, 33 CFOs accepted being interviewed.[71]

Fifty days of field work were conducted over the period of September-October 2004 in Turkey. During the first three weeks, in addition to arranging the appointments, face-to-face interviews with the representatives from Turkish Industrialists' and Businessmens' Association (TUSIAD), and The Union of Chambers and Commodity Exchanges of Turkey (TOBB) were conducted. During these interviews with industry representatives, I had the opportunity to access previously undertaken survey results by these organizations. They also helped me revise the interview design.

During the second part of the project, I traveled to eight different cities, mostly located in the Western part of Turkey to conduct the interviews. I visited 11 firms in Istanbul, six in Izmir, five in Bursa, four in Kayseri, one in Bolu, one in Kutahya, one in Nigde and one in Ankara. Each interview with company CFOs lasted about two hours. All interviews were conducted in Turkish. I obtained permission to use a voice recorder for eight interviews and took notes during the others. I also acquired company-specific documents, such as annual audit reports and feasibility reports for some of their investment projects.

[71] All of these firms are publicly traded in Istanbul Stock Exchange and are therefore bound by public disclosure rules. Some CFOs declined interview requests regarding their financing and investment activities with the claim that any further information disclosure might be harmful for the performance of the shares of their company in the market. Although this might have some correlation with the firm specific conditions, such as an anticipation of a merger or an IPO among many, I do not observe any particular patter in the way CFOs declined my request for an interview.

4.2 Interview Design

The main template of questions asked during the interviews is included in the Appendix. In the first part of the interview, information on firm demographics, including the age of the firm, the number of employees, products made, market share, profit margin, export orientation, group affiliation, and foreign ownership was captured by closed questions. In the second part, CFOs were asked about the nature of specific investment projects undertaken within the last ten years. For these questions, a semi-structured interview design was adopted. The following are the specific issues that were investigated in the second part of the interviews:

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

4.3 Findings from Part 1: Firm Demographics

Table 8 describes firm demographics both for the firms interviewed and the total number of firms included in the data set. In this field work, I interviewed 31% of the firms that are included in the data to be used in the econometric analysis presented in Chapter 7. Size and sectoral distributions of the firms interviewed closely follow those of the firms in the data set. However, the set of interviewed firms contains fewer firms that were established after 1980 compared to the data set.[72] The median share of export

[72] 19% of firms were established after 1980, while the ratio is 12% in the set of firms interviewed.

in sales was 26% in 2003 for the firms in the data set, and 30% for the firms interviewed. Sixteen percent of the firms in the data set have foreign entities among their owners, while this ratio is 21% among the firms interviewed. In terms of size, sectoral distribution, export orientation and foreign ownership, firms in the data set and the firms interviewed display similar patterns indicating that the latter sample is representative of the data set.

I found the following results on firm demographics for the firms interviewed.

Size: The majority of firms are medium and large sized[73] with employment figures from 89 to 1864 employees. Only 9% of the firms would be categorized as "small". This bias originates from the initial selection of firms in the data set that is constructed from the publicly disclosed accounting information of the firms traded in the Istanbul Stock Exchange. One implication of this pattern is that a majority of the firms that are publicly traded in the stock market are large and medium-sized. While the focus on large and medium firms might reduce the firm heterogeneity in sampling, it should be noted that in 2005 small firms are responsible from only 7% of total sales of the Turkish manufacturing industry, while this ratio is 20% for medium sized firms.[74] Large firms produce 73% of the total manufacturing output. Therefore information

[73] The size distribution categories adopted in this study follow the definitions in CBRT Sectoral Balance Sheets for 2003 and are based on the 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-sized, and those with net sales above this level are large in 2003. A net-sales-based classification is preferred here, since similar information is available for all firms included in the main data set at that date.

[74] This information is reported in the Consolidated Balance Sheets of the Turkish manufacturing industry, as released by the Central Bank of Turkey on its web-site. Figures are for 2005.

derived from large and medium size firms is valuable as it explains the investment dynamics of the set of firms which produces 93% of total output in manufacturing.

Market Structure: The market shares of firms range from 5% to 85% in particular commodity markets. This finding indicates that many of the industries these manufacturing firms operate in are either oligopolistic or monopolistically competitive. As in the case of size, the high market share of these firms might introduce a bias to the sample of firms interviewed. Firms with high market share might be stronger and hold more resources and may not be constrained by the same factors as those in more competitive industries. On the other hand, high level of concentration is a stylized fact of many subsectors of the Turkish manufacturing industry rather than an exception.[75]

Unionization: The labor force is generally unionized with the exception of four firms out of 33. Two firms out of these four are small in size. However participation in the union within one workplace varies across companies and is not high on average. Trade unions are present and accessible at the worksites but their presence should not be taken as a sign of the strength of unions. The issue of the uncertainty in wages and its role in investment decisions will be investigated in the second part of the interviews.

Age: Only a small number of firms can be categorized as 'young', since those established after 1980 were only 12% of the interviewed firms. This implies that the

[75] See for instance Gunes, Kose and Yeldan. (1996). Metin-Ozcan, Voyvoda and Yeldan (2002) argue that, contrary to expectations, the processes of export orientation and overall trade liberalization since 1980 have not altered the highly concentrated structure in the Turkish industrial markets. An interesting study by Gunay , Metin-Ozcan and Yeldan (2005) finds that the market power of Turkish manufacturing firms is positively affected by real wage costs and price inflation. The study concludes that the manufacturing firms have responded to shocks of acceleration of inflation and real wages costs by increasing their market power as measured by mark-ups.

majority of the firms interviewed are likely to have a good reputation and network connections in their market due to their longevity.

Sectoral distribution: Twenty-four percent of firms interviewed are in textiles and clothing, followed by a 21% in machinery and equipment industries (See the Table 8 for distribution across other industries). This distribution is in line with that of the data set as well as the patterns of the overall the sectoral distribution of Turkish manufacturing industry.[76]

Export Orientation: The median share of exports in total sales is 30% for the sample of firms interviewed. Only three firms out of 33 sell their products solely in the domestic market, while the majority of firms are export oriented. Figure 10 shows the median of firm level share of exports in total sales, as calculated from the firm-level panel data set to be used in the econometric analysis.[77] The median share of exports increased to 26% of total sales in 2003 from 14% in 1992, indicating that firms in the data set have increased their export orientation over the course of the 1990s. Consolidated Balance Sheets released by the Central Bank report that the ratio of exports in total sales for the whole manufacturing industry was 31.2% in 2003. Therefore with their export orientation, the sample of firms interviewed follows both the pattern in the data set and the manufacturing industry at large.

[76] The report that is available on the Central Bank web-site states that in 2003, 27% of 3667 manufacturing firms were in the textiles and clothing; 17% were in the machinery, equipment and the automotive industries. The former industries were responsible from 13% of total manufacturing sales and the latter were responsible from 27.2%.

[77] Decomposition of sales into foreign and domestic components is only available after 1992; hence the series on the share of exports in the data set as shown in Figure 10 begin in 1992.

Public Ownership: All firms are publicly traded with an average of 20% publicly traded shares. Only one firm out of 33 has 50% of its shares held by the public, while the median is around 30%. Gursoy (2005) provides evidence from the set of all firms traded in the Istanbul Stock Exchange to support this observation. He finds that Turkish firms have highly concentrated ownership structures and families have significant involvement in the governance of their firms. Firms interviewed express their concern about losing their autonomy from equity markets by selling the majority of shares to the public. This also shows that unlike most developed countries, the threat of stock market takeover does not exist and a "shareholder revolution" has not happened for these manufacturing firms in Turkey. The lack of shareholder pressure has implications for the investment behavior of these firms.[78] Away from shareholder pressure, mangers might still have room to maximize long term reproduction and growth of the firms instead that of short term stock market value. Managers of these manufacturing firms might be more sensitive to risk involved investment decisions than it is suggested by neoclassical theories of investment.

Group Affiliation: Twenty-eight percent of firms (nine out of 33) are owned by well-known *holding* companies, i.e. Turkish conglomerates. Group affiliation is an important aspect of their market positions as these firms tend to be larger and older compared to others interviewed. For instance none of the 'small' firms or 'young' firms is affiliated with a group. However it should also be noted that group affiliation does not

[78] The strongest theoretical praise for 'shareholder revolution" was voiced by Jensen and Meckling (1976). They thought of shareholder pressure as a solution to 'principal-agent problem' that would discipline managers' actions and bring them inline with shareholder value maximization.

seem to always lead to greater market power and better access to resources.[79] Five of these nine firms are affiliated with a group that also owns the majority shares of a bank.[80] In this institutional setting relationship banking can be an important factor in the determination of investment, as the cost of funds provided by these affiliated banks would be cheaper and safer than other alternatives of external funding.

Foreign Ownership: Twenty-one percent of firms have foreign entities among their shareholders. Although foreign direct investment in the form of partnership with domestic firms has been permitted since the liberalization of capital account, there are still a limited number of foreign-domestic partnerships in the manufacturing industry. Among these firms, some are owned by multinational companies with majority shares. There are also foreign banks among the smaller foreign partners of firms.

These set of firm characteristics has implications for the investment specification I will develop in the remainder of the dissertation. As these firms in the Turkish manufacturing industry have substantial market power in product markets, many of the neoclassical investment models that assume competitive product markets cannot provide an adequate framework. Since most firms are controlled by families and have concentrated ownership, shareholder pressure may not factor into the managers decision

[79] There seems to be variety in the benefits to member firms provided by group affiliation across these *holding* companies. Some of these *holding*s are owned by very powerful and old families or coalitions of families and they are the owners of household brands. Being a member of these groups that generally own a commercially bank seems to be the most beneficial for the firms in the group in terms of access to resources. Other *holding*s are more recently established and not as diversified across different industries. These have a heavier trade orientation in their activities rather than industry and have gathered only a few firms under their roof for mainly legal concerns.

[80] Not all *holding* companies own banks.

making. Managers still have room to maximize the long run growth prospects of their companies as suggested by Post Keynesian theory instead of maximizing the short term stock prices. In addition to their market power and relatively large size, group affiliation of these firms can provide them access to cheaper funds for financing their investment projects. I will take these characteristics into consideration while building the investment specification in Chapter 5 of the dissertation.

The next section presents the findings from Part 2 of the interviews. In Part 2, the issues of the determinants of investment, the sources of investment funds, the sources of uncertainty, the effect of financial crises on firm behavior and the firm's strategies to cope with crises are investigated.

4.4 Findings from Part 2: Investment-Financing-Uncertainty

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

4.4.1 Sources of Investment Funds

While various recent investment theories concur about the validity of the hierarchy of finance hypotheses of investment funds,[81] there are disagreements, as exemplified by Post Keynesian and New Keynesian theories, on the underlying reasons for the hierarchy of finance. In this section I attempt to identify the sources of

[81] The Pecking Order Theory of finance, developed by Myers (1984) maintains that businesses adhere to a hierarchy of financing sources and prefer internal financing when available, and debt is preferred over equity if external financing is required.

investment funds and the hierarchy among them as well as the motivations for the emerging patterns.

Interview results suggest internal funds are very important for financing investment projects, while external funds in the form of bank credit are also used in the event that internal funds are insufficient. Eighteen percent of firms use only bank credit to finance investment; 27% use only internal funds; and 55% use a combination of both.[82] No firm reported informal credit as the source of finance.

All firms that use solely internal funds to fund investment are either medium or large in size (18% of sample). They use internal funds only, because their internal funds tend to be sufficient to fund large projects. When explicitly asked about why they prefer internal funds, CFOs' answers range from "cheaper" to "safer". It seems that the managers are risk averse in their behavior as they want to avoid formal debt commitments in the future when possible. No small firm uses only internal funds to finance investment. Their funds are not enough to fund investment so they must borrow. Overall, I conclude that large firms with large internal resources rely on internal funds more than small firms do, although all firms prefer internal funds as a result of risk aversive behavior of managers.

This conclusion seems to contradict size-based firm classifications suggested in the New Keynesian literature on financing constraints. In the New Keynesian framework of information asymmetries, the cash flow sensitivity of investment of small

[82] It should also be noted that respondents who chose the combination option also mention that they benefit from investment subsidies provided by the government, which require at least 20% contribution of internal funds in investment projections.

firms is expected to be higher than that of large firms, as small firms are assumed to face greater constraints in the credit markets. The New Keynesian interpretation of cash flow sensitivity as a sign of a constraint imposed by the credit market would lead into unrealistic conclusion that in the Turkish manufacturing industry large firms are the ones facing greater constraints.

In the econometric specification based on the larger data set, I use a cash-stock variable as scaled by the capital stock to measure internal funds.[83] The mean value of this internal funds variable is 0.228 for large firms and 0.167 for medium and small firms. Descriptive statistics support the hypothesis that large firms rely more on internal funds for investment funding, since they have more internal funds available to them.

According to a survey conducted in 1991 by the Istanbul Chamber of Industry (ICI)[84], in financing fixed capital assets, 34% of manufacturing firms use bank credit, 25.4% use retained earnings, 15.2% use equity capital, 9.5% use trade credit, 5.9% prefer transfers of funds from the affiliated *holding* company, 0.5% issue bonds in the corporate bond market, 0.3% issue shares in the stock market and 5.8% prefer "other" sources of funds. We can classify these different sources into external and internal funds based on the cost of funds. Assuming that external funds have a higher cost and they imply formal future debt commitments, we can classify bank credit, corporate bonds and

[83] See Chapter 6 for detailed description of the data set, firm categories and the variables used in empirical specification.

[84] This survey covers 1,786 manufacturing firms of different sizes that are well represented. The original survey included firms from services and other industries such as mining, but the results are presented separately. Figures reported here are for manufacturing firms only.

issuance of shares in this category. Internal funds are retained earnings, equity capital and borrowing from the affiliated *holding* company. Trade credits are a commonly used source of funding for the Turkish firms as in other developing countries and generally accepted as a preferable form of credit.[85] As I will show in the remainder of this chapter, the terms of trade credits are flexible and prone to change over time in accordance with the agreement of the parties involved. As a result trade credits are not perfect substitutes with other sources of external funds, and lie between internal and external funds. Nevertheless I classify trade credits as external funds. Based on this classification, the survey results show that 44.3% of firms use external funds, while 45.1% use internal funds.[86] Obviously the both sources of funds are important in financing investment. While the percentage of firms that use external funds is higher than my findings in the interviews, it should be noted that the coverage of the survey differs from that of my sample in that the survey includes a higher proportion of small firms. Consequently the higher use of external credit might be the reflection of funding choices by smaller firms.

Interview results suggest that the preference for internal funds might be reversed in the case of firms with group affiliations, especially if the *holding* company is also affiliated with a bank. Firms with group affiliations mention that they prefer borrowing

[85] See Kaplan, Ozmen and Yalcin (2006) on the importance and role of trade credits for the Turkish manufacturing firms. In their analysis of corporate how the currency composition of corporate leverage changes as a response to the movements in the exchange rate, Kaplan, Ozmen and Yalcin (2006) recognize that trade credit and other formal credit cannot be treated as perfect substitutes as the former is preferred by managers due to its flexible terms and lack of collateral requirements.

[86] "Other" sources of funds are not included in this classification. The industry representatives from TUSIAD, from whom I obtained the survey results, note that 'other' sources are the informal sources of borrowing, such as family and friends. In that case these funds can be considered as a part of internal funds.

from the *holding* company or the group bank, since the terms of credit are 'favorable.' Although this type of credit is reported under debt accounts on the balance sheets, due to its cheaper cost to the firm, it can be seen as a substitute for internal funds. Therefore in the case of firms with group affiliation, one can expect a lower cash flow sensitivity of investment, compared to that of those without group affiliations.

Overall interview results suggest that firms always prefer internal funds, as they prefer cheaper and safer funds in their financing of investment. The New Keynesian thesis that reliance on internal funds is a sign of information asymmetries in the credit markets is not supported by these findings. Small firms may have lower cash flow sensitivities than large firms, since their internal funds might not be sufficient to fund investment. On the other hand, firms with group affiliations might have lower cash flows sensitivities, since their borrowing from affiliated companies is a substitute for cheap and safe internal funds. In Chapter 7 of the dissertation, I will empirically test these hypotheses regarding differences across firm categories.

These results also suggest that firms do not rely on the stock market or the corporate bond market to raise funds for their investment projects. Evidently, capital markets in Turkey are still perceived to be underdeveloped.

4.4.2 Determinants of Investment

The literature review in Chapter 2 showed that various theories identify different determinants of investment. In this part of the interviews, I attempt to identify these determinants and discuss my findings in the framework of these theories. During the interviews, I provided the interviewees with a list of possible determinants of

investment derived from different theories and asked them to rank these factors. In the evaluation of answers, I assigned points to these determinants based on the rankings by the firms.[87]

Sixty percent of firms that were interviewed report that future demand conditions and growth of their market share are the most important determinants of their investment decisions. As suggested by Keynesian theories, future demand conditions emerge as the highest ranking determinant of investment. This finding indicates that the neoclassical assumption of Say's Law[88] does not have supportive micro foundations at the firm level.

How does a firm generate the forecast on future demand conditions? In further conversations, firms mention that they follow current trends in sales as these are very helpful in forecasting future demand conditions. A similar result regarding the importance of current demand conditions was found in the survey by ICI in 1991. In this survey, 48% of all manufacturing firms mention the role of current demand conditions as highly important.

However they do not rely solely on current trajectory of demand to generate the forecasts of expected demand. They also follow the key macroeconomic variables from business news, expert opinions in the media and industry association publications. In accordance with Post Keynesian insights, the process of forming expectations is

[87] On a scale from 5 to 1, the factor that is reported as the first is given 5 points; the second is given 4 points and so on, while the fifth factor's score is 1.

[88] Say's Law states that there is no possibility of aggregate demand exceeding or falling below aggregate supply, i.e. supply creates its own demand.

embedded in social conventions due to the fundamental uncertainty surrounding future outcomes. These conventions serve two purposes as suggested by Crotty (1994). They not only provide more information about the choices and potential outcomes of those choices, but also create confidence in the meaningfulness of manager's forecasts. In other words, firms do not directly link their investment decisions with the forecasted level of expected demand. Based on these conventions, they modify and revise their own method of forecasting the future. They also generate a sense about the truth content of these methods. Use of extrapolation in the forecast of future demand validates a Keynesian notion of expectation formation as reviewed in Chapter 2, rather than an assumption of 'rational expectations.'

Another finding from further conversations is that many firms emphasize demand in international export markets as an important determinant of investment. As I will explore in more detail below, exporter firms[89] generally carry out investment projects aimed at improving the quality of their products in order to comply with international standards. Therefore their output for exports is comprised of slightly differentiated products, produced at the same facilities, but with different processes.[90] These firms mention that changes in domestic demand can generally be met by the

[89] Firms are categorized as export oriented if the ratio of exports in total sales is above 25%, on average, over the years the data are available.

[90] This pattern is most observable with those firms operating in textiles and clothing apparel that are among the leading exporter industries of the economy. Demand in international textiles and clothing apparel markets is very flexible with fast changing preferences. Instead of selling a standardized product, these exporter firms provide to the special orders of the international buyers with design and quality of their products. In order to gain such flexibility in design and quality, they purchase special machinery and equipment mainly used for meeting international demand.

already available capacity, while substantial changes in international demand generally require them to invest in new technologies and production processes to be able to produce differentiated products. I therefore expect the sensitivity of investment to sales to be higher for these export-oriented firms than that for firms which sell mostly in domestic markets.

The second-highest ranked determinant of investment is the growth of firm's market share. This finding is reinforced by the observation that most product markets are oligopolistic or monopolistically competitive. Firms in these markets have substantial market power that produces high profit margins. Investment and pricing decisions of these oligopolies that aim to preserve high profit margins are linked.[91] Firms with market power conceive of investment as a way of sustaining or expanding their power. In line with the arguments of the Post Keynesian perspective on firm behavior, firms aim to grow in size and increase their market share to further increase their market power.

Quality improvement, cost reduction and product differentiation follow these two main determinants with their rankings. The first two factors can be understood as standard neoclassical arguments to explain investment behavior, as these factors are driven by competitive pressures following the assumption of competitive markets. Given that the degree of competition in domestic product markets is low, it is not surprising to see that these factors are not ranked higher. On the other hand product differentiation signals to monopolistically competitive dynamics in the product markets.

[91] Eichner (1976) provides a theory of 'megacorp', in which oligopolistic pricing decisions are linked with investment decisions.

As mentioned above the emphasis on quality improvement is intertwined with product differentiation and can be better understood in light of firms' export orientation. The majority of CFOs agree that the most important implication of international competition has been quality improvements in the products. In order to export successfully, besides undertaking investment in advanced and flexible production technologies, they have to comply with the most recent rules of the International Organization for Standardization (ISO) and get certified by the ISO.

Vertical integration ranks as the least important determinant of investment. Finally, no firm mentions investment subsidies as a determinant of investment, although most firms note that subsidies are important especially in the choice of location. Most of the factories I visited were located in "organized industrial zones" surrounding cities and firms and were eligible for different types of investment subsidies.

In sum, interview results give support to the Keynesian foci on expected demand and market share as the most important determinants of firm investment. Firms form expectations about the future demand based on social conventions via the use of extrapolation.

4.4.3 Impediments to Investment

From the answers to the questions 4 and 11 as shown in the interview template in the Appendix, I attempt to identify the main impediments to investment, to better evaluate the factors that constrain investment by the firm. Responses can be categorized under two subcategories: 1) High cost of finance or insufficient funds, 2) Uncertainties in cost or demand conditions. Ninety-seven percent 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. While there is no explicit pattern in these responses based on size or export orientation, none of the firms with group affiliation report cost and/or availability of funds as important impediments. Another interesting pattern is that all firms that report insufficient funds as a problem are those that are in financial jeopardy as indicated by their accounting data.[92]

According to the results of the ICI survey, 32.4% of manufacturing firms cite high inflation as the most important factor. It should be noted that the year this survey was conducted is 1991 and that the average inflation rate over the period of 1985-1995 was around 60%, based on the Wholesale Price index. A high inflation rate is important in investment decisions since the actual levels of inflation that are higher than anticipated makes future predictions more difficult. As a result, the high level of inflation itself is considered to be a source of uncertainty. The same survey reports that 30.2% of manufacturing firms mention "uncertainties in inflation rate, exchange rate and interest rate", 19.5% cite the high level of interest rates, and 17% cite political instability as important factors that negatively effect decisions about investment financing.

[92] I checked their financial situation from the available balance sheets in 2003. All four firms in this group had incurred losses as shown on their income statements.

A similar pattern emerges from the data provided in the Business Tendency Survey (BTS):[93] 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. Uncertainty in demand conditions and the high cost of financing together imply that the most important issue in the determination of investment is not only the level of expected demand but also the uncertainty associated with it. This emphasis on uncertainty fits within the Post Keynesian focus on uncertainty surrounding expected demand. Other investment theories that assume firms know the stochastic future, or do not need to asses the future because investment is reversible (as in the case of Neo classical and Euler equation models) are thus not appropriate approaches to apply to the Turkish case in recent decades.

Based on the interviews and the surveys, the most important impediment to investment emerges as uncertainty while the cost of financing is the second important factor. Two other findings are noteworthy: 1) although the cost of external funds and the availability of internal funds matter, obtaining external funds is not perceived as the major problem in investment decisions. Firms do not perceive themselves as facing

[93] The Business Tendency Survey has been regularly conducted by The Central Bank of the Republic of Turkey (CBRT) since December 1987. The survey was designed to poll senior managers from 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. The coverage was increased in later years. 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.

credit constraints in terms of quantity of credit.[94] 2) The concerns about inadequate net present value (NPV) as reported above might be the result of uncertainty in both demand and cost conditions. According to the NPV rule, investment projects with positive value are accepted and those with negative value are rejected. However, from this concern over the insufficient NPV we understand that firms follow a 'hurdle rate' rule rather than the NPV rule to evaluate investment projects. The hurdle rate rule requires an investment project to not merely have a positive NPV but to have a sufficiently positive NPV. As the observed volatility in current conditions increases, managers become less confident regarding their ability to form expectations and require higher safety margins, which in return translates into a higher hurdle rate. In this framework, the hurdle rate and volatility are positively related. In other words, with the uncertainty they are facing regarding future demand and cost conditions, firms would require even higher NPV projections to accept investment projects. As suggested in the Post Keynesian framework of presented in Chapter 2, higher volatility causes a decline in the confidence and higher hurdle rates follow.

A last interesting finding is the relative insignificance of "cost of labor" in investment projections. Among the responses to the question on the sources of uncertainty, "uncertainty in wages" is mentioned by only one firm as the third important source of uncertainty, while the other firms do not even rank this factor. In further

[94] Many firms mention that they have access to subsidized investment credit not only from the government of Turkey, but from foreign sources. When investment projects involve the purchase of machinery and equipment, these capital goods are typically imported from European countries. In this case, the company generally has access to European Eximbank credits, subsidized by the government of the exporter country.

conversations, firms mention that they do not face problems with their labor force. As mentioned before, unions are present in all production sites with the exception of four firms.[95] However, as noted, this cannot be seen as a sign of strong unions. The unemployment rate in Turkey has risen over the last decade, while real wages have declined.[96] Figure 11 presents the trend of real earnings per production worker in the private manufacturing industry. The declining trend since the crisis of 1994 might help explain why in 2004 private manufacturing firms do not expect that uncertainty in industrial relations might play a negative role in their investment projections. Weak unions, high unemployment and the existence of informal labor markets with jobs that pay significantly less than formal employment all contribute to this result. The new era of high instability and frequent crises seems to have changed the balance of industrial relations in favor of capital by preparing the conditions of low labor costs.

[95] The official unionization statistics for the Turkish economy are accepted as very problematic as they overstate the actual number of unionized workers. According to the official statistics 67.8% of labor force was unionized in 1996. The main source of the problem is that workers can have membership in more than one union, although they cannot be effectively represented by more than one union. Trade unions are subjected to quotas of 10% participation rate by the workers at one worksite to be legally recognized. As a result, they try to sign up as many members as possible. Celik (2004) provides an estimation of actual unionization rates based on official statistics. He claims that the unionization rate in Turkey in 1996 was 12.7%. Both official statistics and Celik (2004) suggest that the unionization rate declined by 50% between 1988 and 2001.

[96] Official statistics on unemployment in Turkey are controversial. Based on the narrowest definition of unemployment that is not comparable with international statistics, the unemployment in 2003 was 10%. The broader definition that is widely adopted internationally results in 18% unemployment in 2003.

4.4.4 Realization of Expected Profits

In Questions 6 and 7 of the interview, I asked the interviewees whether the investment projects they completed achieved the expected profitability that they had forecast and the reasons for discrepancies if any were observed. Only 21% of all firms mention that completed investment projects achieved the expected profitability. Fifteen percent said the investment never reached the expected profitability they anticipated, while 64% said "expected profitability was achieved initially, but declined later". Out of all firms that experienced a decline in expected profitability (79% of all), only 6% mention that this was a result of "their own managerial mistakes in forecasting", while the rest refer to "unforeseeable developments that happened at the macro or sectoral level".

This question aims to distinguish between firm level (idiosyncratic) and aggregate (macro or sectoral level) problems that caused a discrepancy between expected and actual profitability of investment. Given these responses, it seems that unforeseen events in the aggregate play a more substantial role. This finding is reinforced by the previous discussion on the importance of uncertainty as an impediment to investment. Given the burst of instability over the last decade of the Turkish economy, macroeconomic factors are logically the dominant causes of failure in the realization of investment returns.[97] Nevertheless interviewees might have a tendency to blame the external conditions, i.e. unforeseen aggregate changes, as the source of

[97] While these responses certainly point to the importance of unforeseen macro developments, it should be noted that it might be difficult to disentangle the main sources of failure as strictly aggregate or idiosyncratic. Seemingly idiosyncratic problems might be underscored by aggregate factors.

problems that they face. Hence, based on their responses, it is reasonable only to conclude that aggregate problems probably play a more important role than idiosyncratic problems in explaining the unrealized expectations of investment profitability.

4.4.5 Sources of Uncertainty

In the remainder of this dissertation I will construct empirical measures of uncertainty to investigate its impact on investment. For that purpose in Question 12 on the interviews I asked the firms to identify the most important source of uncertainty as they perceive it. When asked to rank potential sources, firms responded as follows: uncertainty in demand conditions, uncertainty in overall macro policies, uncertainty in input costs, uncertainty in inflation, uncertainty in interest rates. As mentioned above, the Business Tendency Survey also finds that in 2003, 47% of firms report "demand uncertainty" as the most important impediment to investment. From this evidence, demand uncertainty emerges as the most crucial obstacle to future projections of investment.

The following observations were also gathered in further conversations about other sources of uncertainty:

1) In choosing 'uncertainty in macro policies' firms are mainly referring to the exchange rate and the interest rate policies of the government as these policies are perceived as responsible for unanticipated changes in key macroeconomic variables including the exchange rates, interest rate and the inflation rate. When firms rank policy uncertainty as the second important source, they might implicitly be referring to uncertainties in these three indicators, instead of ranking them separately.

2) Uncertainty in input costs seems to be important through two channels: The most prevalent channel is the one caused by fluctuations in the exchange rate. Firms either directly import inputs or buy from domestic suppliers whose prices are sensitive to exchange rate fluctuations.[98] Hence production and investment decisions are heavily influenced by volatility in input prices, as caused by exchange rate fluctuations. The second channel works through uncertainty in inflation. Sometimes contracts with suppliers require these firms to make payments adjusted for inflation.[99] When actual inflation exceeds the level that they anticipated, firms lose money on these contracts. In general uncertainty about the inflation rate is mentioned as a factor that renders inventory management difficult. Certain industries such as iron and steel and metal products tend to work with higher levels of stock due to longer continuous process cycles in their production. However some of the firms in these industries also openly admit that during the decade of high inflation, they were able to make profits from their inventories due to ever increasing inflation. Firms were able to increase final product price and widen the profit margin in line with inflation. This is also the evidence for a mark-up pricing rule these firms were following. This finding indicates that it is not necessarily the high inflation but that unpredictability of inflation that creates problems for firms. While a broader data set might allow me explore all these sectoral and firm

[98] From dyes used in textiles to ore used in iron and steel industries, many inputs are imported.

[99] For example, firms in food processing industries have such seasonal or annual contracts with local farmers who supply them with fresh produce.

level differences, I am not able to distinguish across firms according to their relations with suppliers.

3) Finally, uncertainty in exchange rates also affects those firms that borrow in foreign currency, by making their debt commitments and the cost of finance uncertain.[100] Although there are sectoral differences, financial dollarization of the Turkish corporate sector over the 1990s is cited in the recent studies that use the consolidated Balance Sheets of the non-financial corporations.[101] As reviewed in the section on the Turkish economy, increased instability in key macro variables leads to financial dollarization in both assets and liabilities of households and nonfinancial firms. A fragile financial structure emerges especially for those firms with very low export shares. Firms with a mostly domestic market orientation have no means of generating revenues in foreign currency; hence they are expected to be more vulnerable to devaluations because of their highly dollarized liability structure. This vulnerability or even the likelihood of it would also have negative impacts in a Post Keynesian investment framework. In the empirical analysis in Chapter 7, I attempt to test the hypothesis that the investment of those firms with high domestic market orientation may have higher negative sensitivity to the measure of uncertainty that I construct.

[100] Further conversations revealed that these firms refer to unanticipated devaluations in the value of domestic currency as exchange rate uncertainty. Given that cyclical growth pattern of the Turkish economy is knotted with financial crises during which the domestic currency had huge losses in value over very short periods of time, this fear can easily be understood.

[101] Kesriyeli, Ozmen and Yigit (2005) state that the liability structure of the balance sheets for the Turkish manufacturing firms was responding to macro instability conditions as well as sectoral differences.

4.4.6 The Impact of 2001 Crisis on Firms

In this section of the interviews, I asked open-ended questions about how the crisis in 2001 affected these firms. In 2001, with the most recent crisis of the Turkish economy, real GDP declined by 9.5%, and the Turkish Lira was devalued in real terms by 45%. These extreme swings in domestic demand and exchange rate should have consequences for the performance of the firms in manufacturing industry.

Eighty-seven percent of all firms reported that they incurred losses for at least one year after the crisis because of the decline in domestic demand. The remaining 13% were able to find new international export markets as they had already have a high share of exports in their sales. Figure 10 shows the median share of exports over time for the sample of all firms included in the constructed data set. While the median share of exports is 16% in 2000, it jumps to 28% in 2001 indicating a surge in exports mainly due to devaluation.

Approximately half of all firms (45%) reported that they were "caught unprepared" when the crisis of devaluation hit and incurred losses due to devaluation.[102] The remaining 55% said that they had been careful about not having a short position in foreign currency as they were anticipating devaluation at some point. Hence they were either reluctant to borrow in foreign currency or tried to hedge in different ways. This careful attitude prevented a loss from currency mismatch in their balance sheets. The majority of these firms also mentioned that they had substantial shares of exports in

[102] Two firms also mentioned that they incurred losses on forward options they were holding for hedging purposes.

their sales which apparently helped matching debt commitments with revenues in foreign currency after the crisis.

For most firms, incurring such unanticipated losses with the crisis made the decision making process more "conservative" or "overly careful" for at least a year into the post-crisis era. As I concluded in my discussion of interview results on the role of uncertainty, high volatility in key macroeconomic variables causes a decline of the confidence in the ability to make reliable forecasts. When the volatility is extreme, as in the case of the 2001 crisis, firms find themselves in a 'crisis of confidence' where the belief that the future will look like the past extrapolated breaks down. Many interviewees mentioned that after the crisis, the time horizon for future planning got shorter, and no company in their industries can plan for a term longer than three years. In sum, when confidence declined due to extreme volatility with the crisis, not only do hurdle rates increase, but also short-termism dominates.

4.4. 7 Strategies to Cope with the Uncertain Environment after a Crisis

The results in this section are derived from the open-ended questions on changes in firm behavior as a strategic response the uncertain conditions after the crisis in 2001 (See the Appendix). Uncertainty not only affects factor demands (both for labor and capital), but also requires resources off-setting its effects, which will further reduce output and the growth of the firm.[103]

[103] For example Fafchamps *et al.* (2000) find a strong effect of the firm specific measures of contractual risk on the holdings of inventories and liquid assets by Zimbabwean manufacturing firms.

It is especially important to trace the effects of uncertainty in inventory and liquid asset management. When a firm faces highly volatile earnings, liquid assets are crucial not only as funds for potential investment prospects (as implied by financing constraints literature), but also as the source of funds to meet future debt commitments and as a way to avoid large capital losses on long term financial commitments. As suggested in the chapter on the Turkish economy, high volatility might result in a liquidity preference that is observable in the balance sheets of the non-financial firms. When the cost of inputs and/or output prices are highly volatile, firms might try to minimize the size of inventories of inputs and/or outputs. With the prevalent short-termism mentioned in the previous section, we can expect changes in the maturity structure or the composition of the debt used by these firms. Having faced high volatility in earnings, in order to avoid defaulting on future financial commitments, a firm might prefer shortening the maturity of the debt.[104] Another possibility is that more informal sources of funds such as trade credit might increase with their share of firm's liabilities.

Responses can be categorized under two headings:

i. Temporary Responses to Post Crisis Uncertainties

- Currency substitution: For those firms with a primarily domestic market orientation, there has been an overall increase in the share of foreign currency in their short term liquid asset portfolios. The motivation to hold foreign currency is to hedge

[104] Another reason for this short term debt orientation of the firms might be that the banks might become more cautious in offering long term debts to highly leveraged firms.

against future fluctuations in the exchange rate. For more export oriented firms, since sales revenues are in foreign currency, there has not been a similar change. This change in the behavior of domestic market oriented firms should be interpreted as reinforcing the ongoing financial dollarization in the economy.

- Liquidity Preference: Although motivations mentioned differ across the firms, there has been an increase in the share of short term liquid assets to total liquid assets. When asked about reasons, these firms expressed their concern about unforeseen changes in market conditions. Crisis and high volatility experienced by these firms change the liquidity preference of the firms in favor of more liquid and shorter term financial assets. Again the motivation is hedging and the observation is in accordance with a Keynesian liquidity preference.

- Non-operational Income: Liquidity preference and currency substitution have consequences for the composition of the income of these manufacturing firms: the share of non-operational income originating from exchange rate differentials and interest differentials has increased, especially at times when sales revenues are still sluggish. Turkish manufacturing firms had high levels of non-operational income even before the crisis in 2001. The main source of this income over the period before the crisis was the interest income earned from short term government papers offering very high interest rates. So the motivation then was higher returns that can be understood as a portfolio choice decision. However, a different motivation comes out of the interviews in the post crisis period. Right after the crisis, the primary goal of holding short term securities and foreign currency is to be able stay safe and liquid as a way to avoid losses on future commitments. Hence the motivation is hedging, not profit making. As suggested by the

literature on financialization in developed countries, non-financial corporations have been increasing their financial investments relative to their real investments. This reduces the internal funds available to fund real investment. Empirical testing of this hypothesis at the firm level requires the detailed sub-accounts of short term securities among which governments securities are reported on the balance sheets. These accounts are only available after 1994 and cannot be used for the empirical analysis in Chapter 7 of the dissertation. However, I use a measure of the market for government securities to represent the post liberalization macroeconomic environment and analyze its impact on firm level investment. From these findings the impact of this measure on investment can also be interpreted as the impact of financialization. Interview results suggest a negative effect.

-Trade (Commercial) Credit: The last observation regarding temporary changes after the crisis is the increased use of commercial credit for working capital. For the majority of the interviewees, this took the form of extended maturity terms of the contracts between firms and their suppliers. Obviously, the need to do so originates from cash flow problems of the firms. This trend has been less prevalent in the more competitive industries such as textiles but commonly observed in industries dominated by oligopolistic firms such as iron and steel and cement products. It can be inferred that a close firm-supplier relationship that allows the use of trade credit is more easily achieved in a more concentrated market structure.

ii. Permanent Responses to Post Crisis Uncertainties

-Reorientation into Export Markets: Nearly all of the firms mention a reorientation to export markets away from domestic markets, both for more stable

demand and to eliminate currency mismatches between inputs and outputs. Hence by the date of the interviews, 91% of the firms had more than 10% of their sales income from exports. Having faced a big crisis and decline in domestic demand, firms note that export orientation provides them with an ability to earn revenues in foreign currency. Given the financial dollarization of the debt commitments of these firms, firm conceive of export orientation as a way of avoiding defaulting on their debt commitments due to volatility in their earnings from domestic product markets.

To the extent that this new export orientation would be accompanied by productivity enhancing investments, the outcome might be seen as a positive development for capital accumulation in Turkish economy. However there is a point of caution to note here. The main exports of the Turkish economy have been low-value added products, such as textiles, mostly exploiting low labor costs within the vicinity of European product markets. It is still too early to conclude whether the new post-crisis export orientation of manufacturing firms will be any different from this previous pattern.

-Changes in Inventory Management: With the exception of three firms, 30 firms reported an overall reduction in inventories after the crisis. They also mentioned an intentional move towards a Just-in-Time inventory management for both inputs and outputs, while sectoral differences impose limitations on such transformation. For example, in iron and steel and other primary metals, inventories cannot be completely eliminated due to the continuous nature of the production process. Another important factor contributing to this change is the trend of declining inflation in the post crisis period. Interestingly, after over 25 years of high inflation, thanks to their oligopolistic

power in product markets Turkish manufacturing firms were able increase product prices in line with inflation and benefited from high levels of inventories piled up at lower prices in previous periods. Since this channel of making profits from high inventories ceases to exist with lower inflation rates, these firms have to adopt more economically efficient ways of inventory management.

4.4.8 Hedging and Risk Management

This section was not initially a part of the interview design. However, from the first interview on, the issue of risk management recurred.

As of 2004, formal hedging instruments were not commonly used by manufacturing firms. Forward options are available through banks, but the institutional structure was not yet legalized. Those firms which use forward options are generally affiliated with banks or foreign companies.

Only one firm out of 33 had a "risk management" department and it was a subsidiary of a large MNC. It is the only firm that uses explicit Net Present Value calculations in making investment decisions. It is also the only one that engages in daily options transactions in international financial markets.

4.5. Potential Problems of the Research

Before summarizing my conclusions from this field research, it is important to note potential problems in the research:

There is the problem of survival bias in sample selection. Some firms that were adversely affected by the crisis had to shut down because they did not have sufficient

resources to endure and cope with shocks and volatility. Hence all firms interviewed are by definition stronger than those that failed. As mentioned in the section on firm demographics, they are mostly medium and large size firms. Although this sample is not representative of all manufacturing in Turkish economy, as can be seen from Table 8 the distribution of interviewed firms and those in the data set that is used in the later chapters in this dissertation matches very closely. Interview results suggest that uncertainty has a negative impact on investment in particular and on the firm performance in general. Obviously the crisis in 2001 was the peak of uncertainty these firms faced. The negative impact suggested should have been greater among those firms that could not endure the shock of crises. Therefore for the purposes of this study, sample bias strengthens the validity of my results.

The second problem is the time horizon that interviews attempted to cover: Some CFOs interviewed were not with the firm before the crisis (five out of 33 CFOs), hence they relied on second-hand observations in their responses to questions about the pre-crisis years. However, I do not expect this problem to cause any systematic bias in the sample.

The third problem originates from a potential tendency of the managers to look for the sources of problems outside of their own control. This might cause an overemphasis on the importance of aggregate conditions in their decision making process. However, given the well documented macroeconomic instability in the Turkish economy, the overall impact of this bias should be small.

4.6. What Do the Surveys Tell us About an Appropriate Investment Function for Turkey?

Neoclassical investment theory, as exemplified by Jorgenson's model and Tobin's q theory, relies on the assumption that long term capital goods have perfect or near perfect resale markets and that assumption, in turn, makes real investment liquid and riskless. When real investment is reversible, financial commitments associated with it become reversible as well. In neoclassical theory there is no "legacy of the past [debt] contracts." (Minsky, 1982, p.63)

However, interview results show that managers of these firms act as risk-averse agents in their investment decisions. They are aware that serious mistakes can be costly and their attitude about risk is characterized by their desire to avoid these costs. This risk aversion follows from the fact that both investment and associated financial commitments in future are irreversible. That is why the hurdle rate they follow is highly sensitive to changes in expectations, as well as the degree of confidence management placed on them. The neoclassical assumptions of the reversibility of investment and risk neutral behavior of managers are in contradiction with survey results.

While the neoclassical Modigliani-Miller theorem claimed that the sources of finance are irrelevant to investment decisions, I find evidence that internal funds are an important determinant of investment. The interpretation of this reliance on internal funds is the source of a dispute between Post Keynesian and New Keynesian investment theories. The former poses the issue as a 'demand side' constraint imposed by the risk averse managers who would like to avoid future debt commitments to credit markets because of fundamental uncertainty of the future. Post Keynesian perspective also

emphasizes that risk aversion is a characteristic of the periods of downturns in the economy, while agents might act as risk loving during the boom periods. On the other hand, the New Keynesian perspective points to the information asymmetries in the credit markets and interprets this positive link as a 'supply side' constraint imposed by creditors.

Interview results show that constructing *a priori* firm categories to identify differences in credit constraint due to information asymmetries can lead to contradictory outcomes. Larger firms that are expected to be less constrained in credit markets might rely more on internal funds, while smaller firms that are expected to be more constrained might be forced to use external funds or a combination of both. However, those that are forced to use external funds do not report any problem in borrowing. With a different corporate ownership structure, such as group affiliation, this trend might be reversed. Firms with group affiliation might rely more on external funds in the form of credit compared to the firms without group affiliation. These findings lead us to the conclusion that the use of internal funds cannot be seen as a sign of financing constraint caused by information asymmetries as suggested by the New Keynesian literature. Rather, preference for internal funds is likely to be caused by Keynesian motives as firms themselves avoid debt to reduce risk. Given that the use of internal funds is not a sign of information asymmetries, then there is no reason to expect that a change in the use of internal funds can tell us anything about the functioning of credit markets or the elimination of information asymmetries.

In Chapter 7 of this dissertation, I will test differences in cash flow sensitivities across firm categories of size and group affiliation. I expect that large firms will have a

higher sensitivity of investment to internal funds than smaller firms, while firms with group affiliation will rely less on internal funds than independent firms

Demand conditions and a desire for greater market share are the most important determinants of investment decisions. As in the accelerator theory of investment, current trends in sales are considered by firms as very helpful information in forecasting the future prospects of an investment project. This finding also confirms a Post Keynesian perspective of firm behavior: firms aim to increase their market share to gain power and invest accordingly by considering extrapolated demand conditions as an important indicator of future revenue streams. The contrast with neoclassical theory is striking. Interview results show that firms treat future demand as an unknown to forecast carefully, while in Jorgensonian neoclassical theory, output (not demand) is derived via a production function based on the labor and capital employed. In this framework, investment is determined by the marginal products of capital and output; supply creates its own demand.

Interview results suggest that there may be differences in the sensitivity of investment to the demand variable between export-oriented firms and firms with domestic market orientation. Changes in international demand generally force exporter firms to invest in new technologies and production processes to be able to produce differentiated products.[105] I therefore expect the sensitivity of investment to sales to be

[105] Although I cannot test the hypothesis with data on international sales in particular, given the high share of exports in total sales for those firms categorized as exporter, the hypothesis can also be posed as a link between investment and total sales.

higher for these export-oriented firms than for firms which sell mostly in domestic markets.

The most important impediment to investment emerges as uncertainty which is faced by all firms regardless of demographics. The cost of financing is secondary in importance and is experienced as an obstacle to investment only by certain firms.[106] This finding provides evidence that 'cost of credit' problems are not experienced by 'all' firms as suggested by the New Keynesian theory of information asymmetries.[107]

Interview results also emphasize the role of 'confidence' in expectation formation, a variable missing from mainstream theories. Respondents note that high volatility in key macroeconomic variables implies the potential for unexpected outcomes. Unexpected outcomes induce a decline in management's confidence in the validity of the forecasting process. The moments in which outcomes become the least predictable are the times the macroeconomic instability is at peak, i.e. crises. When the volatility is extreme, as in the case of 2001 crisis, then firms find themselves in a 'crisis of confidence' where the belief that the future will look like the past extrapolated breaks down. Extreme volatility causes not only a decline in confidence but also shorter time horizons for investment planning.

Interviews also suggest that there might be differences across firms in terms of the negative impact of uncertainty on investment. Due to the currency mismatches and associated fragility in their balance sheets, firms with domestic market orientation might

[106] The availability of credit is not ranked as a serious problem.

have a higher sensitivity of investment to the negative impact of uncertainty compared to those firms with high export orientation.

Regarding the impact of financial developments on firm level investment, interview results show that firms hold a portion of their short term assets in government securities and non-operational income from these short term securities. This potentially reduces the funds available for investment and might depress real investments. To capture this impact empirically, in chapter 7 of the dissertation I use a measure of government securities as a proxy for liberalization and analyze its impact on firm level investment.

Given these findings, I conclude that demand conditions, uncertainty, and internal funds play important roles in the determination of investment. The roles of these variables are expected to change across different firm categories. Consequently, with those variables chosen, the investment function developed in Chapter 5 is similar to accelerator models that emphasize demand conditions and Post-Keynesian models that focus on expected demand, uncertainty and the role of internal funds across different firm categories.

[107] In New Keynesian literature, information asymmetries are inherent to capital markets and faced by all firms that need to borrow capital. However, the intensity of constraints varies across firms.

CHAPTER 5

INVESTMENT MODEL AND HYPOTHESES ON LIBERALIZATION

While the investment theory literature varies regarding the assessment of the determinants of investment, the evidence provided by my fieldwork directs me to focus on three key variables: demand, internal funds, and uncertainty. In this chapter I first build a theoretical framework that links these variables with investment. Then I present an empirical specification of the model and develop hypotheses about the impact of financial liberalization on investment.

5.1 An Investment Model

All theories of investment recognize that businesses invest with the intention of making profits in the future. Depending on the perspective of each theory, various real or financial variables tend to be used to capture future profit opportunities. In the work that follows, I propose an investment model that relies on the findings of the interviews as presented in Chapter 4.

Investment is the change in capital stock during a given period. Consequently, unlike capital, investment is a flow term and not a stock term. The investment flow in period t (I_t) can be calculated in real terms as the difference between the capital stock at the end of the period and the capital stock at the beginning of the period.

$$I_t = \Delta K_t = K_t - K_{t-1} + \delta K_{t-1} = K_t - (1-\delta) K_{t-1}$$

where K_t is the capital stock at the end of period t and K_{t-1} is the stock of capital at the end of period t-1 (and thus at the beginning of period t), and δ is the physical

depreciation rate of capital. In the expression above I_t is a net measure of investment, as replacement capital is excluded from the capital stock.

Because capital goods are a factor of production, the demand for new capital goods, i.e. net investment, depends on firms' plans for expanding production in the future to capture profit opportunities. Interview results have shown that demand conditions and growth of market share are the most important determinants of the investment decisions made by Turkish manufacturing firms. Assuming that the degree of capacity utilization is currently at an optimum level[108] as in the flexible accelerator theory of investment, as expected demand increases, *ceteris paribus,* firms invest more.

$$\partial I / \partial S^e > 0$$

where S^e is the expected demand.

The question that emerges from this formulation is how to forecast future demand conditions under fundamental uncertainty. As explained in the section on accelerator models, businesses estimate their potential need for capital from the recent course of output. Lags of past output are included in investment specifications to represent future demand expectations based on an adaptive expectation formation process. The interview results presented in Chapter 4 showed that firms consider current trends in sales to be very helpful information for forecasting the future demand. Therefore I use the current course of output as the proxy for expected demand.

[108] See Chenery (1952) for an example of optimal degree of capacity utilization assumption. The assumption is necessary in order to propose a link between the changes in future demand and the current capital stock. If the capacity utilization is very far from the desired level, an increase in future demand might not induce a change in the current demand for capital. However, under this assumption, there would be fluctuations of capacity utilization during recessions and crises.

However I do not expect a simple positive link between current and future demand. In Keynes' theory of conventional expectation formation, the belief that the future will look like the relevant past extrapolated is intertwined with reliability of this belief. The emphasis is placed on the confidence with which firms make these forecasts of future demand. In Crotty's words (1993), "no rational management would undertake a large, risky investment project on the basis of an optimistic forecast in which it had little faith." Hence, while the current course of demand is important in forming future demand forecasts, the confidence of decision makers play an additional role in this process.

Confidence is determined by the adequacy of extrapolative forecasts in the relevant past. When the realized outcomes in the relevant past diverge widely from expected forecast, firms lose their sense of confidence in the meaningfulness of their forecasts. Unexpected outcomes induce not only a change in forecast values, but also a decline in the level of confidence, while the outcomes confirming expectations might raise confidence in the validity of forecasts.

In support of this Keynesian understanding of expectations formation, interview results show that manufacturing firms in the Turkish economy report uncertainty in demand conditions as the most crucial source among all other sources of uncertainty. Frequent economic crises and extreme volatility in demand conditions result in sudden swings in sales and induce a decline in the confidence managers place on their forecasts. With high volatility in demand conditions, future projections of investment become unreliable, forcing risk averse managers to expect higher hurdle rates from investment projects to be realized. In an attempt to avoid large capital losses due to long term

investment commitments, the liquidity preference of these managers leads to the adoption of shorter time horizons for investment planning. As volatility of sales increases, the confidence of the managers in the validity of their own forecast declines. As the degree of confidence declines, *ceteris paribus,* lower investment follows.[109]

$$\partial I / \partial V < 0$$

where V is the volatility of sales.

Since confidence is a behavioral variable, the negative relationship between confidence and volatility is a complex one. At very high levels of volatility, we may observe a point of structural change in this negative relationship whereby the confidence collapses bringing investment with it. Interview results suggest that the moments of crises are perceived as the 'crisis of confidence' that might induce a structural break in the way investment decisions are made. Due to this nonlinearity in the confidence-volatility relationship, nonlinear negative relationship would be observed between investment and volatility over high levels of the latter. In other words, very high levels of volatility, as in the case of the Turkish economy under liberalization, might lead to a greater negative response of investment to volatility and ($\partial I / \partial V$) assumes a greater negative number

Another important determinant of investment is internal funds as a source of financing investment. Interview results show that internal funds and bank credit are the

[109] It should be noted that a rise in observed volatility does not necessarily imply that a lower expected demand forecast follows. The change in the expected demand forecast might be mean-preserving. The link through the degree of confidence as described here provides a behavioral explanation based on managerial perception of the forecast, rather than the forecast itself.

two main sources of investment finance for Turkish manufacturing firms. The stock market and the corporate bond market are not used by firms to raise investment capital at this point in time. There are two different ways of thinking about the importance of internal funds, either as a 'preference' or a 'constraint' as discussed in Post Keynesian and New Keynesian frameworks, respectively. Here, in line with the assumption of risk-averse managers, I assume that firms prefer internal funds to external funds for financing investment projects.[110] There are various characteristics of internal funds underlying this preference: internal funds are under the sole control of the firm itself and can be used to finance any project the firm wants to undertake. Further, they are not subject to external scrutiny by credit markets. The most important factor from the perspective of a risk-averse manager is that there is no future financial commitment attached to the use of internal funds.[111] Risk-averse management would like to avoid bankruptcy or insolvency at all costs, as these outcomes imply the loss of management autonomy and/or employment. As the amount of internal funds increases, *ceteris paribus,* investment increases.

$$\partial I / \partial IF > 0$$

[110] Preference for internal funds does not mean that external funds are not important or that not used. If internal funds are not sufficient, firms borrow to fund investment. However in the context of the Turkish economy, long term debt as reported in the balance sheets over the period of 1984-2003 cannot be taken as a reliable indicator due to a lack of inflation accounting. Debt figures on the balance sheets were not adjusted for inflation, despite the high and volatile inflation levels over the period.

[111] With more developed capital markets and governance structures, the use of internal funds might induce shareholder pressure, if used ineffectively. In extreme cases, the fear of takeover in capital markets might change the preference of managers away from internal funds.

where IF is the amount of internal funds.

Hence the investment equation can be written as

$I = (S^e, V, IF)$

In this framework, current investment is positively related to expected demand (S^e), proxied by the current course of sales. The volatility variable (V) measures the state of confidence in forecasts proxied by the volatility in sales ratio and it is negatively related to investment. Finally, investment is positively related to internal funds (IF) of the firm.

5.2 Empirical Specification of the Base Investment Model

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

$$(I/K)_{it} = \beta_0 + \beta_1(I/K)_{it-1} + \beta_2(S^e/K)_{it} + \beta_3(IF/K)_{it} + \beta_4 V_{it} + \alpha_t + \gamma_i + \eta_{it}$$

where β's are parameters, the *(i)* subscript denotes the firm, and the *(t)* subscript denotes the time period. Time (t) specific effects are denoted by α_t, cross-section (i) specific effects are denoted by γ_i, and η_{it} is a disturbance term.[112]

The regression variables are scaled by the beginning-of-period capital stock to correct for heteroscedasticity; a common practice in investment studies that use firm-level data.[113] The exception to this is the volatility variable (V_{it}).

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[112] The expected signs for the coefficients in the regression are summarized in Table 9.

[113] See Kuh (1963), Eisner (1960), Fazzari *et al.* (1988) and Carpenter, Fazzari and Petersen (1995) for earlier uses of the method.

In order to control for dynamic effects, I include the first lag of the investment-to-capital ratio $(I/K)_{it-1}$ in the regressions. The first lag of investment represents dynamic effects such as gestation lags and inertia. For example, 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.[114] The expected sign of this dynamic effect is positive.

As mentioned above, expected sales (S^e) are proxied by the current trajectory of output. In the chapter on estimation techniques, I explain that past and current sales values will be used as instrumental variables for (S^e). Since expected sales are an indicator of expected profitability of investment projects, I posit a positive relation between sales and investment. However, given that the capacity utilization may fluctuate over the business cycle, the size of the coefficient may be affected over the period under investigation.

Internal funds (IF) are proxied by cash and short term financial securities held by a firm. As noted in studies on firm level investment, internal funds may be correlated with current operating profits and may simply reflect future profitability. In order to control for this link between internal funds and future profitability, Love (2003) suggests a more parsimonious definition of internal funds, derived from the most liquid assets of the firm, as shown under the accounts of "cash and checks" and "marketable

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[114] See Kopcke and Brauman (2001) on the significance of this term in explaining investment.

securities" on the balance sheets. I use the same definition in the empirical specification and expect a positive relation between internal funds and investment.

There are various methods one might adopt to construct the volatility variable.[115] Naturally the method of construction influences what the variable is able to capture. In my analysis, the degree is of confidence is a variable of perception. The ideal approach to capture this would be to incorporate some direct measure of perception, generally from business surveys that are undertaken regularly over a long enough time period. This requires primary data collection at the firm level, which is expensive and difficult and no such information is available in the Turkish case. An increasingly common method in the empirical literature on uncertainty and investment is to estimate a statistical model of the process (such as ARCH/GARCH or ARIMA models) to determine the conditional variance of a series and use this as a proxy for uncertainty. The computation of the conditional variance via such models requires high frequency data which are not available in the case of Turkey. Moreover this approach assumes that there is some complex functional form that is always used by decision makers to generate outcomes, while in reality, the rules followed are revised with the help of conventions. This method assigns too much 'rationality' to decision makers to capture these conventions. The final 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. I adopt this method to construct a volatility measure. Since survey results suggest that the

[115] For a comprehensive review of these methods, see Carruth, Dickerson, Henley (2000).

uncertainty in demand conditions is the most visible and important source of uncertainty for firms, in terms of their future projections, I construct the volatility measure (V_{it}) as the coefficient of variation in the firm level sales-to-capital ratio. The standard deviation and the mean of the sales variable are computed every year by the lagged values of the sales ratio. However I do not use all available lags as the theory suggests that agents use data from only the 'relevant past' in their extrapolations. To construct a meaningful and relevant series of volatility, the past data should ideally be truncated right after a major crisis and/or the moment of 'regime shift'. However the period under investigation spans three major economic crises of the Turkish economy thus there is more than one candidate for the moment of truncation. This method of testing for different truncation points is appropriate for a balanced panel data set. Since the data to be used in the econometric analysis is an unbalanced data set, I prefer a standard method of truncation to be applied to all firms in the data set. Hence in time t, the coefficient of variation in the sales ratio is based on the series of lagged sales ratios dated t-6.

As this measure of volatility increases, the degree of confidence declines and lower investment follows. Hence I expect a negative relationship between volatility and investment.

The base model of investment will be estimated for all firms over the period of 1985-2003, as well as for different firm categories. Based on the findings of the field research as presented in Chapter 4, I expect the determinants of investment to differ in coefficients across firm categories.[116] The interview results suggest that investment by

[116] Refer to the conclusion of Chapter 4 for the explanations behind these firm level differences to be tested.

firms with higher export orientation may be more sensitive to the sales variable. Moreover firms with domestic market orientation may have a higher sensitivity of investment to uncertainty with respect to domestic demand compared to those firms with high export orientation. Size is another category to capture firm level differences in investment. I expect that large firms will have a higher sensitivity of investment to internal funds than smaller firms.

The last category is group affiliation. Interview results suggest that firms with group affiliation rely less on internal funds than independent firms. The data for group affiliation to be included in the data set are not publicly available.[117] As a result I use an approximation to identify these companies. Those groups that can provide the member firms with numerous resources including financing for investment as a substitute for internal funds are well-established and older *holding* companies that are owned by families or coalition of families. The member firms enjoy high market power as they have established their product market positions early on. Therefore I use firm longevity as a proxy to identify well established firms. The specifics of firm level categories are explained in Chapter 6. In Chapter 7, estimation results are disaggregated in order to see these differences across different groups.

[117] Although all shareholders with more than 10% ownership are listed in annual reports, some firms are owned by *holding* companies whose shares are not publicly traded. In this case I cannot tell whether the shareholder company is a *holding* company or not. In other cases, shareholder information contains only names of individuals. Since these are family controlled *holdings*, I again cannot tell whether the reported individual is also among the owners of a *holding* company or not.

5.3 Hypotheses on the Impact of Liberalization on Investment

As explained in Chapter 2, in New Keynesian literature of financing constraints, the availability of credit is the main channel through which financial liberalization policies are expected to have an impact on firm level investment. The experiences of developing countries suggest ways in which liberalization policies may cause heightened economic volatility and instability. As shown in Chapter 3, the Turkish case is not exceptional in terms of heightened instabilities and crises. While there has been no evidence of credit expansion for productive investment at the macro level, financial deepening has taken place in two forms: expansion of the market for government securities and financial dollarization. I will focus on these two forms in constructing a financial liberalization variable (FIN) to proxy the post liberalization environment.

As shown in Table 3, one of the common methods to proxy for liberalization is to employ a year dummy. This method is not suitable for the Turkish case in which reform policies were implemented gradually over a decade. Instead I choose an aggregate indicator to represent the macroeconomic environment of the post-liberalization period in which firms make investment decisions. Conventional indicators of depth as reported in Table 6 are used as proxies for the FIN variable. Among all indicators, I particularly focus on four variables: the financial securities-to-GNP ratio, the government-securities-to-GDP ratio, the M2Y-to-GNP ratio and the ratio of foreign exchange deposits of the banking system. The first two of the four variables represent deepening in the market for financial securities. The last variable is representative of dollarization of the economy, while M2Y-to-GNP accounts for both securitization and

dollarization. These two aspects effectively illustrate the particular form of the Turkish experience as mentioned above.

I use this macro indicator of liberalization (FIN) to test the hypotheses about the impact of post liberalization environment on firm level investment by estimating the following specification.

$$(I/K)_{it} = \beta_0 + \beta_1(I/K)_{it-1} + \beta_2(S^e/K)_{it} + \beta_3(IF/K)_{it} + \beta_4 V_{it} + \beta_5(FIN_t)(IF/K)_{it} + \beta_6(FIN_t)V_{it} + \beta_7(FIN_t) + \alpha_t + \gamma_i + \eta_{it}$$

where β's are parameters, the *(i)* subscript denotes the firm, and the *(t)* subscript denotes the time period. Time (t) specific effects are denoted by α_t, cross-section (i) specific effects are denoted by γ_i, and η_{it} is a disturbance term.[118]

The financial liberalization (FIN_t) variable is included in the regression to represent and capture the impact of the macroeconomic environment in which firms make investment decisions. Financial liberalization might affect investment negatively mainly through two channels. The first channel works through level effects, such as overvalued exchange rates and very high real interest rates prevailing in the economy following liberalization. Distortions in these key economic indicators create incentives for agents to channel funds into non-productive or speculative areas, resulting in crowding out of real investment. Secondly, financial liberalization is followed by a series of shocks to the economy that dramatically increases uncertainty which further reduces investment. These shocks create an extremely volatile environment in which agents' sensitivity to shocks and volatility changes. While the former channel is

[118] The expected signs for the coefficients in the regression are summarized in Table 9.

represented by the coefficient of liberalization above, the latter is reflected in the coefficient of interaction between liberalization and volatility.

Given my discussion of the post liberalization environment in the Turkish economy, the coefficient of the financial liberalization variable (β_7) is expected to be negative. When the government securities or financial securities ratios are used as proxies for FIN, they mainly represent the expansion in government securities. In this case a negative coefficient of FIN should indicate the possible crowding out of private investment. When the foreign exchange deposit ratio is used as a proxy for FIN, a negative sign can point to the impact of financial dollarization on investment. There is no available data for firms' holding of demand deposits with banks or the denomination of the deposits they hold. The Central Bank study mentioned above (Kaplan, Ozmen and Yalcin 2006) mentions that over the 1990s, an increased share of short term financial securities was held in foreign currency to hedge against currency risk in a highly unstable macroeconomic environment. Yet it should be noted that none of these explanations can be proven with certainty at the firm level with the current data set. Further inquiry requires data on the holdings of government securities and the currency composition of debt at the firm level. None of these series are available in the firm level data set for the whole period under investigation. Nevertheless, contrary to the predictions by the advocates of liberalization, a negative sign for the coefficient (β_7) does indicate a detrimental affect of post liberalization environment on firm investment.

Changes in two determinants of investment in this macroeconomic environment are of particular interest to our discussion: the internal funds and volatility variables, respectively. By including interaction terms for internal funds and volatility with the

FIN variable, I test whether the effect of these two determinants of investment change with financial liberalization.

For internal funds, the coefficient of interest is β_5. Contrary to the prediction of the financing constraint literature, there is no *a priori* reason to expect that financial liberalization and deepening would reduce information asymmetries in financial markets. Therefore, I would not interpret any change in the sensitivity of internal funds as a sign that asymmetries have been reduced, but as the impact of moving from the system of financial allocation that prevailed before the 1990s to another. Given my interview results and the fact that there was no increase in bank loans to the private sector and thus investment, I do not expect to find any decline in the importance of internal funds following financial liberalization.

Regarding the interaction term of volatility and financial liberalization, the coefficient of interest is β_6. Ideally, one might expect that financial deepening would provide non-financial firms with the opportunities and instruments to hedge themselves against risk. Mainstream theories that assumed that deepening would make options and other hedging instruments accessible to firms both domestically and internationally might also expect that the impact of volatility on investment behavior would be lessened with the deepening of financial markets.[119]

[119] Interviews with firms suggest that formal hedging instruments that could have eased the impact of volatility are not commonly used by Turkish manufacturing firms even at the time of interviews. By 2003, forward options were available through the banking system, but the institutional structure was not yet legalized. 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 their contracts due to apparent loopholes in the legal framework. Even a decade after these instruments were introduced to the Turkish financial system, manufacturing firms were still reluctant to use them despite a highly volatile environment.

There are two separate issues involved in understanding a changing volatility-investment relationship under liberalization. First is the issue of whether financial liberalization is linked with higher volatility. My review showed that as financial liberalization proceeded, the Turkish economy suffered from higher instability. This macro level stylized fact is supported by a positive correlation between the firm level volatility measure I constructed and financial deepening indicators with the exception of the bank credit ratio. Panels in Figure 12 show simple linear fits of annual median firm-level volatility on various indicators of financial deepening over the 1987-2003 period. With one exception, all panels indicate that there exists a positive correlation between the volatility measure and all measures of financial deepening. The negative correlation between the bank credit-to-public ratio and the median volatility is the other side of the same coin. My discussion of the role of government securities in Chapter 3 showed that the high returns on government securities created incentives to hold government securities for the banking system instead of lending to the public as funding for investment. Over the period under liberalization the credit ratio slightly declined, while volatility increased.[120] In conclusion, these simple linear fits tell us that firm level volatility increases as financial deepening takes place.

The second question is whether financial liberalization is linked with higher negative sensitivity of investment to volatility due to nonlinearities in investment-volatility relationship as explained above. Given that financial liberalization is

[120] Cimenoglu and Yenturk (2005) find evidence that changes in private sector investment in Turkey expenditures are positively related to the changes in the amount of bank credit that is extended to the private sector. However due to the abovementioned behavior of the banking sector, the credit expansion has not taken place.

associated with higher levels of volatility, it can cause a structural break in investment volatility relationship due to a collapse in confidence of managers. The coefficient of interaction term (β_6) provides an answer to the question. I suggest that as volatility reaches very high levels under financial liberalization there occurs a break in the way investment responds to volatility. After a threshold level, managers might perceive volatility as 'extremely high' and the sensitivity of investment to volatility might become even greater. In other words, I suggest that there might be nonlinearities between volatility and investment.[121]

This issue of a nonlinear relationship between uncertainty and investment is theoretically suggested in some recent studies, although with a different nonlinear form than I assumed above. These studies propose that investment-uncertainty relationship may follow an inverted U curve: for low levels of uncertainty the relationship is positive, while for high levels of uncertainty the effect becomes negative.[122] The relationship I suggest here is a negative one over the domain of all levels of uncertainty. For high levels of uncertainty negative relationship displays a steeper slope. In other words, investment-uncertainty relationship can be represented by a downward slopping curve concave to the origin.

Given the particular experience of the Turkish economy with several crises and heightened volatility especially after the opening of the capital account, I anticipate that

[121] In future research I will consider testing for this nonlinearity by introducing a quadratic volatility variable into the investment specification.

[122] Abel and Eberly (1999) provide the main theoretical reference suggesting an inverted U shaped relationship between investment and uncertainty. Bo and Lensin (2005) empirically confirm this nonlinearity for a panel of Dutch non-financial firms.

the negative impact of uncertainty on firm-level investment has not been reduced, but rather has become more acute under financial liberalization. My anticipation would be supported by a negative sign for the coefficient of $\beta_{6.}$[123]

As with the base investment model, I suggest that different types of firms might be affected by the financial deepening process differently. To identify these firm level differences, the investment specification will be estimated for all firms over 1985-2003, as well as for different firm categories.

[123] Since my argument here is intertwined with the impact of financial liberalization on investment, it does not by itself, provide a test of the shape of nonlinearities per se. The ideal method to test for the shape of uncertainty-investment relationship would require introducing nonlinear (quadratic) variables of uncertainty into the regression without the proxies for financial liberalization. However the negative sign for the coefficient β_6 does provide support for my argument that the negative impact becomes worse with liberalization due to nonlinearities in the relationship between investment and volatility.

CHAPTER 6

DATA SET AND VARIABLES

In chapter 5, I developed a theoretical framework to empirically analyze the implication of financial liberalization on the investment behavior of manufacturing firms in the Turkish economy. Using this model, I will test my hypotheses on the impact of liberalization in investment with a firm level data set. In this chapter, I explain the construction of the novel data set used in the statistical analysis. The definitions of variables and descriptive statistics are also presented.

6.1 Data Set

The data set used in this study is a firm-level unbalanced panel data set constructed from the balance sheets and income statements of 165 manufacturing firms in Turkey for the period 1985-2003. The construction of an original data set is one of the essential contributions of this dissertation, given our interest in the impact of the financial deepening process that was initiated in the mid-1980s on firm level investment. The widely used Worldscope database could not be used for the purposes of this study, since it provides observations on only 23 firms in Turkey, beginning from the early 1990's.

I collected firm-level information from the publications of 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 the 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 the financial statements from the ISE data set report more disaggregated accounts, the ones from the CMB have fewer details; I merge certain accounts into one, in line with the accounting practices followed in CMB publications.

6.2 Coverage

Because of the dynamic structure of investment models only those firms with continuous coverage for at least five years after the initial year are included. 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.

The data set only includes manufacturing firms, because physical capital accumulation is the focus of this study and because financial and insurance firms are subject to different accounting standards. The exclusion of diverse sectors such as commerce and agriculture has helped keeping the firm heterogeneity in the sample under control.

Only 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 the country’s long-term development plans, their financing and investment decisions are not necessarily expected to follow the models of their private competitors.

6.3 Construction of Variables:

Capital Stock (K): Capital stock is calculated as the item "Tangible Fixed Assets" on the balance sheets, which includes accumulated depreciation. Specifically, it is the sum of machinery, plants, equipment, buildings, land, property, other tangible assets, and construction-in-progress. Inventories are reported separately and not included in the calculations. Under the Turkish accounting rules, tangible fixed assets are recorded at historical cost and revalued at the end of every fiscal year according to the revaluation rates announced by the Ministry of Finance. The item "land' is an exception to this revaluation rule. Until quite recently, land account was not revalued, stayed at historical cost. Since there is no detailed data on 'land' before 1994, it is not possible to exclude land from the calculation of capital stock.

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

Sales (S): The item "net sales," net of "sales deductions."

Internal Funds (IF): This is a 'cash stock' variable, similar to the one used by Love (2003). It is the sum of "cash" and "marketable securities" under "Current Assets."

Volatility (V): The coefficient of variation in sales ratio, i.e. the mean adjusted standard deviation based on available lags of sales ratio, not to exceed t-6.

After constructing these variables from accounting reports, I use a Private Manufacturing Industry Wholesale Price Index to express all values in 1984 prices.[124] These real values are used in constructing regression variables. In regressions all variables, except volatility, are adjusted by the beginning-of-period capital stock.

Macro Variables (FIN): The four proxies of financial liberalization are the following financial depth indicators:

The financial securities-to-GNP ratio

The government-securities-to-GNP ratio

The M2Y-to-GNP ratio[125]

The foreign exchange deposits of banking system-to-GNP ratio

The source for all these macro variables is "Economic and Social Indicators, 1950-2004" published by the State Planning Organization (SPO) of Turkey. Table 10 presents the descriptive statistics for all macro variables used in regression analysis.

6.4 Treatment of Outliers:

Firms with missing values or zero for sales, cash and securities, tangible fixed assets or assets are excluded. This exclusion criterion is comparable to those followed by Laeven (2002) and Love (2003). However, I differ from these studies in that I do not delete all observations of negative or zero investment. Since I already controlled for

[124] Alternative indices have been tried in the analysis and it can be concluded that results do not depend on the choice of price index, probably because of the use of ratios in regression specifications.

[125] M2Y includes currency in circulation + demand and time deposits + foreign exchange deposits of the banking system.

mergers and acquisitions in the sample, negative or zero investment values should simply be accepted as sign of poor investment performance. Instead, I delete 1% on each side of the distribution of the investment ratio.[126] I do not impose similar deletion criteria to other variables that will be used in regressions. This would have caused the exclusion of too many variables and firms leading to small number of observations.

Table 11 lays out the descriptive statistics for regression variables after omissions are completed.

6.5 Firm Categories:

Size: Size is a time-invariant identifier for firms, based on net sales in 1999. It follows the definitions given in the Sectoral Balance Sheets published by Central Bank of Turkey. 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, the most common classification is a self-referential method based on the mean or the median of sales variable in the sample. However my sample is not randomly selected. It is possible that over time, smaller firms enter the sample by selling shares in the stock exchange. This pulls the median size levels down, causing categorization of more firms as "large", without any substantial change in the size of manufacturing firms in the overall economy. Hence I prefer this method to reflect the size of the firms in the overall economy.

[126] This corresponds to the exclusion of 42 observations out of 2047.

Export Orientation: Export orientation is a time-invariant identifier for firms, based on the ratio of firms' foreign sales to their total sales. 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 firms' web-sites. The median and the mean of the age of firms in the sample are both 31. Firms that are younger than 31 are classified as young, while those which are older are considered as established firms.

6.6 Potential Problems:

The main problem in the construction of data set is the absence of Generally Accepted Accounting Principles in line with international standards. Only after the establishment of Capital Markets Board (CMB) as a part of reform policies in 1983, did large private enterprises begin to report their financial statements in accordance with "International Accounting Standards." Since this date, CMB has been the main authority to issue accounting standards for all companies subject to its authority. The first set of financial accounting standards for the publicly owned and/or traded companies was developed by the CMB in 1989. Hence the first 5 years of coverage in the data set comes from balance sheets that were disclosed before the implementation of law in 1989.

The lack of full inflation accounting in Turkey is likely to cause some measurement error in the variables.[127] Although the country has been a highly inflationary environment, inflation adjusted accounting techniques are yet to be implemented. For instance, the fact that the figures for land were not revalued should introduce measurement error into the calculation of capital stock.[128] Moreover 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 rates used for this purpose might not closely follow the relevant inflation rate.[129] However these issues are common to research using firm level accounting data from developing countries.

Another 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 from the time they enter until the end of 2003 generates a survival bias. On

[127] Inflation accounting was introduced after 2003; hence the data set used in this study is constructed from the balance sheets based on the previous system.

[128] Since there is no data on purchases or sales of land figures, I am not able calculate an estimate of this measurement error. Changes in the 'land' account that is available after 1994 can be due to purchases, sales, or voluntary revaluations by the firm. However it should be noted that there has not been a real estate boom in the Turkish economy, as in the case of some other developing countries. Land owned by these manufacturing firms is mainly held for the purposes of facilitating their operations and does not serve speculative purposes. Given this context, the resulting bias should not be substantial.

[129] 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 specific price indices for each item listed under the tangible fixed assets. However, these prices indices are not available for the Turkish economy.

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.

CHAPTER 7

ESTIMATION TECHNIQUES AND REGRESSION RESULTS

In chapter 5, I developed a theoretical framework to empirically analyze the impacts of the financial liberalization and deepening process on the private manufacturing investment in the Turkish economy. In this theoretical framework internal funds and sales variables positively determine investment, while the volatility of sales has a negative impact. I expect the responsiveness of investment to these determinants to vary across different firm categories for the reasons discussed in chapter 4 on field research and chapter 5 on the model. Specifically, the investment of firms with higher export orientation might be more sensitive to the sales variable. Firms with domestic market orientation might have a higher sensitivity of investment to the negative impact of uncertainty compared to those firms with high export orientation. Large firms might have a higher sensitivity of investment to internal funds than smaller firms. And finally well established firms with possible group affiliations might rely less on internal funds than younger firms with no network or group affiliation.

In the third section of Chapter 5, I developed the hypotheses that the financial liberalization and deepening process would not affect the sensitivity of investment to internal funds, but would increase the negative impact of volatility on investment. Differences in these changes across various firm categories will be explored, but no specific hypothesis is formulated as to how firms might differ.

In this chapter I test these hypotheses with firm level panel data. There are several reasons for using firm level data. Macroeconomic data, although useful in identifying general trends, fail to pick up the heterogeneity in firm behavior. As

mentioned in chapter 2, the relationship between uncertainty and investment should be captured with firm level data, as the biases due to aggregation might give spurious results (See Table 1 and 2). In addition, firm level analysis allows me to control for the impact of possible omitted firm specific factors. Finally there is a practical reason for not using the macroeconomic time series for the empirical testing. Financial variables such as internal funds can only be derived from balance sheets of individual firms to be aggregated in a 'flow of funds' framework. Such data set is not available for the Turkish economy.[130]

In the next section I discuss various estimation techniques to identify the one most suitable for estimating dynamic panel data equations. The second section presents the results from the base model of investment to asses the validity of the theoretical framework both for the sample of all firms and different form categories. Results confirm my theoretical framework and hypotheses on differences across firms as laid out in chapter 5. In the third section, I test the hypotheses on the impact of liberalization on investment through the channels of internal funds and volatility by using different indicators of financial deepening. Results in this section confirm that liberalization process did not lead to a change in the responsiveness of investment to internal funds, while it had negative affects on investment through the channel of volatility as well as other channels that are not captured in the framework of the base model of investment. I

[130] While consolidated balance sheets of non-financial firms are made available by the Central Bank of Turkey, the coverage of available data begins from 1994. Since one of the main goals of my analysis is to evaluate the changes in investment over time under the influence of financial liberalization and deepening which began in the early 1980s, the aggregated data cannot be used to test my hypotheses.

conclude by discussing the implications of these results both for the Turkish economy and other developing economies that have similar experiences under liberalization.

7.1 Estimation Technique:

An Ordinary Least Square (OLS) estimation of the econometric specifications laid out in chapter 5 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 to substantial differences in investment behavior across firms. Endogeneity is expected; the error term may be correlated with the explanatory variables since they would all be affected by technology shocks.

Consider the following dynamic panel data model:

$$y_{it} = \alpha y_{it-1} + \beta x_{it} + u_{it}$$

where $u_{it} = \gamma_i + \eta_{it}$ and $E(\nu_{it} \mid x_{i0},\ldots, x_{it}, \gamma_i) = 0$

γ_i is an unobserved individual effect, such as firm specific factors. In this model, the existence of unobserved individual effect implies that y_{it-1} is an endogenous variable since it is correlated with γ_i. In this case the OLS estimator will be biased upwards.

To solve the estimation problem raised by the potential presence of unobserved firm specific effects, one can estimate the specific model in first differences, as in the case of the fixed effects estimation method. If I remove the unobserved individual effect by first differencing the equation above, I obtain:

$$\Delta y_{it} = \alpha \Delta y_{it-1} + \beta \Delta x_{it} + \Delta \eta_{it}$$

In this first-differenced model Δv_{it} is correlated with Δy_{it-1} by construction. Moreover, joint endogeneity of the explanatory variables might still be present. In these cases, adopting an OLS technique such as a fixed effects model would give us an estimator that is biased downwards (Bond 2002). Hence an instrumental variable technique is called for.

I utilize the Generalized Method of Moments (GMM) estimation technique, widely used in the empirical literature with dynamic panel data models.[131] After first-differencing the explanatory variables to eliminate unobservable firm effects, the GMM method uses the lagged values of these right-hand side variables as instruments.

Under the assumption that the error term η_{it} is not serially correlated and the explanatory variables are weakly exogenous (or predetermined as commonly referred in GMM literature), the following moment conditions apply to the lagged dependent variable and the set of explanatory variables:

$$E (\Delta y_{it-s} \Delta \eta_{it}) = 0 \qquad \text{for all} \qquad s \geq 2 \; ; \; t = 3,\ldots,T$$

$$E (\Delta x_{it-s} \Delta \eta_{it}) = 0 \qquad \text{for all} \qquad s \geq 2 \; ; \; t = 3,\ldots,T$$

so that $(\Delta y_{it-2} , \Delta y_{it-3} , \ldots, \Delta y_{i1})$ and $(\Delta x_{it-2} , \Delta x_{it-3} , \ldots, \Delta x_{i1})$ are valid instruments. The GMM estimator uses these moment conditions to estimate the parameters consistently and efficiently in two steps.[132]

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[131] For a more detailed discussion of GMM estimators for dynamic panel data models, refer to Hansen (1982), Arellano and Bond (1991) and Arellano and Bover (1995).

[132] Arellano and Bond (1991) show that under the above assumptions this 'difference estimator' is an efficient one. Results from step-one are consistent, although they rely on overly restrictive assumptions of homoskedasticity and lack of correlation over time. Hence robust standard errors that adjust for heteroskedasticity and autocorrelation should be obtained and used. The two-step estimator is efficient under more general conditions like heteroskedasticity.

To asses the validity of the assumptions that the GMM estimator is based, I consider two specification tests suggested by Arellano and Bond (1991). The first is a Sargan test for over-identifying restrictions, which is used to test the validity of instruments. It tests the null hypothesis of no correlation between the instruments and the residuals. Under the null, this test statistic has a χ^2_q distribution, with (q) equal to the number of instruments minus the number of parameters in the model.

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 the estimated regressions.[133] Under the null of no serial correlation, the test statistics are standard normally distributed.

I treat all of the firm specific explanatory variables on the right hand side as potentially endogenous. Hence lags dated from (t-2) and earlier are available to be used as instrumental variables. However as noted by Bond (2002) and Bowsher(2002), the power of the Sargan test to detect invalid over-identifying restrictions can decline in finite samples if an excessive number of moment conditions are used. Moreover, remote lags do not provide much additional information. Hence I use $2 \leq t \leq 4$ lagged values of right hand side variables as instruments. This choice is based on a comparison of Sargan test statistics from different estimations with different lag structure.[134] I use the same

[133] Blundell and Bond (1998) show that when the dependent variable and the explanatory variables are persistent over time, lagged levels of these variables are weak instruments for the regression equation in differences.

[134] I ran regressions with all possible dynamic lag structure and chose the one with the highest test value for Sargan, as the most suitable one.

dynamic lag structure for instruments of the lagged dependent variable. As noted by Bond (2002), the maintained endogenous variables should be treated symmetrically with the dependent variable.

In the regressions, I specify all macroeconomic proxies for financial liberalization (FIN) as strictly exogenous. Similarly, interaction terms between this macro measure and firm specific variables are treated as strictly exogenous. Hence, no instrumental variables are necessary for these variables. Instead I include the current levels of these variables in to the instrument set.

7.2 Results from the Base Model of Investment:

In this section I first present the regression results for the sample of all manufacturing firms to test various hypotheses on the determinants of investment and discuss the implications of these for various investment theories. Then I proceed with testing the hypotheses about different firm categories.

The following base model of investment is estimated:

$$(I/K)_{it} = \beta_0 + \beta_1 (I/K)_{it-1} + \beta_2 (S^e/K)_{it} + \beta_3 (IF/K)_{it} + \beta_4 V_{it} + \alpha_t + \gamma_i + \eta_{it}$$

Expected signs are the following: $\beta_1 > 0$, $\beta_2 > 0$, $\beta_3 > 0$, $\beta_4 < 0$

7.2.1 Sample of All Firms

The results of the regression analysis for the base model are presented in Table 12 for the sample of all firms. Time dummies and constant are included, but not reported. The first column presents results from an OLS fixed-effects model, to check for the robustness of the results to the estimation technique. All coefficients in the OLS

regression have the expected signs. Since the OLS results are biased downwards, I pursue the statistical inference on variables in the model based on the GMM results.

As presented in Table 12, the GMM regression passes the specification tests: the instruments are valid; and the correlation structure is as expected, with no second-order serial correlation. The coefficients of all variables of the base model have the expected signs and are statistically significant. To have a clear picture of the determinants of investment in this base model, in what follows I calculate the elasticities based on sample variation and regression results.

A statistically significant, positive dynamic component represented by the first lag of the investment-to-capital ratio is evidence of gestation lags and inertia in investment behavior. The coefficient for this dynamic effect is calculated as 0.141. As can be seen in Table 11, where descriptive statistics for firm specific variables are laid out, the investment-to-capital ratio has a standard deviation of 0.221.[135] If the lag of the investment ratio increases by 0.221 for a typical firm in the sample, the overall impact on the current investment ratio would be an increase of 0.032.[136] Given that the median level of investment for the overall sample is given in the same table as 0.168, this change would correspond to a 20% increase in the median ratio of investment. Hence one standard deviation increase in the lag investment ratio is associated with 20% increase in the current investment ratio for the sample of all firms.

[135] For all elasticity calculations presented here, I take the standard deviation within firms as the magnitude of initial change in the relevant explanatory variable.

[136] Given the estimate of 0.141 for the coefficient lag investment ratio, one standard deviation (0.237) increase in the lag investment ratio would be associated with (0.141)*(0.221)= (0.032) increase in the current investment ratio.

The coefficient of the sales variable, which is reflective of future demand conditions, has a statistically significant and positive effect on investment. The coefficient is calculated as 0.013 in the regression. As can be seen in Table 11, the sales-to-capital ratio has a standard deviation of 3.34. If the sales ratio increases by 3.34 for a typical firm in the sample, the overall impact on investment would be an increase of 0.043 in the investment ratio.[137] Given that the median level of investment for the overall sample is 0.168, this change corresponds to a 26% increase in the median ratio of investment. One standard deviation increase in the sales ratio is associated with 26% increase in the investment ratio for the sample of all firms. This result gives support to the accelerator and Keynesian investment theories that emphasize expected future demand conditions as an important determinant of investment. Neoclassical assumption of Say's Law does not have evidence at the firm level.

Contrary to the Modigliani-Miller Theorem on the irrelevance of finance, the positive and significant coefficient of internal funds provides evidence that the source of investment finance matters. The positive coefficient for internal funds supports the Post Keynesian argument that risk averse managers prefer internal funds rather than external funds as internal funds are cheaper and safer. The relevant coefficient is found as 0.175. As reported in Table 11, the internal funds ratio has a standard deviation of 0.303. If the internal funds ratio increases by 0.303 for a typical firm in the sample, the overall

[137]Given the estimate of 0.013 for the coefficient of sales ratio, one standard deviation (5.16) increase in the sales ratio would be associated with (0.013)*(3.34)= (0.043) increase in the investment ratio.

impact on investment would be an increase of 0.053 in the investment ratio.[138] Given that the median level of investment for the overall sample is 0.168, this change would correspond to a 32% increase in the median ratio of investment. One standard deviation increase in the internal funds ratio is associated with 32% increase in the investment ratio for sample of all firms. I interpret this large affect as a result of risk aversion, rather than financing constraints based on information asymmetries as suggested by New Keynesian theories. The empirical analysis of the reliance on internal funds across different firm categories in the next section will shed further light on this interpretation.

Finally I find statistically significant and negative coefficient for the volatility measure. This finding supports the key Keynesian insight on the role of uncertainty and confidence formation in investment decisions. As volatility increases, the state of confidence in the reliability of expectations of future profitability erodes and firms invest less. The negative coefficient of volatility is found as (-0.463) in the regression for all firms. Table 11 shows that the volatility variable has a standard deviation of 0.110. If the volatility measure increases by 0.110 for a typical firm in the sample, the overall impact on investment would be a decline of -0.051 in the investment ratio.[139] Given the median level of investment for the overall sample, this change would

[138]Given the estimate of 0.175 for the coefficient of internal funds ratio, one standard deviation (0.371) increase in the internal funds ratio would be associated with (0.175)*(0.303)= (0.053) increase in the investment ratio.

[139]Given the estimate of -0.463 for coefficient of volatility, one standard deviation (0.110) increase in volatility would be associated with (-0.463)*(0.110) = (-0.051) decline in the investment ratio.

correspond to a 30% decline in the median ratio of investment.[140] As argued and shown above in Figure 12 the volatility measure has a positive correlation with different indicators of financial deepening. Therefore this high negative impact of volatility on investment is likely to be linked with the process of financial liberalization.

Results on determinants of investment and respective elasticities are summarized in Table 13. Given the sample variation, the relative impact of internal funds on investment is the highest among all determinants of investment. Firms base their forecast of future demand on the current trends in sales, while their decisions are also influenced by the volatility of sales. On the whole these results are very supportive of the Post Keynesian framework laid out in Chapter 5 of the dissertation.

7.2.2. Firm Categories:

Based on the interviews results and the descriptive statistics, I posit four hypotheses on the investment behavior of different types of firms.

1. The investment of firms with higher export orientation might be more sensitive to the sales variable than that of firms with domestic market orientation.
2. Large firms might have a higher sensitivity of investment to internal funds than smaller firms.
3. Well established firms might rely less on internal funds than younger firms.

[140] If we compare this with a change over the mean investment ratio, which is 0.221 for the overall sample, we still get a 23% decline in the mean investment ratio as result of one standard deviation increase in volatility.

4. Firms with domestic market orientation might have a higher sensitivity of investment to the negative impact of uncertainty compared with those firms with high export orientation.

The same base model of investment is estimated for different firm categories.[141] All regressions are estimated by GMM and the results are presented in Table 14. All regressions pass the specification tests: the instruments are valid; and the correlation structure is as expected, with no second-order serial correlation. The coefficients of all variables of the base model have the expected signs for all firm categories and are statistically significant for most of them. However statistical significance is not always obtained at the 1% level of confidence as it was in the case of the regression for all firms. Small sample size for each firm category and heterogeneity within these categories based on other unobservable firm specific variables might be a potential problem of the analysis in this section. Hence I do not proceed with a similar elasticity calculation in this section, but interpret regression results with their sign and statistical significance only.

A positive dynamic component represented by the first lag of the investment-to-capital ratio is observed for all firm categories, while the coefficient is statistically significant only for large firms, exporter firms and well established firms. This positive impact is the highest for well-established firms, with a coefficient that is higher than the coefficient from the regression with all firms.

[141] Firm categories are explained in chapter 6.

The coefficient of the sales variable, which is reflective of future demand and profitability conditions, has a statistically significant and positive effect on investment for all firm categories. The first hypothesis stated above about the higher sales sensitivity of investment for exporters is supported by the regressions. It should be noted that the sales variable mainly reflects international sales for exporters, while it stands mostly for domestic sales for firms with domestic market orientation. The coefficient of sales for exporters is more than twice the size of that for firms selling in domestic markets. As suggested by interview results, firms with high export orientation generally sell slightly differentiated products of higher quality in export markets. Substantial change in international demand requires them to invest in new technologies and production processes to be able to produce differentiated products.

Among other firm types, the sensitivity of investment to sales for well-established firms is worth noting. It is likely that well-established firms are dominant firms with higher market shares in more oligopolistic markets. As suggested by the 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 markets, the investment of well-established firms might be more responsive to sales. On the other hand, they do not have to invest in cycle upturns as the necessary capacity has already been put in place.

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 second hypothesis stated above about the higher sensitivity of investment to

internal funds for large firms finds support in the regression results. Descriptive statistics show that large firms have a higher ratio of internal funds. One recent study by the Central Bank of Turkey (Kaplan, Ozmen and Yalcin 2006) shows that the holdings of financial assets that corresponds to the definition of internal funds I use, tends to increase with the firm size for manufacturing firms in Turkey. Accordingly the interview results suggest that smaller firms need to borrow more due to the insufficiency of internal funds. This finding contradicts the New Keynesian expectation that smaller firms should rely more on internal funds, as they are *a priori* identified as financially constrained. While they might not be constrained in credit markets, large firms prefer internal funds since they value their autonomy from financial markets. This interpretation reaffirms the assumption of risk aversive management, as suggested by the Post Keynesian investment theory.

The third hypothesis stated above concerns the investment-internal funds relationship for well-established firms. As expected, investment of well established firms is not sensitive to internal funds. As suggested by interview findings, the maturity of the firm can be a proxy for group affiliation and the reputation of the firm. It is quite likely that the size of investment projects for well-established firms is not constrained by the availability of internal funds, since these firms can easily borrow money and pursue their growth objective without worrying about their autonomy from financial markets. They can also rely on their network for funding investment. This finding is also supported by interviews results. A statistically significant and positive coefficient of internal funds for young firms can be explained following a similar reasoning: due to

lack of reputation and network, young firms might be constrained by the availability of finance.

The expected negative impact of volatility on investment is supported in the regressions for most firm categories. Specifically, the coefficient of volatility is negative for all firms and statistically significant for all firm categories, except for firms with a higher export orientation. The last hypothesis to be tested posits that firms with a domestic market orientation might have a higher sensitivity of investment to the negative impact of uncertainty compared to those firms with high export orientation. The hypothesis is supported by regression results, as the firms selling mainly in domestic markets have the highest negative sensitivity of investment to volatility. The interview results show that due to currency mismatches in their balance sheets, firms with very low export shares tend to have a fragile financial structure. These firms have no means of generating revenues in foreign currency; hence they are expected to be more vulnerable to sudden devaluations that accompany financial crises because of their highly dollarized liability structure. When firms face fluctuation in demand in domestic markets, those that can export can still sell their product and invest accordingly, as long as domestic market fluctuations are not correlated with demand in export markets. On the other hand firms that mostly sell in domestic markets are more prone to experience a negative impact from fluctuations in demand conditions.

Overall, all hypotheses derived from interview results are supported by the regression results from different firm categories. In the next section I test the hypotheses about the impact of liberalization on investment.

7.3 Results on Investment under Financial Liberalization:

While there seems to be broad consensus that economic volatility has increased drastically in the age of financial liberalization, the effect of heightened volatility on investment of liberalized economies has not received as much attention as the impact of liberalization policies per se. The case of the Turkish economy suggests that the process of financial deepening is linked with higher volatility and in return might have a negative impact on investment, while resulting in no benefits through the credit channel. In this section I test these hypotheses to asses the impact to liberalization on investment in the Turkish economy. However the experience of Turkey is not unique. In the last two decades after opening their capital accounts to international flows, many other developing countries were adversely affected by economic and financial crises, suffered from heightened instabilities and disruptive speculative financial activities.

As developed in chapter 5, I test three hypotheses to capture the impact of liberalization on investment:

1. Given the lack of improvement in the credit given to the public by the banking system, I do not expect any change in the sensitivity of investment to internal funds.
2. Because of the very high levels of volatility reached under financial liberalization I suggest that there might be nonlinearities in the volatility-investment relationship that might cause a greater negative impact of volatility on investment.
3. Due to “uncertainty induced liquidity preference” or speculative motives, there might be a direct negative impact of financial liberalization on investment.

The following specification is estimated to test these hypotheses

$$(I/K)_{it} = \beta_0 + \beta_1(I/K)_{it-1} + \beta_2(S^e/K)_{it} + \beta_3(IF/K)_{it} + \beta_4 V_{it} + \beta_5(FIN_t)(IF/K)_{it} +$$

$$\beta_6(FIN_t)V_{it} + \beta_7(FIN_t) + \alpha_t + \gamma_i + \eta_{it}$$

Expected signs are the following: $\beta_5 = 0$, $\beta_6 < 0$, $\beta_7 < 0$

7.3.1 Sample of All Firms:

The results of the regression analysis for the impact of financial liberalization on investment are presented in Table 15 for all firms.[142] All GMM regressions pass the specification tests: the instruments are valid; and the correlation structure is as expected with no second-order serial correlation.

The financial liberalization (FIN_t) variable that is included to capture the impact of the macroeconomic environment in which firms make investment decisions is proxied by different financial depth indicators. Column (1) presents the results for financial securities-to-GNP ratio; column (2) has the results of government securities-to-GNP ratio; column (3) has the results of M2Y-to-GNP ratio; column (4) has the results for foreign exchange deposits in banking system-to-GNP ratio. Various indicators point to different aspects of financial liberalization and deepening experience of the Turkish economy, as explained in the previous sections. These indicators and

[142] Although I do not report the results here, I also ran these regressions by adopting OLS fixed effect technique. All coefficients in the OLS fixed-effects regression are statistically significant and have the expected signs. This applies to the interaction variables between FIN and firm level variables. The main difference between OLS and GMM results is the coefficient for internal funds (IF): It is significantly positive in all OLS, but significant in GMM estimations only in column (1) and (2). The coefficient for interaction term $(FIN_t)(IF/K)_{it}$ does not have any statistical significance, while the coefficient for interaction term $(FIN_t)V_{it}$ has stronger statistical significance in all regressions with OLS.

corresponding interaction variables are treated as strictly exogenous in the GMM estimations.

In the first three columns of the regression results, FIN_t variable is negatively and significantly related to investment. The post liberalization macroeconomic environment as captured by expanding financial securities in general, and government securities in particular, as well as the monetization of the economy, has a negative impact on investment. The regression in the last column that uses the ratio of foreign exchange deposits-to-GNP to proxy for FIN_t gives a positive but statistically insignificant coefficient for FIN_t.[143] The first two measures that give a significant and negative coefficient are mainly the measures of deepening in securities markets. As discussed in chapter 5, this finding confirms the hypothesis that financial deepening taken place in the government securities market has crowded out manufacturing investment, possibly due to high real interest rates on government debt.[144] The negative and significant coefficient of FIN in the third column is smaller then those in the first two columns indicating that negative relationship is likely to be higher with financial securities than with the broad monetary aggregate M2Y.

[143] This result also calls for further investigation of the currency composition of nonfinancial firms' assets and liabilities and the role of exchange rate and currency risk in investment behavior. However this is a task that cannot be undertaken for the period under study in this dissertation, as data on currency composition of certain balance sheet items (mainly the liabilities) are only available after 1994 for the manufacturing firms in the Turkish economy.

[144] This argument is similar to the insights of the financialization literature as exemplified by Stockhammer (2005) and Crotty (2005). However with current data set it is not possible to identify whether the negative impact is a direct result of increased holdings of government securities by manufacturing firms. Even then, the motive to hold short-term securities might be either hedging or high absolute returns from these securities or a combination of both.

Regardless of the choice of proxy for FIN_t, the interaction between the financial deepening measure and the internal funds variable is not statistically significant and takes both signs.[145] Hence there is no evidence of a declining importance of liquidity under liberalization for the sample of all firms. These results support my theoretical 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 to the elimination of financing constraints in capital markets. Moreover empirically I showed in chapter 3 that there has not been an expansion in bank credit under liberalization. The lack of evidence for a change in the sensitivity of investment to internal funds reaffirms my claim that a better credit allocation into productive areas of investment such as manufacturing did not occur in the Turkish economy under liberalization.

Regardless of the choice of proxy for FIN_t, the interaction between the financial deepening indicator and volatility is negative for the sample of all firms; though it is not significant in the last column with foreign exchange deposits as a measure of FIN. In an environment of increasing macroeconomic instability, the future is perceived as more uncertain and the role of the state of confidence becomes even more important in investment decisions.

The overall impact of volatility on investment under liberalization can be better understood with a simple exercise in which the elasticity of the investment ratio with respect to volatility is computed. In order to see the overall impact of volatility, we need

[145] It should be noted that only the regressions in column (1) and column (2) give statistically significant results for the internal funds variable by itself.

to consider the aggregate impact of both the volatility variable per se and the impact through the interaction term. The negative coefficient of the interaction term of financial liberalization and volatility for the sample of all firms stands at -0.235 in column (1), -0.229 in column (2), -0.196 in column (3) and -0.247 in column (4). The volatility variable itself has a negative and significant coefficient of -0.337 in column (1), -0.342 in column (2), -0.317 in column (3) and -0.463 in column (4). Table 11 shows that the volatility variable has a "within firm" standard deviation of 0.11. I calculate the impact of a one standard deviation increase in volatility on the investment ratio in the year when FIN variable was at its maximum and minimum levels. Table 10 presents the descriptive statistics for the macro level financial indicators used in this regression.[146] For example in column (1), the FIN variable is proxied by financial securities-to-GNP ratio. This proxy is at its minimum value in 1985 (6.4%) and at its maximum value in 2002 (60.01%). Given these figures, one standard deviation increase in the volatility measure would have brought a 23% decline over the median investment ratio in 1985, when the financial liberalization indicator was at its minimum. In 2002, when the financial liberalization indicator reached its peak, the same standard deviation increase

[146] Various financial depth indicators are also laid out in Table 6 in Chapter 3 on the Turkish economy.

in volatility measure would have implied a 32% decline in the median investment ratio.[147]

Calculations are repeated for regressions with all proxies of FIN and the results of elasticities are presented in Table 16. I do not include the results from the regression with the last proxy for FIN, the foreign exchange deposits of the banking system, since the coefficient of the interaction term is not found as significant. The first three proxies of FIN display similar results as to the change in the responsiveness of investment to volatility. When the FIN variable is at its minimum level, a standard deviation increase in volatility is associated with a 24% decline in the investment ratio on average. When the FIN variable reaches its maximum level over the period, the responsiveness of investment to the same change in volatility brings a 31% decline on average. This clearly shows that the negative impact of volatility on investment is greatly affected by the financial deepening process that took place in the economy. As I suggested in chapter 5, there should be a nonlinear relationship between volatility and investment. As volatility increases under liberalization, the negative responsiveness of investment to volatility increases. At very high levels of volatility, risk averse managers observe a 'crisis of confidence' and cut investment even more than they would do at low levels of volatility.

[147] Given the estimate of (-0.337) for the coefficient of volatility and (-0.229) for the coefficient of interaction term, one standard deviation (0.11) increase in volatility would be associated with (-0.337)*(0.11) + (-0.229)*(0.11)*(0.064) = -0.037 decline in the investment ratio, when FIN takes its min value. When FIN is at its maximum level, decline in investment ratio is equal to (-0.337)*(0.11) + (-0.229)*(0.11)*(0.601) = -0.053. Then I calculate the percent equivalent of this change over the median investment ratio.

In order to see the overall impact of financial liberalization on investment, ideally we should consider the combined impact of both FIN variable and the interaction variables. However since the interaction between internal funds and FIN is not significant by all measures of FIN, we only get a significant negative impact from β_6 and β_7. I calculate the response of investment to this overall impact of financial liberalization and present the results in Table 17. In these calculations, volatility is kept at its median level over the period. All three proxies for financial liberalization indicate a decline in median investment ratio in the range of 15-25%. There is strong evidence that financial liberalization had substantial negative consequences for the private manufacturing investment due to heightened instability and liquidity preference induced by uncertainty.

In the next section I estimate the same regression with financial liberalization variables for different firm categories to identify possible differences in the impact of liberalization on investment across different firm categories.

7.3.2 Firm Categories:

The analysis in this section mainly involves an inquiry into possible differences across firms with respect to impacts of financial liberalization, rather then testing for pre-stated hypotheses. I expect to learn about these differences from the econometric results. The analysis in the previous section suggested that the independent impact of financial liberalization as captured by the coefficient β_7 was mostly indicative of an uncertainty induced liquidity preference. Firms preferred holding short term financial assets, mostly in government securities, in order to create a financial buffer under the

conditions of heightened instability. Therefore in this section, I only focus on the government securities-to-GNP ratio as the proxy for FIN in regressions. As mentioned above, the small sample size for each firm category and heterogeneity within these categories based on other unobservable firm specific variables might be a potential problem. Hence I do not proceed with a similar elasticity calculation in this section, but interpret regression results through their sign and statistical significance only.

All regressions are estimated by the GMM estimation technique and the results are presented in Table 18. All regressions pass the specification tests: the instruments are valid; and the correlation structure is as expected, with no second-order serial correlation.

For most firm categories except young firms, FIN_t variable is negatively and significantly related to investment. The post liberalization macroeconomic environment as captured by expanding government securities market has a negative impact on investment, and indicates an increase in liquidity preference due to possible level effects of overvalued exchange rates or high level of interest rates.

The interaction between the financial deepening measure and the internal funds variable is not statistically significant for most categories, with the exception of well established firms and young firms. For the former group the coefficient is significantly positive. This finding might suggest that well-established manufacturing firms rely more on internal funds under liberalization. However, this is hard to interpret, given that the main internal funds variable for this firm category has a negative and insignificant coefficient. On the other hand, the coefficient of interaction term is negative for young firms, although the level of significance is low. This finding might suggest that internal

funds lost their importance for young firms and possibly that other sources of external funding took their place, indicating a better allocation of credit in favor of investment of young manufacturing firms. However, similar attention should be paid to the coefficient of main internal funds variable in the regression. The coefficient of internal funds is significantly positive. Hence, even in we infer that under liberalization there has been a change in the reliance of young firms on internal funds, overall young firms still heavily rely on internal funds in financing investment. This inference is also supported by the regression results of the base model in the previous section. In this study I classify those firms that are younger than 31 years in 2003 as young.[148] 82 firms fall into this category. When we investigate the sectoral distribution of these young firms, we observe an interesting pattern: Out of these 82 firms, 68% (56 firms) operate in textiles and food processing industries. Both of these labor-intensive industries have been among the fastest growing ones for the last decade of the Turkish economy. Structural conditions related with sectoral differences might be the reason for changing reliance on internal funds as the source of investment financing.

The interaction between the financial deepening indicator and demand volatility is negative for most firm categories with the exception of young firms. The positive coefficient for young firms is not statistically significant. Among these negative coefficients, the ones for domestic markets sellers and small-medium firms are statistically significant. Groups of small-medium firms and firms with domestic market orientation are those for which the negative impact of volatility on investment became

[148] The sample is quite heterogeneous in firms' age, ranging from 6 years to 95 years.

worse under financial liberalization[149]. In other words, the negative impact of volatility on investment has not changed for exporters, well-established firms and large firms.

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 tried to reposition themselves towards international markets. Although international markets are not immune from demand volatility 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 fact that the impact of volatility does not seem to worsen for exporters under financial liberalization might be seen as evidence for the experience they mention in interviews. 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.

As noted before small sample size for each firm category and heterogeneity within these categories might be a potential problem of the statistical analysis in this section. To sum up, I do not find any evidence of a change in the sensitivity of investment to internal funds for most firm categories, except young firms. The group of young firms seems to rely on internal funds less under financial liberalization, while their reliance is still the highest among all firm categories. I also find evidence for a

[149] The evidence in the previous section on the high response to uncertainty of domestically-oriented firms also supports this reasoning.

worsening negative impact of volatility on investment for small-medium firms and firms with domestic market orientation.

7.4 Summary and Conclusions:

The findings of the empirical analysis in this chapter have important implications for investment theory. Rather than a firm level foundation for the neoclassical assumption of Say's Law, I find evidence in support of the arguments by the accelerator and Keynesian investment theories in that the expected demand is an important determinant of investment. Further evidence of the negative impact of volatility in current demand on investment supports the key Keynesian insight on the role of uncertainty and confidence formation in forecasting future demand. As volatility increases, the state of confidence in the reliability of expectations of future profitability erodes and firms invest less. The positive and significant coefficient of internal funds provides evidence that the source of investment finance matters. The positive coefficient can be interpreted as evidence for the Post Keynesian assumption about managerial behavior. Risk averse managers prefer internal funds rather than external funds since internal funds are cheaper and safer. Differences across firms reaffirm this assumption. In contradiction with the New Keynesian expectation that smaller firms should rely more on internal funds, large firms prefer internal funds since they value their autonomy from financial markets. Group affiliation and firm reputation are other factors explaining differences on the reliance on internal funds across firms. Moreover, the export orientation of the firms emerges as an important factor in explaining differences in investment behavior across firms. The investment of firms with higher export

orientation have a higher positive sensitivity to demand conditions, while firms with domestic market orientation a higher negative sensitivity of investment to volatility in demand. In highly unstable domestic markets with substantial currency risks, export orientation serves as a hedging strategy.

The findings have important implications also for the impact of financial liberalization and deepening on investment. Post liberalization macroeconomic environment as captured by expanding financial securities in general, and government securities in particular as well as monetization in the economy has a negative impact on investment due to a heightened liquidity preference induced by level of effects of liberalization, such as overvalued currency and high interest rates. Despite the anticipations of the New Keynesian literature on "financing constraints", there is no evidence of a declining importance of liquidity under liberalization. I argue that theoretically there is no *a priori* reason to expect that liberalization would eliminate information asymmetries and lead to the elimination of financing constraints in capital markets. Finally I find that that the negative impact of volatility on investment is greatly affected by the financial deepening process that took place in the economy. As volatility increases under liberalization, the negative responsiveness of investment to volatility increases, suggesting a nonlinear relationship between two variables. The risk aversion assumption of Post Keynesian framework can adequately explain this nonlinearity. The level of voaltiltiy affects the state of confidence in a nonlinear way. At very high levels of volatility, risk averse managers perceive a 'crisis of confidence' and cut investment even more than they would otherwise do over low levels of volatility. Further analysis

of this relationship across firms levels shows that this worsening impact of volatility is significant for small-medium firms and firms with domestic market orientation.

CHAPTER 8

CONCLUSIONS

This study aimed to contribute to two broad literatures of developing economies and investment theory. In this dissertation I analyzed the consequences of financial liberalization on the 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 economies became exposed to the whims of international capital flows, new opportunities for disruptive speculative financial activity emerged, leading to 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 I conducted with managers of manufacturing firms in Turkey. I used these 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 to liquidity and sales, while it responds negatively to the changes in the volatility variable. In this model, volatility emerges as a very important determinant of investment. Statistical evidence on the model provides support for the Post Keynesian model of investment, in which the negative influence of volatility on investment in a highly uncertain macroeconomic environment is intensified through its effect on the state of confidence of managers.

My review of the recent evolution of the Turkish economy showed that all measures of financial deepening, except bank credit to the public, exhibit an increasing pattern under financial liberalization. These indicators reveal two main characteristics of the financial deepening process: a high degree of financial dollarization and an expanding market for short term government securities. Both of these characteristics point to a liquidity preference enhanced by macroeconomic instability. I find that these financial deepening indicators display a positive correlation with the firm level volatility and have implications for private sector investment.

In order to answer the question of how liberalization policies affected investment through the channels of uncertainty and liquidity, I choose a financial deepening indicator as proxy for financial liberalization. In my econometric analysis, I find no evidence for a declining importance of liquidity under financial liberalization. As opposed to the expectations of New Keynesian literature on financing constraints, the financial liberalization and deepening process did not change the preference of firms for internal funds as a source of fund for investment. My econometric analysis also finds evidence that the negative impact of uncertainty on investment became higher under financial liberalization indicating a possible nonlinearity in the negative relationship between volatility and investment. I suggest that such nonlinearity can be explained by a crisis of confidence in the expectation formation, induced by very high levels of volatility. When the financial liberalization indicator is at its minimum, one standard deviation increase in uncertainty would bring a 24% decline in the median investment ratio; when the indicator reaches its maximum level, which happened in 2002, the same increase in uncertainty would bring a 31% decline in the median investment ratio.

Beyond these two channels, I also find evidence that financial liberalization has an overall negative impact on investment, possibly due to an increase in liquidity preference induced by higher volatility. 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 a worsening impact of uncertainty under liberalization.

The 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 uncertainty. As a response to highly volatile demand conditions in the domestic market, almost all firms mention a reorientation into export markets, both for more stable demand and to eliminate the 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" attitudes in forming expectations about the future, i.e. a declining state of confidence. Many interviewees mentioned that after the crises, their 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 my 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 emerge in the process. Since the particular path on which the liberalization process proceeds matters, the indicators to proxy for financial liberalization should be chosen as cautiously as possible and be specific to the case studied.

Furthermore, the expected benefits for investment may be curbed by the 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 be negatively impacted through the link of a declining state of confidence. In the 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 a volatile environment worsens the investment prospects by causing a decline in decision makers' confidence in their ability to make predictions about the future.

I have four suggestions for the direction of future research. The first one is about the expected impacts of liberalization on investment behavior. 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 dissertation suggest that these studies should pay much more attention to the role of uncertainty. The second one concerns the role of uncertainty in investment theory. As suggested by my findings, the issue of nonlinearities in the negative relationship between investment and uncertainty should be taken into consideration within a framework of risk aversive behavior of managers. An inverted U shape, suggested in the literature for this relationship might

not be sufficient or relevant to the experiences of developing countries. Thirdly, more case studies of developing countries will confirm the validity of the framework presented in this dissertation. Finally, future research should more carefully explore the differences across various types of firms in their responses to macroeconomic conditions. One interesting finding emerging from this work is that exporting is seen as a hedging strategy for firms facing high macroeconomic instability. This new incentive for export orientation might have implications for not only the development pattern of liberalized economies, but also for the stability in international product markets.

APPENDIX A: INTERVIEW QUESTIONS

PART 1: Firm Demographics

1. The year of establishment of the firm:
2. What is the main area of operation (industrial sector) for the firm?
3. What are the main products made?
4. What is the market share of the firm in each product market?
5. What is the average profit margin in each product market? (in % terms)
6. What is total number of employees? How many skilled, unskilled, and office worker does the firm employ?
7. Is the labor force unionized?
8. Does the firm export products? What is the share of exports in total sales (%)?
9. Is the firm affiliated with any group (known as *holding* company)?
10. If yes to group affiliation, does the affiliated group own shares in a bank?
11. What percentage of the shares of the firm is publicly traded?

PART 2: Investment-Financing-Uncertainty

1. Give specific examples of the projects that are typically considered investment for the firm.

2. Has the firm undertaken any investment project, either as additions/improvements to the current plant of operation or establishing new plants, since the initial plant establishment?
    - Yes
    - No
    - Planned, but could not realize

3. If the answer to Question 2 is 'yes', what was the source of funds for the investment project?
    - 100 % internal funds
    - 100% Bank credit
    - 100% loans from friends, family, business partners (informal channels)
    - A combination of above (specify the approximate shares of each)
    - Other Sources (Corporate debt, IPO, …)

4. If the answer to Question 2 is 'no' or 'planned but could not realize', what were the main reasons for not doing so? (If possible, rank the following obstacles beginning from 1 with the most detrimental factor ranked as number 1)
    - Insufficient credit/funds (in terms of quantity)
    - High cost of borrowing
    - Shortage of skilled labor
    - The cost of inputs to production
    - Uncertainties in future profitability of the investment project
    - Other impediments (please be specific)

Note: If you rank uncertainty among the first three factors, please explain if it's firm level, industry level or macro level uncertainty.

5. If the answer to Question 2 is 'yes' what were the reasons/motivations to undertake the investment projects mentioned above? (If possible, rank the following factors beginning from 1 with the most important factor ranked as number 1)
    - Better demand conditions in either domestic or international markets
    - Achieving higher growth and larger market share as a firm strategy
    - Product diversification/differentiation
    - Quality improving technological change
    - Cost reducing technological change
    - Vertical integration (to begin in-house production of the inputs)
    - Investment subsidies by the government
    - Change of location
    - Other (please give specific examples)

6. Did the above-mentioned investment project achieve the expected profitability that the feasibility reports had suggested?
    - Yes
    - No
    - Yes in early stages after completion, but not quite so later

7. If the answer to question 6 is negative, what went wrong? Try to identify the sources for the unfulfilled promises of profits from the investment project
    - Error in forecasting the market conditions (such as the cost of investment turned out to be higher than we expected), things that originated from the miscalculation by the firm
    - Unexpected events (economic crises, natural disasters …etc in both domestic and international markets) at the macro level
    - Other (please explain)

8. Is there a <u>current</u> investment project that your firm is undertaking or planning? If yes, which one of the reasons listed in questions 5 are more important for this project?

9. What is the rule you use to implement an investment project or asses the future profitability from an investment project?

10. Do you use formal Net Present Value Calculations or any other formal rule? Please explain.

11. If the firm is currently not planning an investment project, which of the following(s) explains the reasons better? (Please rank)
    - No need for investment (the firm is satisfied with the current level of investment and performance)
    - Insufficient demand
    - Insufficient Credit (or inability to raise external finance)

- High Cost of external finance (even in the case of availability of it)
- Uncertainty regarding future (in your own industry? for your own firm? in the overall economy?)
- High competition in the product market
- Shortage of skilled labor including managerial and technical staff
- Other (please explain)

12. If you think uncertainty has been important in your investment decisions, which of the following(s) are important in explaining the kind of uncertainty your firm has faced? (Please rank, if possible)
    Volatility in
    - inflation levels
    - interest rates (cost of credit)
    - economic policies of the government
    - wages
    - demand conditions
    - input costs
    - other factors (please explain)

13. If you think uncertainty has been important in your investment decisions, have you been concerned with developing strategies that help cope with the uncertainty? Please specify.

    Examples of specific questions aiming capture different strategies:

    - Have you referred to trade (commercial) credit or other informal/alternative channels of credit more often?
    - Have you changed the currency composition of the cash and other short-term liquid assets of the firm?
    - Has there been an increase in the inventories with this aim?
    - Has there been an increase in the ratio of short-term financial assets to total? If so, was the motive behind this choice: hedging against risk or simply higher returns on these instruments compared to the return from main activities?

12. How did the crises of 2001 affect your strategies to cope with uncertainty or in general decision making process (the rules that you follow)?

APPENDIX B: TABLES AND FIGURES

Table 1: Aggregate Studies of Investment-Uncertainty Relationship

Study	Country	Model Fundamentals	Uncertainty Proxy	Uncertainty Effect
Pyndick(1986)	US	Not available	Lagged stock market returns	(-)
Driver and Moreton (1991)	UK	Investment-output ECM	Unconditional variance of output and inflation	(-)
Goldberg (1993)	US	Investment=f(output, cost of capital)	Exchange rate volatility	None Weak (-)
Huizinga (1993)	US	Investment= f(sales, profits, factor prices)	ARCH estimates of conditional variances of inflation, real wages, and real profits	(+) for profits (-) for inflation and wages
Episcopos (1995)	US	Growth in investment= f(growth in GDP, growth in real interest rate)	ARCH estimates of conditional variances of interest rates, stock market index, consumer spending, GDP deflator	(-)
Price (1995)	UK	Investment-output ECM	GARCH estimates of conditional variance of GDP	(-)
Ferderer (1993)	US	Jorgenson and q models	Risk premium computed from interest rate term structure	(-)
Ferderer and Zalewski (1994)	US	Accelerator and q models	Risk premium computed from interest rate term structure	(-)
Carruth, Dickerson, Henley (1997)	UK	Investment, output, real interest rate ECM	Gold price and abnormal return to holding gold	(-)

Source: Carruth, Dickerson and Henley (2000)

Table 2: Disaggregate Studies of Investment-Uncertainty Relationship

Study	Country	Level Of Disaggregation	Uncertainty Proxy	Uncertainty Effect
Goldberg (1993)	US	2 digit industry time series	Exchange rate volatility from ARMA model residuals	None / (-)
Campa and Goldberg (1995)	US	2 digit industry panel data	Exchange rate volatility from ARMA model residuals	None
Campa (1993)	US	4 digit industry panel of FDI data	Exchange rate volatility from ARMA model residuals	(-) especially for Japanese inward investment
Huizinga (1993)	US	4 digit industry cross section	Volatility of real wages, material prices and output prices from ARMA model residuals	(-) for wages and material prices / (+) for output prices
Ghosal and Lougani (1996)	US	4 digit industry panel data	Volatility of output price from AR model residuals	(-) for only low concentration industries
Leahy and Whited (1996)	US	Panel of manufacturing firms	Forecast share return volatiltiy	Weak (-) / None
Driver, Yip, Dahkil (1996)	US	Panel of manufacturing plants	Market share volatility	Weak (-) / None
Guiso and Parigi (1996)	Italy	Cross section of manufacturing firms	Firm's perception about future product demand	(-)

Source: Carruth, Dickerson and Henley (2000)

Table 3: A Classification of Empirical Literature on the impact of Liberalization on Financing Constraints

Study	Data Coverage	Investment model	Proxies For Net Worth	Liberalization Indicator	Estimation Technique	Firm Categories	Results
Harrison *et al* (2004)	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	Large, chaebol affiliated firms, face greater constraints after liberalization
Harris, Schiantarelli, Siregar (1994)	Indonesia 1981-88 523 firms	Accelerator model	-Cash flow ratio -Leverage	Year dummy for post banking deregulation	-OLS -GMM	-Size	Large firms are not constrained, 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 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 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 (2003)	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 -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 -Leverage	-Structural change in the sample -financial liberalization index	-OLS -GMM	-Stock market valuation -conglomerate affiliation	Constraints were reduced for all firm types

Table 4: 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

Source: The "Economic and Social Indicators, 1950-2004" published by the State Planning Organization (SPO) of Turkey.
Notes:
b: Average annual compounded interest rates on domestic borrowing, adjusted for 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 the USA, producer prices for the Euro area and wholesale prices for Turkey are used (source: ifs, sis)

Table 5: Sectoral Distribution of Private Investment

	1980	1985	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Agriculture	7.4	7.7	3.6	3.2	3.1	3.3	2.6	4.1	4.7	4.3	4.8	2.9	3.3	2.1	2.1	2.7
Mining	0.5	1.2	1.1	1.1	1.0	0.9	1.2	1.1	1.1	1.1	1.4	1.6	1.1	1.6	1.8	2.2
Manufacturing	30.0	31.9	26.2	25.3	24.3	23.6	23.8	26.2	26.1	22.9	23.4	23.8	26.5	24.8	35.6	39.5
Energy	0.4	0.4	1.3	1.9	1.0	0.8	0.9	0.8	2.9	6.4	5.3	4.5	3.9	9.8	4.5	3.1
Trans&Com	9.7	17.0	10.7	10.8	14.7	18.8	11.5	16.4	17.4	21.6	20.7	20.0	27.9	23.6	18.4	16.9
Tourism	0.6	1.8	5.0	4.7	3.5	2.4	2.3	2.4	2.3	2.5	3.7	5.5	4.9	6.3	6.9	8.6
Housing	44.7	32.3	46.0	46.4	45.9	44.5	51.5	43.0	38.7	33.4	32.0	31.8	22.2	19.6	17.1	14.5
Education	0.2	0.5	0.7	0.8	0.8	0.8	0.8	0.7	1.1	1.1	0.9	1.7	1.9	1.9	1.5	1.6
Health	0.2	0.5	0.9	1.4	1.4	1.3	1.5	1.2	1.8	2.9	3.6	3.3	3.7	4.0	4.0	4.0
Other Services	6.3	6.7	4.4	4.3	4.4	3.7	4.0	4.1	4.0	3.8	4.2	4.9	4.7	6.4	8.1	6.9

Source: The "Economic and Social Indicators, 1950-2004" published by the State Planning Organization (SPO) of Turkey.
Note: All figures are expressed as % Share in Total Private Investment

Table 6: Indicators of Financial Deepening

	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

Source: The "Economic and Social Indicators, 1950-2004" published by the State Planning Organization (SPO) of Turkey.
Notes: All figures are expressed as percent of GNP
[a]: The sum of Deposits and Securities [b]: Bank Credit includes credit to public by depository institution.

Table 7: Developments in Banking Sector Balance Sheet

	% Share In GDP		% Share In Total Assets	
	1986-1994	**1995-2000**	**1986-1994**	**1995-2000**
Asset Side Items				
Security Portfolio	5.2	10.5	11.4	15.8
(Government Security Stocks)	*4.2*	*7.9*	*9.3*	*11.6*
Credit Stocks	18.3	22.2	40.1	35.4
Liability Side Items				
Deposit Funds	28.8	44.7	61.6	69.4
Non-deposit Funds	7.1	8.5	15.4	12.7
(Credits)	4.7	6.6	10.7	10.0
(Foreign Credits)	2.4	4.9	5.2	7.1
Equity Capital	1.0	1.5	2.1	2.2

Source: Central Bank of Turkey Consolidated Balance Sheets, available through the Bank web-site.

Table 8: Firm Demographics of Interviewed and Data Set Firms

	Data set in 2003	Interviewed
SIZE DISTRIBUTION		
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%
Median share of exports in sales	26%	30%
More than 10% foreign ownership	16%	21%
TOTAL # OF FIRMS	108	33

Source: Calculated by the author from the balance sheets and annual reports of the firms interviewed and included in the data set constructed for this dissertation.
Note: Size classification is based on 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.

Table 9: Regression Variables and Their Expected Signs

Dependent Variable: Investment Ratio $(I/K)_{it}$		
Explanatory Variables	**Symbol**	**Expected Sign**
Lagged investment ratio	$(I/K)_{it-1}$	(+)
Sales Ratio	$(S/K)_{it}$	(+)
Internal funds Ratio	$(IF/K)_{it}$	(+)
Volatility	V_{it}	(-)
Financial Liberalization_Internal Funds	$(FIN_t)(IF/K)_{it}$	(0)
Financial Liberalizaton_Volatility	$(FIN_t)V_{it}$	(-)
Financial Liberalization	(FIN_t)	(-)

Table 10: Descriptive Statistics of Macro Variables (1985-2003)

Variable	Median	Std. Dev.	Min	Max
Financial Securities/GNP	0.219	0.152	0.064	0.601
Government Securities/GNP	0.190	0.148	0.047	0.552
M2Y/GNP	0.358	0.102	0.235	0.580
FX Deposits/GNP	0.161	0.070	0.021	0.273

Source: The "Economic and Social Indicators, 1950-2004" published by the State Planning Organization (SPO) of Turkey.

Table 11: Descriptive Statistics of Firm Level Variables (1985-2003)

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
IF/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
V	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

Source: Publications of Capital Markets Board of Turkey for 1985-1988; publications of the Istanbul Stock Exchange for 1989-2003.

Table 12: Estimation Results from the Base Model of Investment, All Firms

Dependent variable $(I/K)_{it}$		
	OLS fixed effect	GMM
$(I/K)_{it-1}$	0.140*** (0.004)	0.141** (0.000)
$(S^e/K)_{it}$	0.013*** (0.003)	0.013*** (0.008)
$(IF/K)_{it}$	0.080*** (0.000)	0.175*** (0.003)
V_{it}	-0.312*** (0.000)	-0.463*** (0.002)
# of obs	1828	1651
# of firms	165	165
m1	--	-4.18 (0.000)
m2	--	1.21 (0.225)
Sargan Test	--	162.76 (0.998)

Notes:

1. *Values in parentheses are p-values that are based on robust standard errors.*
2. *For the OLS regression, F(20,1643) =16.52 and it is statistically significant at a 1% confidence level, while the R^2 (within)= 0.198.*
3. *Coefficients for the constant term and the time dummies are not reported.*
4. ** indicates statistical significance at 10%, ** statistical significance at 5% and *** statistical significance at 1%.*
5. *"m1" and "m2" are tests for first and second-order serial correlation, respectively. The Sargan test statistic is obtained from GMM two-step estimations.*

Table 13: Responsiveness of Investment to Its Determinants

Determinants of Investment	**Associated change over the median level of investment ratio**
Lagged investment ratio $(I/K)_{it-1}$	+20%
Sales Ratio $(S/K)_{it}$	+26%
Internal funds Ratio $(IF/K)_{it}$	+32%
Volatility $(V)_{it}$	-30%

Source: Authors' calculations from regression results in Table 12 and descriptive statistics in Table 11
Note: Elasticities are calculated based on the assumption of one standard deviation increase in the respective determinant of investment. All standard deviations represent 'within firm' variation.

Table 14: Estimation Results from the Base Model of Investment, Firm Categories

Dependent variable $(I/K)_{it}$ (Robust standard errors are in parentheses for regression coefficients)						
	Large firms	Small-medium firms	Exporter firms	Domestic market oriented	Established firms	Young firms
$(I/K)_{it-1}$	0.091* (0.043)	0.054 (0.059)	0.101* (0.052)	0.067 (0.047)	0.146** (0.058)	0.018 (0.044)
$(S^e/K)_{it}$	0.010*** (0.002)	0.020** (0.007)	0.024** (0.010)	0.010*** (0.001)	0.023** (0.009)	0.009*** (0.002)
$(IF/K)_{it}$	0.096** (0.046)	0.010 (0.036)	0.027 (0.040)	0.096* (0.048)	0.034 (0.033)	0.116* (0.071)
V_{it}	-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	950	701	701	950	865	786
# of firms	88	77	73	92	83	82
m1	-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	1.09 (0.277)	-0.52 (0.606)	-0.84 (0.399)	1.06 (0.288)	0.98 (0.328)	-0.21 (0.834)
Sargan Test	65.28 (0.987)	70.17 (0.990)	40.91 (0.854)	66.39 (0.754)	65.64 (0.887)	69.04 (0.723)

Notes:

1. *Coefficients for the constant term and the time dummies are not reported.*
2. ** indicates statistical significance at 10%, ** statistical significance at 5% and *** statistical significance at 1%.*
3. *"m1" and "m2" are tests for first and second-order serial correlation, respectively. The Sargan test statistic is obtained from GMM two-step estimations.*

Table 15: Estimation Results of Investment under Financial Liberalization
Various Measures of Liberalization

Dependent variable $(I/K)_{it}$ (Robust standard errors are in parentheses for regression coefficients)				
	(1) FIN=Financial Securities/GNP	(2) FIN=Government Securities/GNP	(3) FIN=M2Y/GNP	(4) FIN=FX Deposits/GNP
$(I/K)_{it-1}$	0.127*** (0.037)	0.134*** (0.036)	0.139*** (0.038)	0.129*** (0.040)
$(S^e/K)_{it}$	0.013*** (0.004)	0.012*** (0.004)	0.013*** (0.005)	0.024*** (0.004)
$(IF/K)_{it}$	0.162** (0.089)	0.169** (0.084)	0.169 (0.164)	0.115 (0.112)
V_{it}	-0.337** (0.105)	-0.342** (0.101)	-0.317** (0.148)	-0.463** (0.156)
$FIN_t(IF/K)_{it}$	0.098 (0.234)	-0.134 (0.243)	-0.098 (0.190)	0.148 (0.564)
FIN_tV_{it}	-0.229** (0.095)	-0.203** (0.067)	-0.196* (0.098)	-0.247 (0.254)
FIN_t	-0.215** (0.078)	-0.198** (0.082)	-0.173* (0.084)	0.107 (0.226)
# of obs	1651	1651	1651	1651
# of firms	165	165	165	165
m1	-4.23 (0.000)	-4.21 (0.000)	-4.18 (0.000)	-4.16 (0.000)
m2	1.11 (0.265)	1.10 (0.269)	1.21 (0.227)	1.02 (0.305)
Sargan Test	161.36 (0.997)	160.42 (0.995)	161.82 (0.998)	161.12 (0.998)

Notes:

1. *Coefficients for the constant term and the time dummies are not reported.*
2. ** indicates statistical significance at 10%, ** statistical significance at 5% and *** statistical significance at 1%.*
3. *"m1" and "m2" are tests for first and second-order serial correlation, respectively. The Sargan test statistic is obtained from GMM two-step estimations.*

Table 16: The Impact of Volatility on Investment under Financial Liberalization

Proxies for FIN	Response of investment to volatility when FIN is at minimum	Response of investment to volatility when FIN is at maximum
Financial Securities/GNP	23%	32%
Government Securities/GNP	24%	31%
M2Y/GNP	24%	28%

Source: Authors' calculations from regression results in Table 15 and descriptive statistics in Table 10 and Table 11
Note: Elasticities are calculated based on the assumption of one standard deviation increase in the respective determinant of investment. All standard deviations represent 'within firm' variation.

Table 17: The overall impact of Financial Liberalization on Investment

Proxies for Financial Liberalization	Associated change over the median level of investment ratio
Financial Securities/GNP	-25%
Government Securities/GNP	-23%
M2Y/GNP	-%15

Source: Authors' calculations from regression results in Table 15 and descriptive statistics in Table 10 and Table 11
Note: Percentage changes in the second column reflect the combined impact of financial liberalization variable and the interaction term between volatility and financial liberalization. Elasticities are calculated based on the assumption of one standard deviation increase in the respective proxy for financial liberalization. The volatility variable is kept at its median level in all calculations.

Table 18: Estimation Results of Investment under Financial Liberalization Firm Categories

Dependent variable $(I/K)_{it}$ (Robust standard errors are in parentheses for regression coefficients)						
	Large firms	Small-medium firms	Exporter firms	Domestic market sellers	Established firms	Young firms
$(I/K)_{it-1}$	0.118** (0.050)	0.119** (0.052)	0.142*** (0.055)	0.094** (0.042)	0.167** (0.052)	0.071* (0.043)
$(S^e/K)_{it}$	0.011*** (0.002)	0.021** (0.012)	0.027** (0.013)	0.010*** (0.002)	0.029** (0.011)	0.011*** (0.004)
$(IF/K)_{it}$	0.202** (0.088)	0.007 (0.131)	0.037 (0.061)	0.065 (0.084)	-0.076 (0.081)	0.438** (0.177)
V_{it}	-0.453*** (0.138)	-0.282* (0.148)	-0.149 (0.104)	-0.285** (0.137)	-0.201 (0.235)	-0.467** (0.224)
$FIN_t(IF/K)_{it}$	0.286 (0.190)	-0.089 (0.322)	-0.031 (0.109)	-0.316 (0.287)	0.739** (0.364)	-0.751* (0.442)
FIN_tV_{it}	-0.020 (0.277)	-0.289** (0.143)	-0.072 (0.208)	-0.219** (0.098)	-0.143 (0.225)	0.153 (0.328)
FIN_t	-0.241** (0.119)	-0.239* (0.112)	-0.159* (0.092)	-0.372*** (0.134)	-0.373** (0.173)	-0.076 (0.109)
# of obs	950	701	701	950	865	786
# of firms	88	77	73	92	83	82
m1	-2.95 (0.003)	-3.08 (0.003)	-2.88 (0.004)	-3.20 (0.001)	-2.95 (0.003)	-3.04 (0.002)
m2	0.94 (0.341)	0.08 (0.936)	1.20 (0.845)	1.11 (0.267)	0.89 (0.375)	0.04 (0.969)
Sargan Test	82.41 (0.857)	69.13 (0.765)	67.87 (0.844)	88.01 (0.601)	71.04 (0.826)	78.23 (0.814)

Notes:

1. *Coefficients for the constant term and are not reported.*
2. *Proxy for FIN variable is the government securities-to-GNP ratio.*
3. ** indicates statistical significance at 10%, ** statistical significance at 5% and *** statistical significance at 1%.*
4. *"m1" and "m2" are tests for first and second-order serial correlation, respectively. The Sargan test statistic is obtained from GMM two-step estimations.*

Figure 1: Growth Performance of the Turkish Economy

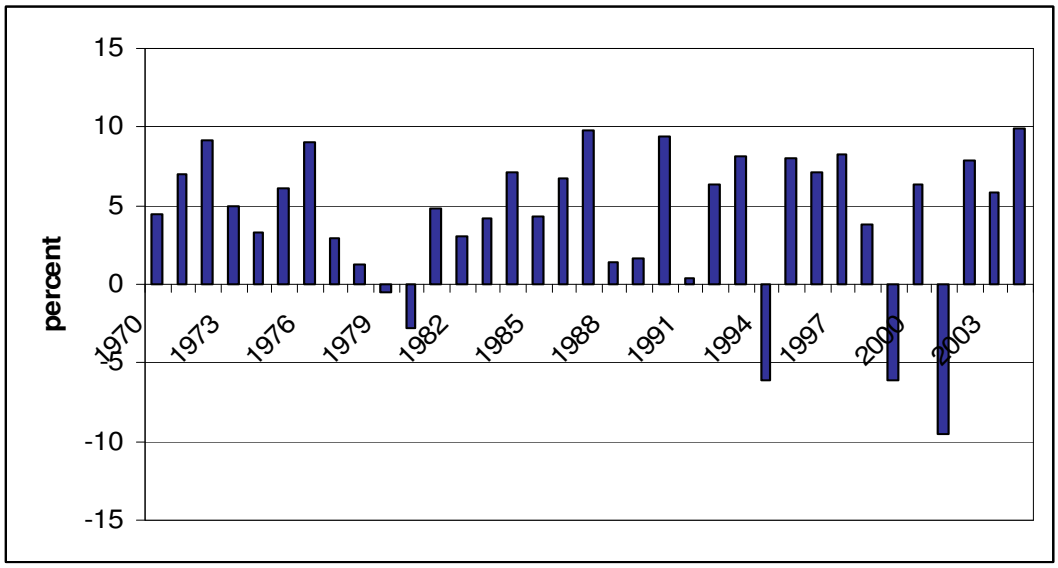


Figure 2: Patterns of Total Investment and Total Savings

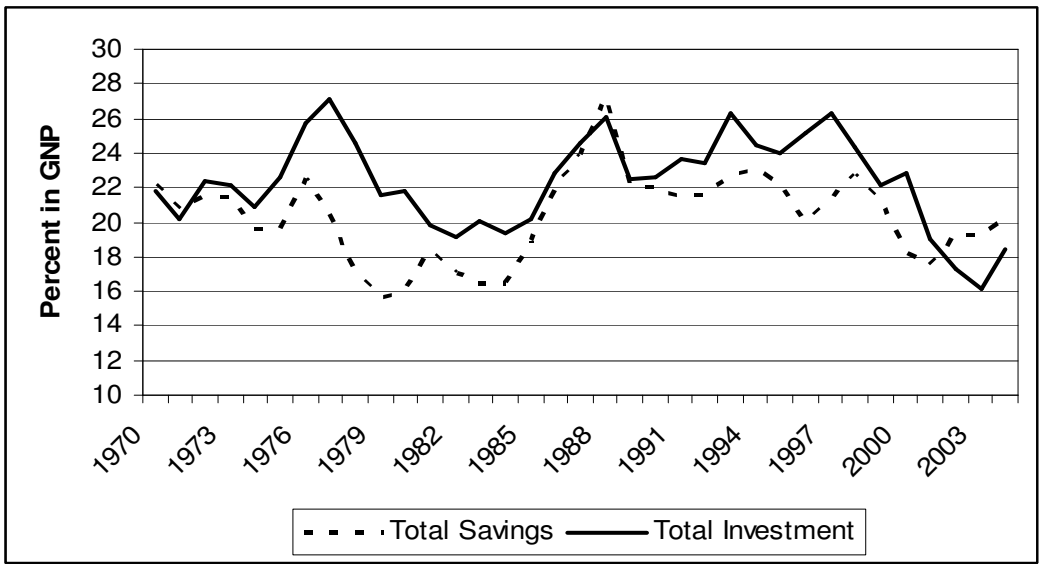


Figure 3: The Share of Private Manufacturing Investment in GNP

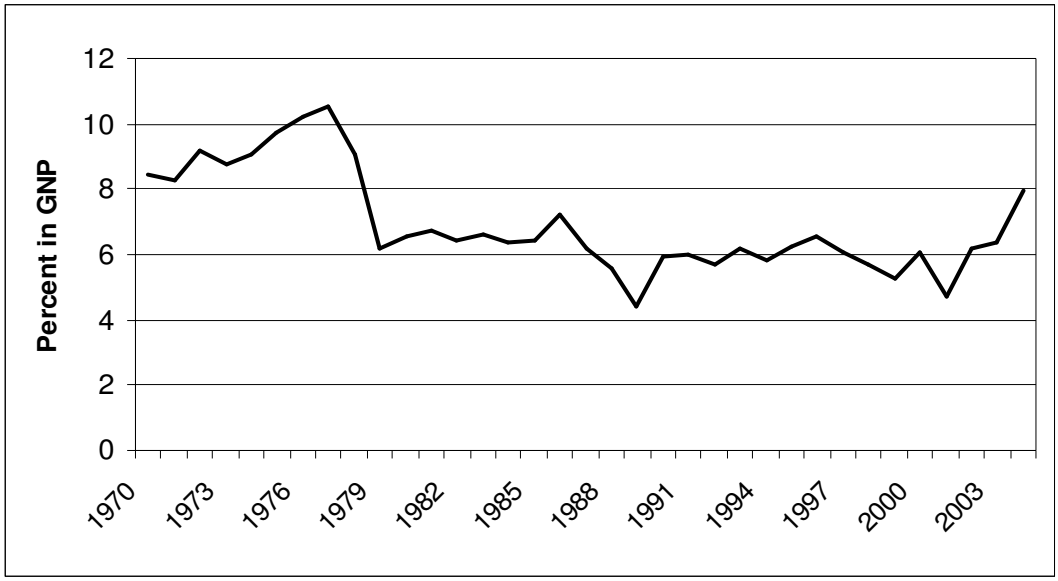
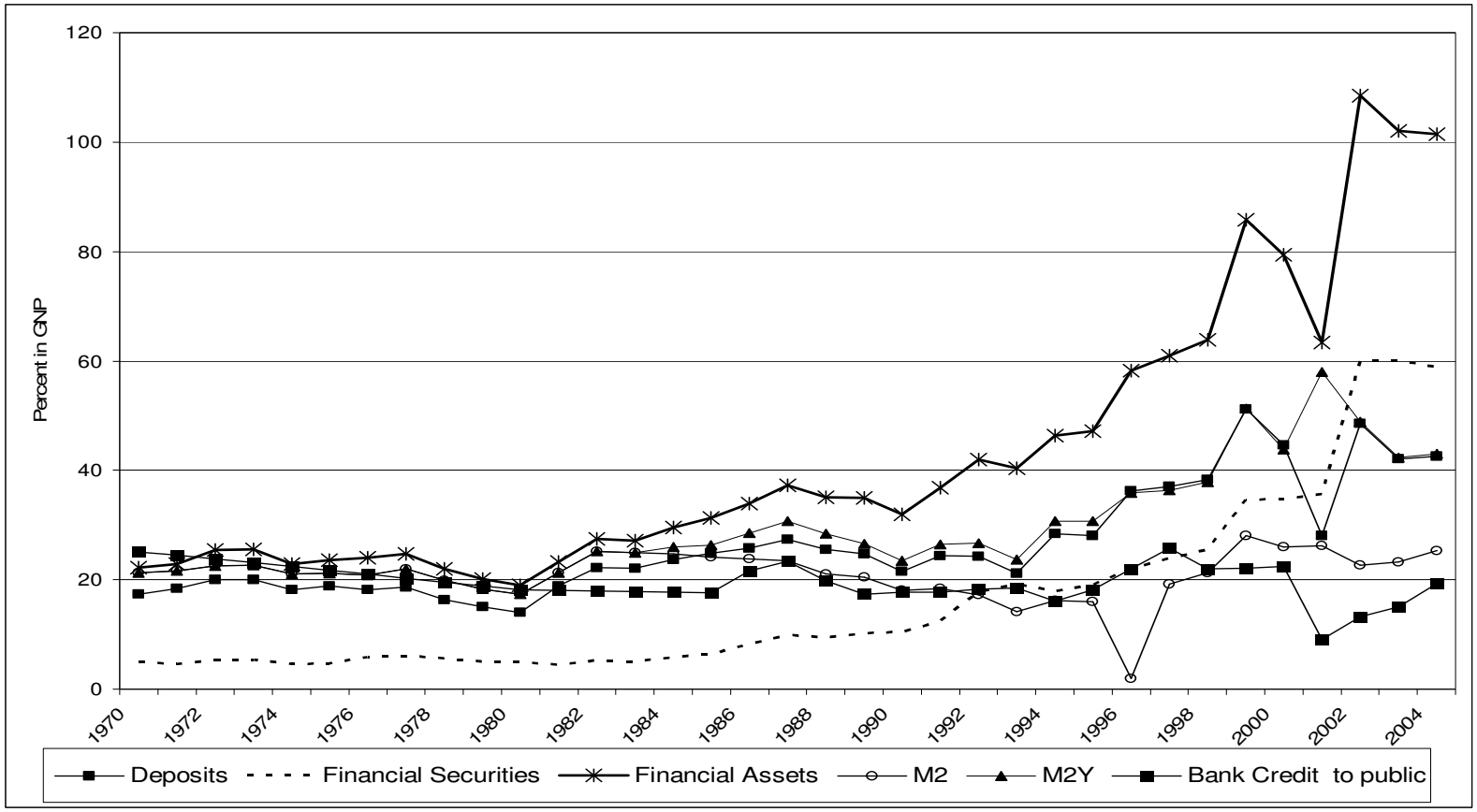


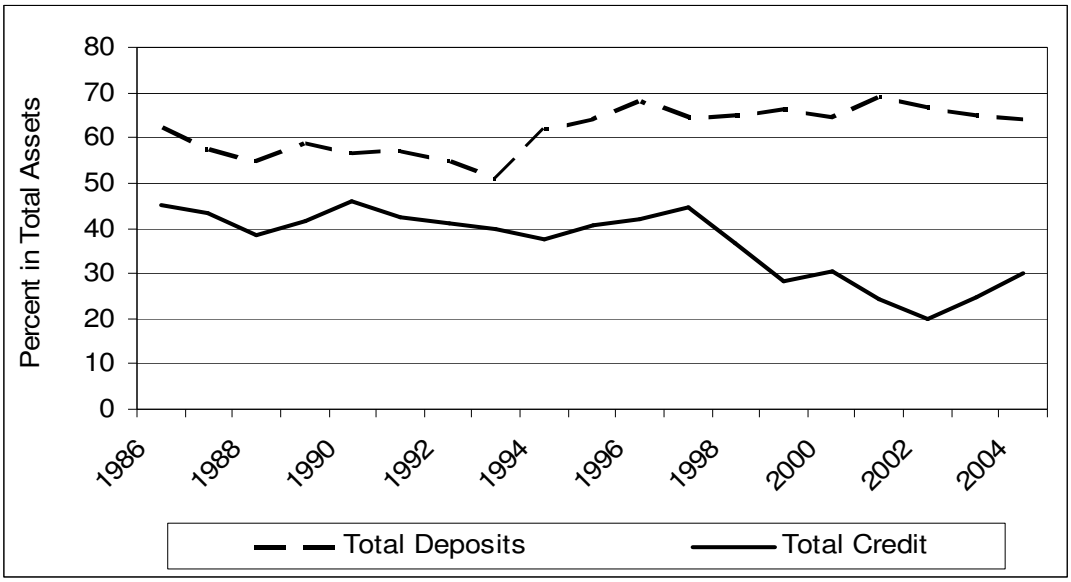
Figure 4: The Indicators of Financial Deepening in the Turkish Economy



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

- *M2 includes currency in circulation + demand and time deposits*
- *M2Y includes M2 + foreign exchange deposits*
- *Bank Credit to Public is the credit given to public by all commercial banks and development and investment banks. It includes the credit received by local governments. It does not include Central Bank Credits to either government or private agents.*

Figure 5: Shares of Total Deposit and Total Credit in the Assets of the Banking Industry



Note: Banking Sector includes all commercial bank, and development and investment banks. Credit figures are aggregated for public and private.

Figure 6: Pattern and Composition of Financial Securities

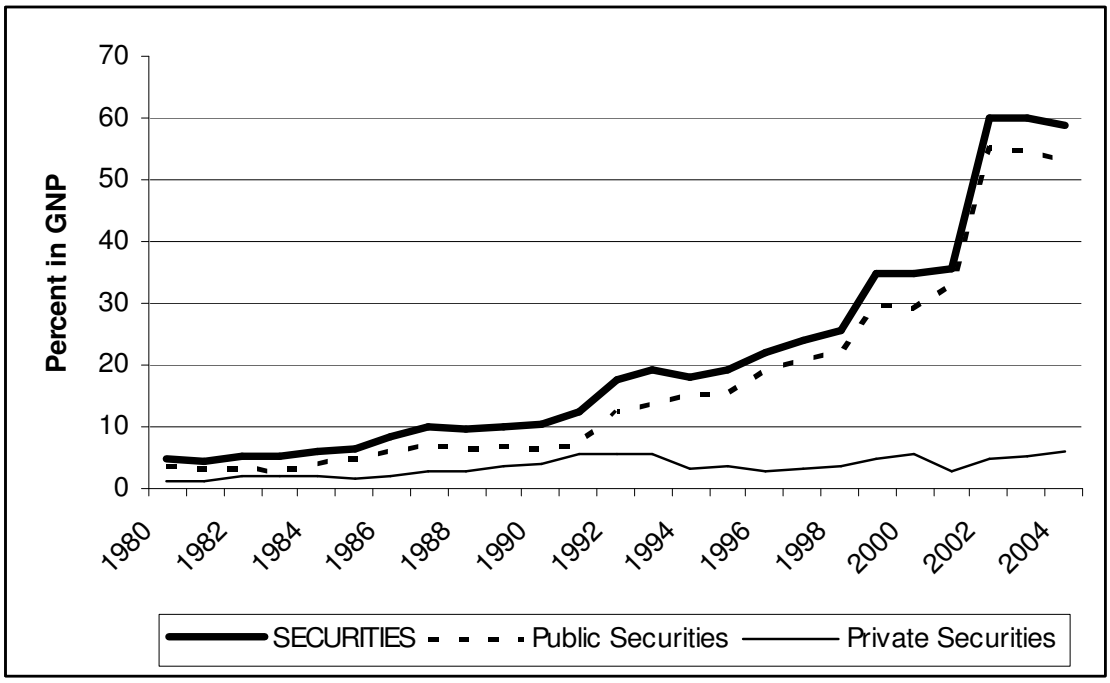


Figure 7: Public Sector Borrowing Requirement and Interest Payments

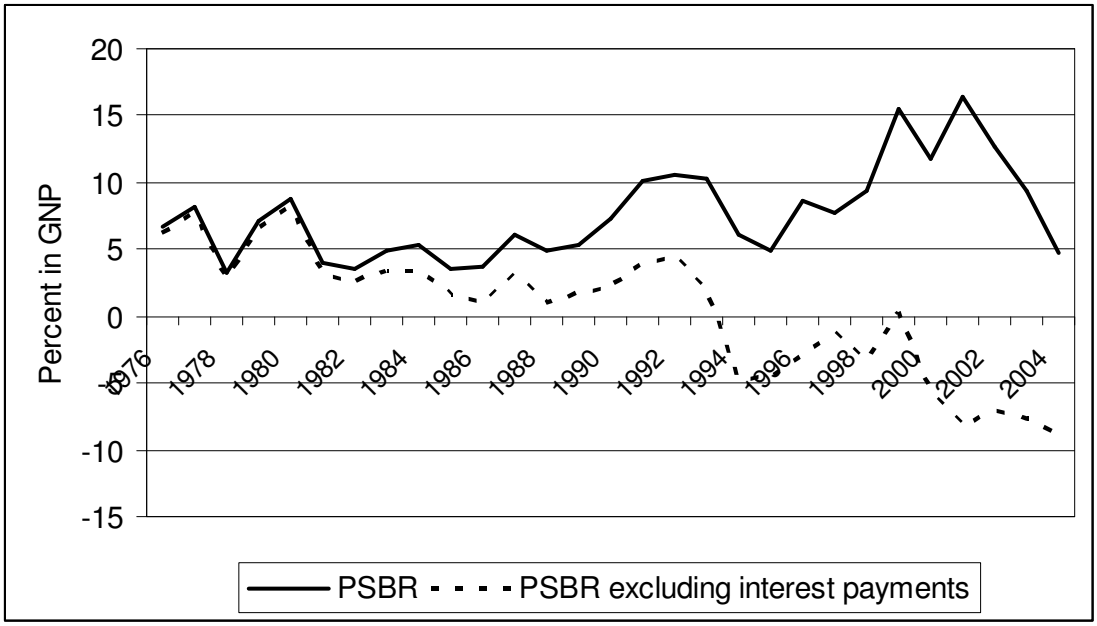


Figure 8: Mobilization of Savings – Currency Composition of Total Deposits

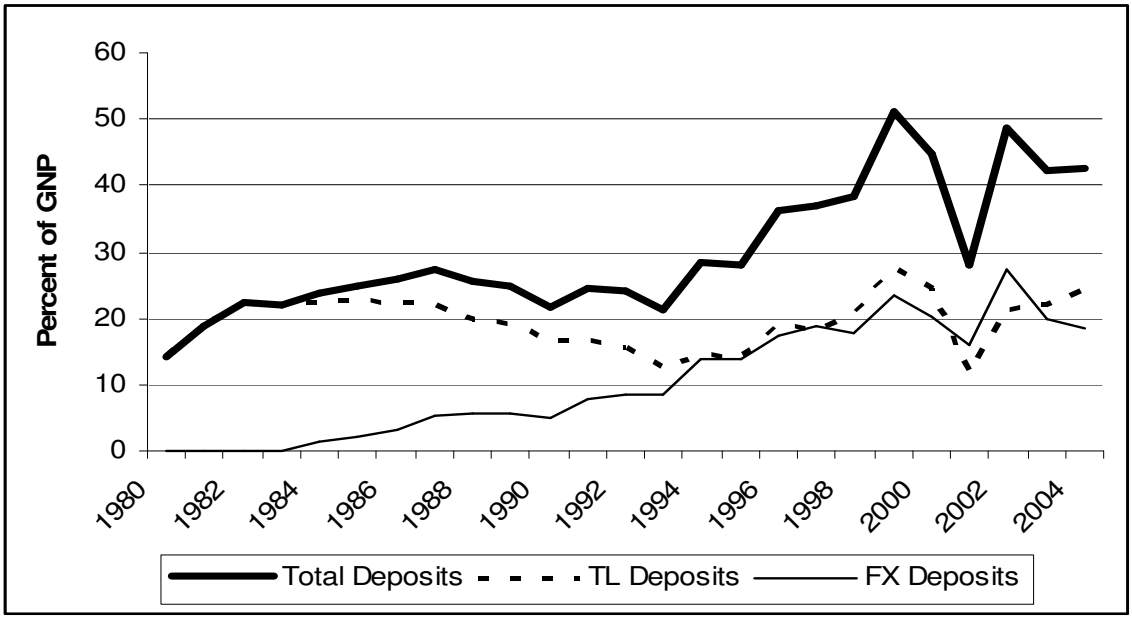
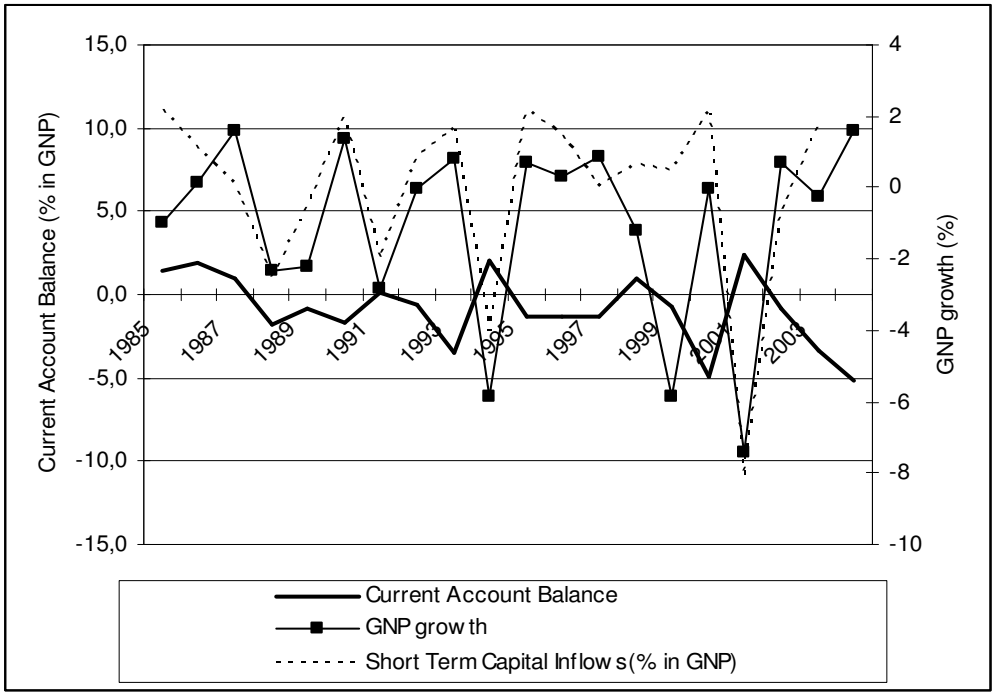
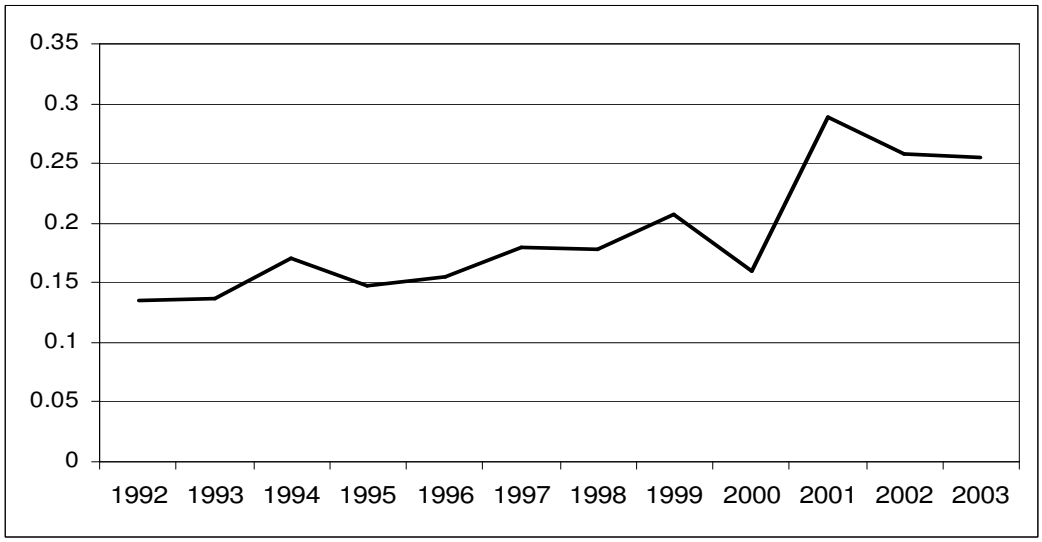


Figure 9: Pattern of Short Term Capital Inflows (STCF) Growth and the Current Account Balance



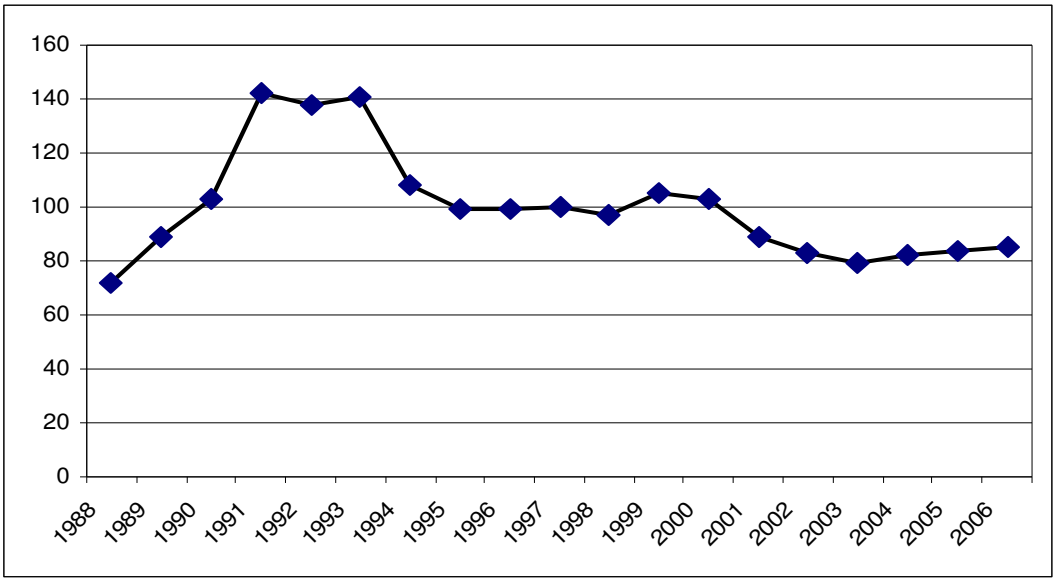
Note: Both Short Term Capital Inflows as percent in GNP and GNP growth rate are shown on the second Y scale on the right.

Figure 10: The Median of Firm Level Share of Exports in Total Sales



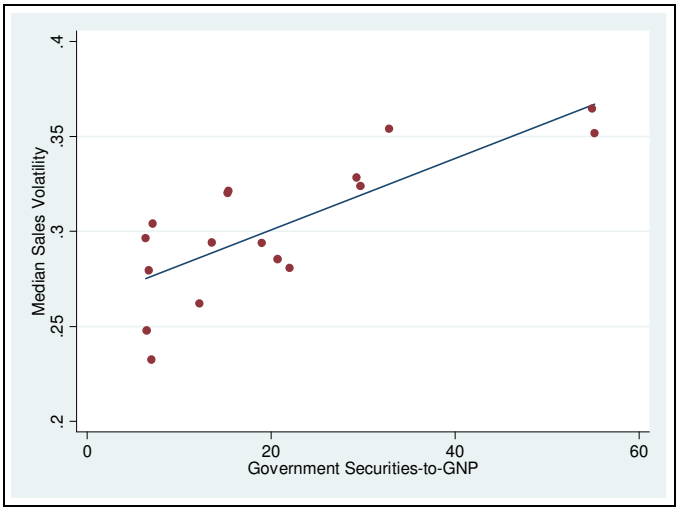
Source: Author's calculations based on the constructed data set.

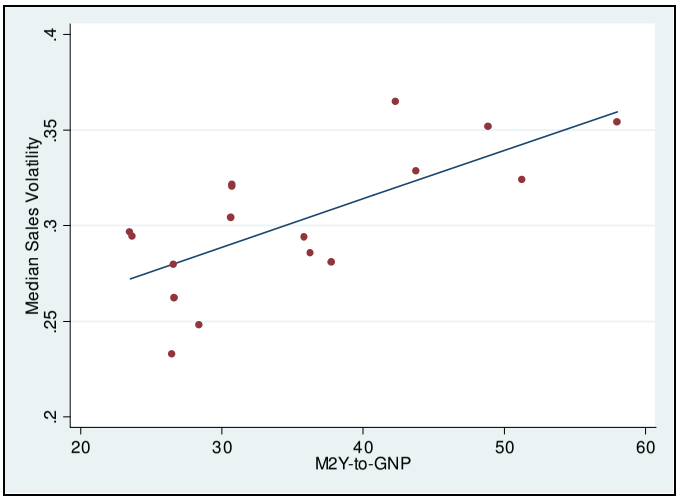
Figure 11: Real Wages in Private Manufacturing Industry

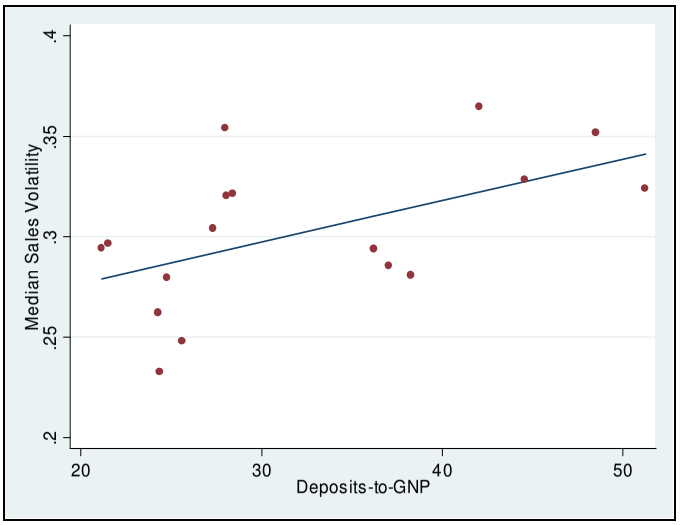


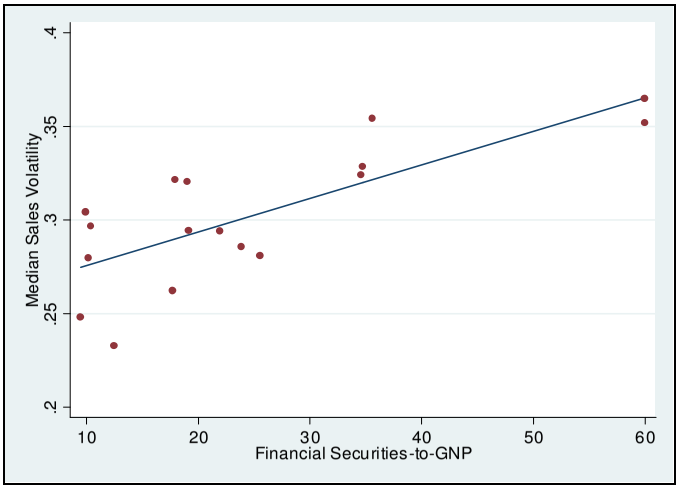
Note: The series is an index of Real Earnings Per Production Worker in private Manufacturing Industry (1997=100) as issued by TURKSTAT

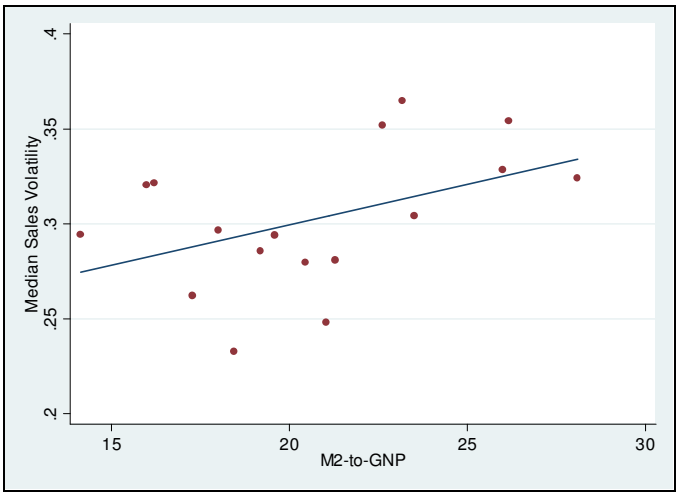
Figure 12: Median of Firm-Level Sales Volatility and Indicators of Financial Liberalization

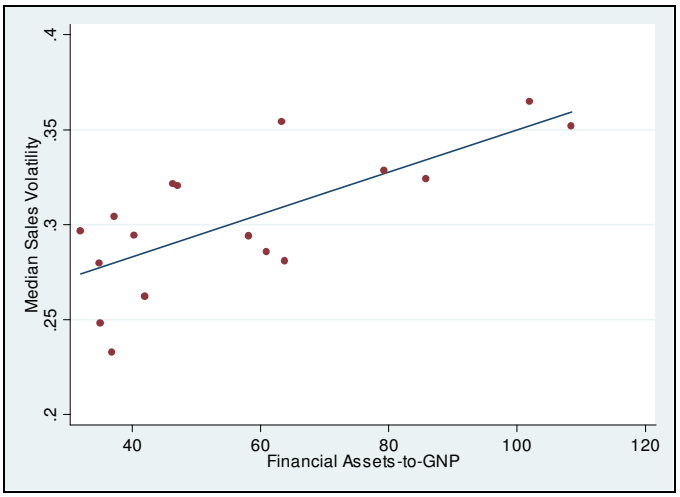


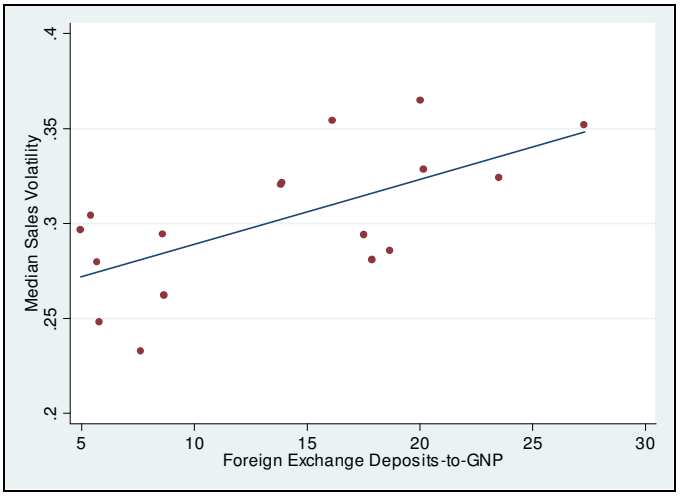

Median Sales Volatility
.2
.25
.3
.35
.4
20
30
40
50
60
M2Y-to-GNP

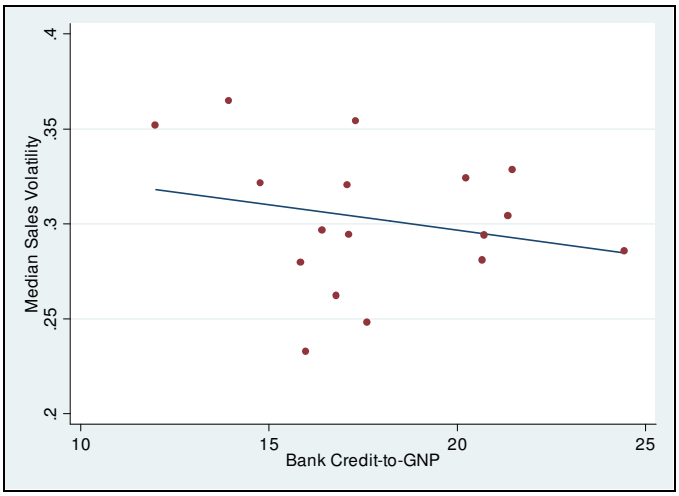

Median Sales Volatility
.2
.25
.3
.35
.4
20
30
40
50
Deposits-to-GNP


Median Sales Volatility
.2
.25
.3
.35
.4
10
20
30
40
50
60
Financial Securities-to-GNP


Median Sales Volatility
.2
.25
.3
.35
.4
15
20
25
30
M2-to-GNP


Median Sales Volatility
.2
.25
.3
.35
.4
40
60
80
100
120
Financial Assets-to-GNP


Median Sales Volatility
.2
.25
.3
.35
.4
5
10
15
20
25
30
Foreign Exchange Deposits-to-GNP



Notes:

- *Sales volatility is calculated as the coefficient of variation in sales-to-capital ratio.*
- *Financial deepening measure on horizontal axis is in percent terms.*
- *The line is derived from a simple linear regression of sales volatility on the liberalization indicator.*

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