Financialization and Manufacturing Firm Profitability under Uncertainty and Macroeconomic Volatility: Evidence from an Emerging Market

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Abstract: Using semi-annual data from 1993 to 2003 for all publicly traded manufacturing firms in Turkey, this paper explores the impacts of macroeconomic uncertainty and external shocks on profitability of real sector firms in the presence of multiple investment options in both real and financial sectors. The paper argues that increasing availability and accessibility of investment opportunities in the financial markets help real sector firms sustain profit margins despite market rigidities, increasing goods market competition, or higher levels of risks. The empirical results based on dynamic panel estimations show that increasing macroeconomic uncertainty and volatility have a significantly negative effect on firm profitability. In contrast, increasing share of financial investments in total assets is found to be reducing such negative effects at a statistically and economically significant level.

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1. Introduction

What are the effects of macroeconomic uncertainty, volatility and risk on manufacturing firms' profitability in developing countries in the presence of multiple investment options in real and financial sector activities? Given that the profit rate signals both the rate return on investment and also the availability of investment financing, the question is of particular importance for the investment and growth performance of manufacturing sectors that are the engine of growth and employment generation with the potential for long run dynamic gains in developing countries.

The collapse of the Bretton Woods system in 1973 initiated a structural transformation in the world economy including the disproportional growth of capital market transactions vis-à-vis goods markets. The ensuing privatization of foreign exchange rate risk and liberalization of domestic and international financial markets weakened the link between real and financial sector transactions such that the annual foreign exchange to world trade ratio jumped from 2/1 in 1973 to 76/1 in 2007 (Bank for International Settlements (BIS), 2007; World Bank, 2008). There is growing research analyzing the impacts of these changes including the increasing availability and accessibility of various financial investment options, and higher levels of uncertainty on real sector firms' profitability and investment performances. In this paper we contribute to the existing research by exploring the determinants of firm profitability under uncertainty in a major emerging market, Turkey, where increasing goods and capital markets liberalization went hand in hand with higher levels of macroeconomic uncertainty and volatility.

While offering substantial benefits, the new era of financial liberalization has also meant higher macro and microeconomic uncertainty and volatility in developing countries. In this environment, liberalized financial markets and new financial engineering methods have offered multiple investment options to firms to hedge their risks and diversify their portfolios. In retrospect, the portfolio choice problem of real sector firms and the optimum allocation of resources under multiple investment options and uncertainty is not a new topic in economics. Tobin (1965), for example, already discussed the substitutability of real and financial investments depending on the respective rates of returns. Similarly, Tornell (1990) argued that in the face of higher uncertainty in developing countries, real sector firms may choose to invest in more liquid *reversible* assets in financial markets that also offer comparable or higher rates of return than on *irreversible* fixed assets.

On the empirical front, there is a growing body of research looking into the causes and effects of the increasing substitutability of fixed and financial investments by real sector firms. In particular, the so called 'financialization' literature explores the short-term and long-term implications of: a) increasing rates of return on financial capital over and above those on fixed capital, b) increasing acquisition of short term financial assets by real sector firms, and c) decreasing fixed investment rates. Arguing that firms increasingly choose to invest in reversible short-term financial assets rather than irreversible long-term fixed assets, Stockammer (2004), Crotty (2005), Dumenil and Levy (2005), and Epstein and Jayadev (2005) using macroeconomic data, provide evidence on this structural change in the portfolio allocation decisions of non-financial corporations in high income OECD countries. In the US, for example, non-financial corporations' portfolio income to cash flow ratio is found to have increased from around 14% in 1960s to around 37% towards the end of 1990s (Crotty, 2005). In the case of developing countries, Demir (2009a), using firm-level data, finds

similar changes favoring financial investments in the portfolio allocation of real sector firms in the face of higher risks and uncertainty in Argentina, Mexico and Turkey with negative long-term effects on fixed capital formation.

On the other hand, financialization of real sector investment decisions is expected to increase firms' profitability. In particular, we argue that increasing availability *and* accessibility of financial investments enable real sector firms to sustain profit margins in the face of market rigidities, falling operating profitability rates, increasing goods market competition, and higher levels of risks. As a result, one would expect an asymmetric effect of uncertainty and volatility on firm profitability depending on the share of financial investments in firm portfolios. Accordingly, while increasing risk and volatility are likely to reduce operating profits and increase short-term liabilities, they may boost financial profits and the value of short-term financial assets. Hence, we expect to find diverging profitability rates between firms with limited and those with full access to financial investment options.

The empirical results using semi-annual data for all publicly traded manufacturing firms in Turkey show that increasing macroeconomic uncertainty and capital flow volatility have an economically and statistically significantly negative effect on firm profitability. In contrast, increasing share of short-term financial assets in total assets is found to be reducing such negative effects at an economically and statistically significant level.

2. Profitability, Uncertainty and Financial Liberalization

The determinants of firm-level profit variation, based on the nature of product market competition, economies of scale, and outside competitive forces in the form of entry-exit barriers, have long been an active topic of research (Porter, 1980; Slater and Olson, 2002). In this field, a major issue for both developed and developing countries has been the examination of time-series behavior of firm profitability using the persistence of profitability method, which suggest that there are differences between firms' long-run equilibrium profit rates and changing degrees of strength and duration of yearly above the average profits reflecting the influence of both industry and firm level factors (Mueller, 1990; Waring, 1996; McGahan and Porter, 1999; Glen, Lee and Singh, 2001; Kambhampati and Parikh, 2003; Yurtoglu, 2004; Goddard, Tavakoli and Wilson, 2005). More recently, firm level heterogeneity in explaining profit variation through trade openness has also been at the center of a growing research along the lines of new trade theory (Melitz, 2003; Baldwin, 2005)

Likewise, there is considerable work on the effects of macroeconomic uncertainty and volatility on firm profitability in developed countries.[1] Jorion (1990), Amihud (1993), Bartov and Bodnar (1994), and Bartov, Bodnar and Kaul (1996) focusing on the US multinational firms, for example, find a negative effect of uncertainty and volatility on firm profitability. On the theoretical front, Shapiro (1974) and Dumas (1978) show a negative effect of exchange rate uncertainty and volatility on firm profitability, while Baum, Caglayan and Barkoulas (2001) point out an indeterminate effect of volatility on profit growth rates.

Regarding volatility in global markets, there have been significant changes with major ramifications for firm profitability in developing countries. In particular, for a variety of reasons that are open to debate (including the role of goods and capital market openness, institutions, financial development, etc.), macroeconomic volatility has been much higher in developing countries than developed ones. In the case of growth volatility, while it declined in developed countries during the 1990s (McConnell and Perez-Quiros, 2000), Montiel and

Serven (2004) report an increase in one third of 77 developing countries, with an overall volatility twice higher than the developed ones. Likewise, terms of trade volatility is found to be more than three times higher in developing countries (except in East Asia) during every decade since 1960 (Loayza et al., 2007). Furthermore, there is evidence that volatility has been on the rise during the 1980s and 1990s. Kose, Prasad and Terrones (2003) show an increase in consumption volatility in emerging markets during the 1990s. The volatility of capital flows to developing countries is also found to be 'high, rising and unpredictable" during the 1990s compared to 70s and 80s (Gabriele, Boratav and Parikh, 2000, p.1051). The empirical evidence also shows an increase in the volatility of stock markets and the earnings of firms in both developed and developing countries for the last three decades (Grabel, 1995; Comin and Mulani, 2006; Wei and Zhang, 2006). Increasing exchange rate and capital flow volatility are also found to raise inflation uncertainty and encourage financial investments while discouraging fixed investments by real sector firms (Felix, 1998; UNCTAD, 2006; Demir, 2009a, 2009b). Furthermore, World Bank (2000) estimates that reducing consumption volatility may create welfare gains in the order of 4%-10% of consumption in 20 Latin American countries (with an overall mean of 20% and median of 7.7%) though such gains would be 1.2% on average in developed countries. In addition, despite comprehensive reform programs persistent capital market imperfections and high real interest rates in developing countries continue to hurt firm profitability.

In the case of Turkey, the standard deviation of real GDP growth has steadily increased from 3.3% to 5.5% and 6.3% 1980-88, 1989-1994, and 1995-2001, respectively before dropping to 1.7% during 2002-2007. In addition, from 1982-1989 to 1990-2007 the coefficient of variation of annual real short-term capital inflows has increased by three-folds. Increasing capital inflows (reaching $203 billion during 1990-2007) also periodically led to considerable appreciation of domestic currency and hurt profitability in tradable goods sectors. Between January 2002 and December 2007, for example, net quarterly portfolio capital inflows reached $155 billion while the effective real exchange rate appreciated by 30%. We also observe an increase in real (and nominal) exchange rate volatility (measured by average 12 month standard deviation of monthly real exchange rate logarithmic change) from 2.3% during 1981-89 to 2.8% during 1990-2001and to 3.4% during 2002-2007.

Moreover, despite large capital inflows, private firms continue to face strict credit rationing and are forced to finance their investments mostly from internal sources or short-term borrowing. As of 2007 (also during 1992-2007), the share of short-term debt in total debt of top 500 private manufacturing firms was around 70%. In the case of capital market deepening, money markets in private securities remained quite underdeveloped such that around 98% of secondary market transactions were of government securities in 2004 (Capital Markets Board, 2004). The high levels of real interest rates, averaging 10% during 1991-2007, also hurt firm profitability and investment performance.

The presence of large financial gains appears to be one of the key reasons why real sector firms prefer to invest in financial assets, especially in the form of government debt securities. This process also leads to serious currency and maturity mismatch in the balance sheets of real and financial sector firms as a result of borrowing from abroad with short-term maturities at low interest rates and lending to the government. As of 2005, 37% of total interest income of private commercial banks in Turkey came from public sector securities. Similarly, the average ratio of revenues from financial investments to net profits of top 500 manufacturing firms increased from around 22% during 1982-1988 to 42% during 1989-

1994 and further up to 160% during 1995-2001 (with a maximum of 546% in 2001). Although it declined during 2002-2007, it still amounted to an average of 54% (Istanbul Chamber of Industry).

3. Empirical Analysis

3.1. Model Specification

In the determinants of profitability literature, a major question has long been the relationship between the degree of freedom of market entry and exit, and the presence of above-normal profits. It is generally argued that in case abnormal profits persists, this is likely to result from firm level differences such as know-how, internal resources, or easier access to credit and financial markets (that may position them better in the face of uncertainty and volatility) (Goddard, Tavakoli and Wilson, 2005). Following this line of research we adopted a similar empirical specification in equations (1) and (2) below as in Kambhampati and Parikh (2003), Yurtoglu (2004), and Goddard, Tavakoli and Wilson (2005) where we tested: a) the effect of uncertainty and external shocks on operating, and net profitability, and b) the effect of financial investments on net profitability under uncertainty and external shocks.

However, different from previous research, we argue that there are two adjustments needed for the correct empirical specification of firm profitability under financialization in developing countries: a) Given the importance of profits from non-operating activities, firms with better access to financial investments may have higher profitability rates. Therefore, to the extent that firms' financial investments are not industry specific and are independent of other market characteristics, any analysis of firm profitability should separate operating profits from non-operating (i.e. financial) ones, and b) Instead of total assets, fixed assets should be used for normalizing the profit variables. We argue that the use of total assets is problematic given that most developing countries (despite high inflation rates) do not use inflation accounting that leads to considerable distortion in the measurement of total assets.[2] As a result relatively new acquisitions, and/or newly established firms appear to have higher asset values that distort the profitability rates asymmetrically and cause measurement bias. Consequently, the findings of previous studies on firm profitability are questionable given their continued use of net profits to net assets ratio as the profitability measure irrespective of any of these two points.

Consequently, we test our hypotheses using the following equations:

$$\pi^{k}_{i,t} = \alpha_1 \pi^{k}_{i,t-1} + \alpha_2 \pi^{k}_{i,t-2} + \alpha_3 KO_{i,t} + \alpha_4 Share_{i,t} + \alpha_5 Size_{i,t} + \alpha_6 Sales_{i,t} + \alpha_7 Risk_t + \varepsilon_{i,t} \quad (1)$$

$$\begin{aligned} \pi_{i,t} &= \beta_1 \pi_{i,t-1} + \beta_2 \pi_{i,t-2} + \beta_3 KO_{i,t} + \beta_4 Share_{i,t} + \beta_5 Size_{i,t} + \beta_6 Sales_{i,t} \\ &+ \beta_7 Risk_t + \beta_8 Risk_t * FK_{i,t} + \nu_{i,t} \end{aligned} \quad (2)$$

where *i=1, …, N and t=1, …, T* respectively refer to the cross section and semi-annual time series elements of the data. Here $\varepsilon_{i,t}$ and $\nu_{i,t}$ are the error terms.

$\pi^{k}_{i,t}$ is the rate of profit from real sector activities measured by the operating profits to net fixed assets ratio, and $\pi_{i,t}$ is the total profitability rate measured by the net profits before

taxes to net fixed assets ratio. The lagged dependent variables are included to control for the speed at which market competition affects profitability.

$KO_{i,t}$ is the capital output ratio to control for capital intensity and capacity utilization. Increasing *KO* may reflect falling capacity utilization and therefore negatively affect profit rates (Glen, Lee and Singh, 2001).

$Share_{i,t}$ is the company sales to two-digit industry sales ratio. Increasing market share and market power is expected to increase profitability rates.

$Size_{i,t}$ is the natural log of end-of-period net fixed assets (net of depreciation and land) that controls for size effects. Depending on the scale and scope economies, a positive relation is expected. Alternatively, if growing size leads to diseconomies of scale, size-profit relationship can also be negative (Goddard, Tavakoli and Wilson, 2005).

$Sales_{i,t}$ is the net sales growth variable controlling for the effect of sales and market demand on profitability. A positive coefficient suggests that faster growing firms are more profitable than others.

$Risk_t$ is a vector of uncertainty and external shock variables including manufacturing inflation and real exchange rate uncertainty ($Risk^{Inf}$ *and* $Risk^{Rer}$), real interest rate (*Int*), and short-term capital flow volatility (*SCFV*), each with an expected negative coefficient. The uncertainty variables are measured by two alternative methods including: a) semi-annual average standard deviations of monthly innovations to a forecasting equation based on an AR(1) process including a time trend and monthly dummies, and b) semi-annual average monthly variance from a GARCH (1,1) process:

$$x_t = \alpha_0 + \alpha_1 t + \sum_{i=1}^{11} \lambda_i d_t + \alpha_2 x_{t-1} + \varepsilon_t$$
$$h_t^2 = \beta_0 + \beta_1 h_{t-1}^2 + \beta_2 \varepsilon_{t-1}^2 \qquad (3)$$

where x is the variable of interest, t is time trend, d is a monthly dummy, h_t^2 is the conditional variance of ε_t and is the uncertainty measure. The results are reported using only the GARCH method given that it is closer to the true meaning of uncertainty.[3] However, results from (a) were not significantly different.

The real interest rate (*Int*) is included in $Risk_t$ in equation (2) to determine its effect on net profits after controlling for the share of financial assets in total assets (*FK*). We expect that increasing real interest rates, by raising cost of debt servicing and new borrowing, will have a negative effect on net profits.

The external shock variable explores the effects of the volatility of short-term capital inflows (*SCFV*) on profits through its effects on boom-bust cycles, exchange rate and domestic price fluctuations, country risk and interest rates as well as aggregate demand and growth. The volatility variable is measured by the semi-annual standard deviation of monthly real net short term capital inflows by non-residents.[4]

The second key variable of interest is the share of liquid financial assets in total assets ($FK_{i,t}$) in equation (2). The financial assets include current assets (cash, bank deposits, other current assets, checks) and short-term investments (stocks, T-bills, government bonds, private sector bonds, REPO and other short term investments) measuring the sum of total liquid monetary assets.[5] The total assets variable, on the other hand, is the sum of net fixed assets (net of land and depreciation) and financial assets. Financialization of firm investments and thus increasing *FK* ratio can help firms hedge against risks while benefiting from rising

returns in financial markets. It also increases firms' responsiveness to market fluctuations. In equation (2) we control for the interaction between financial investments, risk and net profitability by including an interaction variable of $Risk_t*FK_{i,t}$. Accordingly, we expect increasing share of financial assets to reduce the negative effect of risk on net profitability.

3.2. Data

The dataset is from the audited financial accounts of all publicly traded manufacturing firms in Turkey as disclosed in the Istanbul Stock Exchange Market online database and is unbalanced. The period analyzed is semi-annual and cover 1993:1-2003:2. We stopped the data series in 2003 due to the switch to inflation accounting starting from 2004 that made the comparison with the old series impossible. Unlike previous studies that use annual data, we use semi-annual data to capture the effects of sudden changes in uncertainty and volatility on the profitability and investment positions of firms, especially with regard to financial investments that are subject to rapid short term changes. Using end of year values for financial investments and profits would yield a distorted picture of the changes taking place in the balance-sheets and income statements in response to market risk and volatility. Given the highly liquid nature of financial assets, a better choice would be to use quarterly data. Yet, given that quarterly financial statements are not subject to independent auditing, we used semi-annual statements. In the final panel, there are 172 firms with a minimum of nine consecutive time series in the following industries given by their International Standard Industrial Classification (ISIC) codes (number of firms in parenthesis): 15(27), 17(38), 20(2), 21(9), 22(4), 23(2), 24(13), 25(5), 26(28), 27(7), 28(6), 29(11), 30(1), 31(4), 32(3), 34(11), 36(1). The firms included account for 22% of total manufacturing sales in Turkey in 2003. We used the unbalanced panel rather than forcing it to be balanced in order to: a) examine the effects of *Risk* on small and large, new and old firms alike given that they may get market listing only if they satisfy certain conditions, which may be related to their response functions to *Risk*, and b) analyze the effects of financial investments and earnings that may be directly related with firm size, age, and entry and exit characteristics. Thus, we included the systematic element in the sample selection with the bias (if any) it introduces to explore the asymmetric effects *Risk* and *FK* have on firm profits.

However, as a robustness test we also repeated the analysis with two balanced subsets of the original unbalanced panel: one for the entire period (1993:1-2003:2) using 58 firms for which the data were available, and a second one using 115 firms for the period of 1996:1-2003:1. While the reported results are those from both the unbalanced and the balanced panels for the full period, those with the balanced panel for 1996:1-2003:1 were not significantly different than those reported and are available from the author upon request.

Turning to descriptive statistics, a quick look at both balanced and unbalanced panels in Table 1 and 2 reveals a steady decline in median operating profitability (defined by the operating profits to net sales ratio) that dropped from around 20% in 1993 to less than 4% in 2003, possibly reflecting increased product market competition during this period resulting from elimination of barriers of entry of foreign firms, and rising import competition after Turkey's entry to Customs Union with the European Union in 1995. We see a similar downward trend in median operating profit to fixed assets ratio (π^k**)** as well. This may also help explain the increasing dependence of real sector firms on financial investments. In contrast, financial profits increasingly became a significant part of total profits, with a rate of return (π^f) at times exceeding that of operating profits (π^k) as was the case after February 2001 crisis (we observe a similar trend regarding the changes in *FK* ratio). Supporting the

risk/return relationship, the financial profitability variable reached its peaks in 1994:1 and 2001:1, the periods of two serious financial crises in Turkey. Also, the covariance between financial profits and operating profits to capital ratios ($\pi_{i,t}^{f}$ and $\pi_{i,t}^{k}$) is found to be 0.01 that underscores their different determinants.

<INSERT Table 1&2 Here>

3.3. Methodology

In order to correct for parameter endogeneity resulting from the presence of unobserved firm-fixed effects as well as to correct for the correlation between the lagged endogenous variable, and the firm specific effects and the error term, we used the augmented system Generalized Method of Moments (GMM) estimator by Arellano and Bover (1995) and Blundell and Bond (1998).[6] Accordingly, we estimated equations (1) and (2) separately using the two-step system GMM method with Windmeijer (2005) finite-sample correction method that gives asymptotically robust standard errors. The system GMM technique estimates a system of equations in the first differences and levels. Arellano and Bover (1995) show that when the original Arellano and Bond (1991) first differencing estimator is used the lagged level values of variables are often poor instruments for first differences. Thus Arellano and Bover (1995) suggested that if the original equations in levels were added to the system additional moment conditions could be added to increase efficiency. Accordingly the system pools (*t-s*) first difference equations with an additional set of (*t-s*) level equations. While the first difference specification uses the lagged levels as instruments, the level equation utilizes the lagged first differences as instruments. In this estimation, if x_i is serially uncorrelated then $x_{i,\ t\text{-}s}$ will be uncorrelated with $x_{i,t}^{*}$ for $s \geq 2$. This means that if the error term is serially uncorrelated, lagged values of the transformed and untransformed dependent variable and other right-hand side variables dating *t-s* will be uncorrelated with the error term as long as $s \geq 2$. The validity of the estimation is tested by: a) The Hansen test of over-identifying restrictions for testing the validity of instruments used, b) The m_2 test that is a second-order serial-correlation test of the residuals from the first-difference equation given that the use of endogenous *t-2* dated variables is valid only if there is no serial correlation in the error term of order 2.

4. Results

Using equation (1), Table 3 shows that in both unbalanced and balanced panels inflation uncertainty ($Risk^{Inf}$) and short-term capital flow volatility (*SCFV*) have significantly negative effects on operating profitability. The real exchange rate uncertainty ($Risk^{Rer}$), however, is found to have a statistically insignificant positive coefficient. Looking at the economic significance of $Risk^{Inf}$ and *SCFV* using point elasticities, we find that a 10% increase in inflation uncertainty, and capital flow volatility reduces operating profits by 2.1%, and 1.9% respectively.

<INSERT Table 3 Here>

Furthermore, in both balanced and unbalanced panels, there is persistency in operating profits with two period lagged profitability rates being statistically significant at

1% level. Also, similar to Kambhampati and Parikh (2003), capital-output ratio appears with a negative and highly significant coefficient (at 1% level) suggesting that firms with higher capital intensity earn lower profits possibly reflecting decreasing capacity utilization. In both panels, the size variable appears with a significantly positive coefficient suggesting that firms benefit positively from size effects. The industry share variable appears with a negative sign yet statistically significant only in the balanced panel. Sales growth is found with the expected positive sign yet at varying degrees of statistical significance.

<INSERT Table 4 Here>

Table 4 presents the results from equation (2) suggesting a significantly negative effect of macroeconomic uncertainty ($Risk^{Rer}$ and $Risk^{Inf}$), real interest rate (*Int*), and capital flow volatility (*SCFV*) on net profits of manufacturing firms. Moreover, the results (suggested by the interaction variables $Risk^{Rer}$*FK, $Risk^{Inf}$*FK, Int*FK, SCFV*FK) indicate that increasing share of financial investments in total assets significantly reduces the negative effects of uncertainty, real interest rates, and volatility on firm profitability. Accordingly, a negative shock is expected to have an asymmetric effect on manufacturing firms based on the share of liquid financial assets in their asset portfolios.

The estimated economic effect of financial assets is also significant. Once an average firm has a certain level of financial assets (*FK*) in its portfolio, say the median level of 14.6%, the negative effect of exchange rate uncertainty on net profits falls by around 30%. For example, in 2001:1 the real exchange rate uncertainty has increased by 423% with respect to the previous period thanks to the February 21, 2001 crisis that led to 27% currency devaluation (against dollar) overnight and 60% depreciation between January and June 2001. Looking at the percentile distribution of firms at that time based on the share of *FK*, we see that the difference is substantial. While the negative effect of the exchange rate shock is reduced only by 8% for the 25^{th} percentile whose *FK* ratio was a mere 4%, it was reduced by 67% for the 75^{th} percentile of the firms whose *FK* ratio was 32%.

Likewise, the real interest rates increased to 16% in 2001:1, which was a 187% increase compared to the same period of previous year. For firms with no financial investments this would translate into a 60% decline in net profits.[7] However, for firms with the median *FK* of 14.6% the interest rate shock would cause a 16% decline in profits that is a significant reduction. In terms of distribution of the shock based on *FK* ratios, the 25^{th} percentile enjoyed only a 20% reduction in the shock while the upper 75th percentile enjoyed a 40% reduction. This result also shows the dilemma faced by real sector firms in the era of financial liberalization. According to Dumenil and Levy (2005)'s estimates, 2.4% and 1.7% of profits of nonfinancial corporations in France and the US respectively were lost due to rising interest payments from the mid 1980s to 2001. Similarly, the share of interest payments in total value added of top 500 private manufacturing firms in Turkey increased from 19% in 1992 to 93.5% in 2001. Therefore, our findings suggest that real sector firms in Turkey may also be using financial investments as a way of hedging against rising interest expenses. This may help explain the significantly positive effect of the interaction variable (*Int*FK*) and the significantly negative effect of real interest rates on net profits.

Next, we turn to the economic effect of external shocks measured by capital flow volatility. The *SCFV* increased by 69% during 2001:1 crisis that, according to the point estimates, would suggest an 80% fall in net profits for firms with zero financial assets.[8] Yet,

a firm with the median *FK* ratio could reduce the negative effect of the shock by 23%. In this case, the 75th percentile would enjoy almost 50% reduction from the effect of the shock.

Finally, the results regarding persistency of net profits and the capital intensity variables are similar to those from Table 3. Size variable overall appeared to have a positive but insignificant effect in the unbalanced panel while a negative but still insignificant effect in the balanced panel. The industry share variable appeared with a positive coefficient in the unbalanced and a negative one in the balanced panel, both statistically insignificant.

4.1. Firm Heterogeneity

Following the firm heterogeneity literature (i.e. Bernard and Jensen, 1999; Melitz, 2003; Baldwin, 2005), we explored further the effects of uncertainty and volatility on firm profitability based on the degree of firms' openness, measured by the percentage share of exports in total sales. The export shares show the degree of output tradability, competitiveness and firm's access to international markets. Bernard and Jensen (1999) show that size, wages, productivity and capital intensity of exporting firms are higher than those of non exporting ones in the US. Furthermore, firms with access to external markets are expected to perform better in dealing with risk and uncertainty. Assuming that firms involved in foreign trade have more knowledge and access to foreign financial markets, they may benefit from hedging instruments that are not available to other domestic firms. Such firms may also have better access to external finance and as a result may shield themselves from unexpected downturns or internal and external shocks. If this is the case, the negative effect of uncertainty and volatility should decrease with increasing openness (tested by two interaction variables: *Risk*Exports, SCFV*Exports*).[9] On the other hand, Klein, Schuh and Triest (2003) find that industry openness to international trade increases the labor market response to real exchange rate fluctuations in US manufacturing industries. Also, given the low levels of financial development and limited hedging instruments in developing countries, exporting firms may be more exposed to uncertainty and volatility. Especially given that developing country exporters of manufactured goods are price takers in foreign markets, exchange rate uncertainty may have profound effects on firm profitability.[10]

Furthermore, depending on the differences in the hedging strategies and the management of risk, more open firms may utilize financial investments more effectively than others. As a result increasing openness may affect the way *FK* interacts with uncertainty and risk (i.e. *Risk*FK*Exports, SCFV*FK*Exports*). Accordingly, the cushioning effect of FK may increase as firms' openness rise.

A quick look at the summary statistics show that the leverage (i.e. external debt to total assets ratio), operating profitability, and *FK* ratios increase with openness. Accordingly, while firms that export less than 10% of their output have (on average) leverage, operating profitability and *FK* ratios of 57%, 47%, and 23%, those with more than 90% of sales have 63%, 85%, and 28%, respectively. However, the net profits to capital ratios appear to be similar with an average of 42% and 43% respectively. The radical increase in the degree of openness of firms from an average (median) of 15% (6%) in 1993:1 to 29% (25%) in 2003:2 also make it interesting to explore any heterogeneous response among Turkish firms.

<INSERT TABLE 5&6 Here>

Looking at the results from Tables 5 and 6, we do not find any significant effect of openness (in either unbalanced or balanced panels) on operating or net profitability. Likewise, we find no significant evidence that uncertainty or volatility affect firms' operating profitability differently based on the degree of openness. When exploring how *FK* interacts with uncertainty and volatility, and openness, however, we find some evidence suggesting that openness matter. Economically speaking, the cushioning effect of *FK* against uncertainty and volatility is found to be decreasing with increasing openness, although at statistically insignificant levels (except in the balanced panel with respect to $Risk^{Rer}$).

Further exploring the dispersion effects, we analyzed how external indebtedness (measured by the leverage ratio) affects firm performance. Accordingly, while increasing leverage reflects firms' access to external finance and therefore has a positive effect on profitability, it may also make them more vulnerable to uncertainty and volatility, and reduce the cushioning effect of financial investments in the face of increasing risks. The (unreported) regression results show that increasing leverage has an economically and statistically significant operating and net profitability boosting effect. However, measured by interaction variables between uncertainty and volatility, and leverage, increasing external indebtedness is also found to be worsening the negative effect of uncertainty and volatility. Moreover, in the face of uncertainty and volatility, the cushioning effect of *FK* is found to be significantly decreasing with increasing leverage ratio.

5. Conclusion

The findings in this study suggest that increasing uncertainty, real interest rates and capital flow volatility have a significantly negative effect on manufacturing firm profitability in Turkey. In contrast, increasing financial investments by the same firms are found to be reducing the impacts of such negative shocks at statistically *and* economically significant levels. Therefore, increasing investment opportunities in the financial markets may play a positive role in firm profitability by diversifying firms' investment portfolios and work as a cushion against unexpected downturns in the market.

However, as can be seen from the increasing importance of financial profits in the overall profitability of Turkish manufacturing firms, this transformation may also constrain firms' ability and willingness to invest in long-term fixed investment projects that are irreversible and profitable only in the long run. Hence, as real sector firms increase the share of liquid short-term assets in their portfolios, we may see a transformation in the pattern of specialization of these firms away from being primarily involved in manufacturing activities. In fact, such a transformation may already be under way given that the share of manufacturing value added in GDP dropped from around 22% during 1990-2001 to around 17% during 2002-2007, with a low of 16.6% in 2007 that is the lowest level since 1980. Consistent with this, the share of private gross fixed capital formation in GDP also declined from 17% during 1990-2001 to 14% during 2002-2007.

For further research, applying the financialization framework of profitability analysis to other developing countries may help uncover the sources of divergent real sector responses to financial liberalization in those countries.

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Notes

[1] For a review of the effects of uncertainty and volatility on investment and growth, see Aiginger (1987), Pindyck (1993), Serven (1998), and Asteriou and Price (2005).

[2] Average consumer inflation was 50% and 71% in Turkey during 1980-89 and 1990-2002.

[3] When using Garch based uncertainty variables, we used AR based uncertainty measure as an instrument due to the fact that the former uses past as well as future information while the latter uses only current and past information.

[4] The net short-term capital inflows by nonresidents is measured using the Balance of Payments statistics of Central Bank of Turkey as the sum of equity and debt securities liabilities, other investment liabilities-loans-banks and other sectors, other investment currency deposits-banks and other investment-other liabilities.

[5] Long-term financial fixed assets in other firms are excluded given that under Turkish Generally Accepted Accounting Principles they are recorded at historical cost.

[6] The estimates are obtained using the xtabond2 command in Stata 9.2 written by David Roodman.

[7] Using point elasticities at mean values of 12.9% and 32% for real interest rates and total profitability respectively.

[8] Based on the *SCFV* elasticity of net profits of 1.166 given the mean value of *SCFV* of $946 million.

[9] Due to the potential endogeneity between export shares and uncertainty and volatility, we used one-period lagged values.

[10] For further discussion see, Qian and Varangis (1992), and Klein, Schuh and Triest (2003).

Table 1: Summary Statistics for Unbalanced Panel

	Π^k		Π^f		Π		*FK*		*OS*	
	mean	median	mean	median	mean	median	mean	median	mean	median
1993h1	76.16	54.89	20.12	5.02	65.02	40.43	21.93	17.96	18.8	19.16
1993h2	89.04	67.03	23.97	6.61	79.76	49.83	24.15	18.97	19.4	20.64
1994h1	73.85	58.55	34.64	8.93	52.09	30.36	23.65	17.8	25.9	26.72
1994h2	90.46	63.62	26.44	7.55	81.37	48.64	25.04	19.66	21.7	21.02
1995h1	82.43	52.3	26.28	7.16	91.12	54.3	25.72	20.21	21.2	21.37
1995h2	87	54.73	27.56	9.27	72.14	43.98	24.58	16.59	14.9	17.04
1996h1	69	52.03	30.49	10.93	65.82	39.75	21.58	13.3	17.1	18.85
1996h2	62.99	41.88	23.56	8.13	59.44	38.64	21.95	16.72	15.2	16.16
1997h1	70.83	47.18	23.51	7.78	66.36	34.48	21.12	14.05	17.7	18.52
1997h2	67.12	51.4	23.81	7.41	55.78	30.58	22.01	15.04	16.4	17.82
1998h1	60.7	36.13	25.8	8.92	44.3	24.74	20.06	11.52	22.8	16.11
1998h2	40.92	25.55	24.19	6.08	20.82	12.37	20.04	13.24	10.1	12.05
1999h1	37.88	22.63	23.82	11.35	28.09	9.71	20.51	12.97	10.3	12.26
1999h2	26.38	18.64	28.48	8.02	-2.27	3.93	20.76	13.2	8.82	10.56
2000h1	27.85	18.22	18.31	5.93	15.18	9.29	20.94	14.3	3.71	8.8
2000h2	19.85	10.56	14.25	5.52	12.43	7.72	19.26	12.62	2.97	4.72
2001h1	29.68	24.48	39.64	14.51	-63.76	-12.14	19.82	14.44	-11.1	12.53
2001h2	37.98	18.68	19.48	6.29	12.51	5.42	20.17	14.04	-37.5	11.7
2002h1	28.88	20.81	29.33	9.72	-5.28	6.6	20.34	13.07	-8.03	8.65
2002h2	19.53	18.11	13.69	6.14	-0.07	10.26	20.14	12.84	3.67	6.96
2003h1	12.94	8.85	26.63	9.22	17.49	15.08	18.42	12.38	-4.04	5.22
2003h2	12.61	3	11.04	3.6	5.05	-0.21	17.62	9.92	2.36	1.91
1993h1-2003h2	49.2	29.68	24.43	7.66	32.45	19.51	21.22	14.55	7.95	13.49

Table 2: Summary Statistics for Balanced Panel

	Π^k		Π^f		Π		*FK*		*OS*	
	mean	median	mean	median	mean	median	mean	median	mean	median
1993h1	74.76	55.87	14.19	4.20	55.44	34.36	21.17	17.00	19.85	19.80
1993h2	90.44	68.06	17.90	6.68	71.57	45.39	21.71	17.37	20.01	20.62
1994h1	79.31	64.25	43.67	10.67	50.68	33.45	22.61	16.84	29.97	30.35
1994h2	93.18	60.12	25.94	7.50	84.45	40.86	26.64	20.50	22.16	20.50
1995h1	66.97	54.82	23.34	9.76	71.32	56.04	26.42	18.95	20.60	20.24
1995h2	79.43	51.98	17.74	11.75	61.89	39.18	24.40	16.80	19.18	18.14
1996h1	61.43	49.79	15.26	9.22	52.23	27.91	20.34	13.89	18.82	17.91
1996h2	61.86	53.27	14.04	6.62	53.76	35.73	19.78	12.15	16.31	18.61
1997h1	68.43	52.93	12.86	10.45	54.81	34.98	19.30	13.17	19.86	18.74
1997h2	68.89	58.40	21.47	9.35	46.16	31.42	21.26	17.08	18.27	19.09
1998h1	51.53	38.23	19.69	9.33	35.72	29.96	19.41	11.20	15.81	16.94
1998h2	38.96	24.57	18.51	6.64	22.05	15.47	17.91	11.40	11.82	12.31
1999h1	26.79	14.87	23.05	10.62	9.24	2.91	18.82	10.95	9.20	10.82
1999h2	27.09	18.17	22.70	8.36	12.62	6.20	20.23	10.92	20.97	10.55
2000h1	18.19	17.61	15.66	5.49	5.83	7.13	19.93	13.89	1.43	7.15
2000h2	27.96	13.33	12.22	6.43	32.98	7.66	17.97	12.01	10.36	5.54
2001h1	22.28	22.56	46.97	17.41	-47.21	-3.20	21.02	14.83	6.12	13.57
2001h2	38.72	18.13	15.08	6.66	46.77	11.72	23.16	19.04	22.29	13.37
2002h1	26.59	23.84	27.10	11.12	-0.34	5.08	22.76	16.79	8.39	8.52
2002h2	30.85	23.99	6.61	6.67	14.16	12.02	22.32	16.69	8.75	9.70
2003h1	9.52	6.99	18.15	8.58	-9.58	12.15	19.35	13.08	4.07	5.86
2003h2	13.29	6.00	6.50	3.62	5.98	0.24	17.17	10.20	5.55	2.86
1993h1-2003h2	48.93	31.23	19.95	7.55	33.21	20.76	21.08	14.30	14.99	14.71

Notes: Values in percentages. Π^k, Π^f, Π are operating profits, financial profits and net profits before taxes to net fixed assets ratios respectively. Financial profits include dividend income from subsidiaries and affiliates plus interest income and other dividends, plus other income from other operations net of losses and expenses from other operations. *FK* is financial assets to net fixed assets plus financial assets ratio measured using period averages for both numerator and denominator. *OS* is operating profit to net sales ratio.

Table 3: Dependent Variable: Operating Profitability (Π^k)

	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)
$\Pi^k_{i,\,t-1}$	0.146	-0.051	0.127	-0.067	0.130	-0.072
	(0.100)	(0.101)	(0.098)	(0.096)	(0.102)	(0.095)
$\Pi^k_{i,\,t-2}$	0.233***	0.360***	0.227***	0.343***	0.222***	0.348***
	(0.079)	(0.045)	(0.079)	(0.038)	(0.079)	(0.044)
$KO_{i,t}$	-0.378***	-0.371***	-0.385***	-0.389***	-0.378***	-0.379***
	(0.033)	(0.059)	(0.034)	(0.057)	(0.033)	(0.060)
$Size_{i,t}$	0.031*	0.041*	0.032*	0.059***	0.029*	0.049**
	(0.018)	(0.022)	(0.018)	(0.023)	(0.018)	(0.024)
$Share_{i,t}$	-0.001	-0.002**	-0.002	-0.002**	-0.001	-0.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$Sales_{i,t-1}$	0.036	0.113	0.046	0.108*	0.046	0.118*
	(0.065)	(0.074)	(0.061)	(0.057)	(0.061)	(0.062)
$Risk_t^{Rer}$	4.639	1.155				
	(4.274)	(6.888)				
$Risk_t^{Inf}$			-0.102*	-0.153**		
			(0.061)	(0.078)		
$SCFV_t$					-0.0001***	-0.0001***
					(0.00003)	(0.00004)
Hansen	0.986	1.00	0.990	1.00	0.985	1.00
m1	0.061	0.214	0.061	0.214	0.065	0.213
m2	0.888	0.889	0.906	0.919	0.867	0.933

Notes: Arellano-Bond dynamic panel-data estimation two-step system GMM results with asymptotically robust standard errors in parenthesis. All regressions include an unreported constant variable. (1a) is unbalanced, and (1b) is balanced panel. *, **, *** refer to significance at 10, 5 and 1% levels. Π^k is operating profits to net fixed assets ratio. *KO* is capital-output ratio in natural log, *Share* is firm's output share in two-digit industries. *Size* is natural log of net fixed assets in real prices, *Sales* is real net sales growth measured as log differences. $Risk^{Rer}$ and $Risk^{Inf}$ are real exchange and inflation risk measured by GARCH method. *SCFV* is short-term capital flow volatility. Hansen is the Hansen test of over-identifying restrictions, m1 and m2 are AR(1) and AR(2) tests. All test statistics are given by their p-values. All micro data are converted to fixed prices by Manufacturing Wholesale Price Index, and all macro data by general Wholesale Price Index at 1995 January prices.

Table 4: Dependent Variable: Total Profitability (*ΠΠ*)

	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)
$\Pi_{i,t-1}$	0.236*	-0.186	0.226	-0.227*	0.238*	-0.188	0.229*	-0.211
	(0.139)	(0.133)	(0.139)	(0.134)	(0.139)	(0.143)	(0.139)	(0.138)
$\Pi_{i,t-2}$	0.384***	0.376***	0.381***	0.344***	0.387***	0.379***	0.380***	0.364***
	(0.060)	(0.109)	(0.061)	(0.111)	(0.059)	(0.114)	(0.062)	(0.107)
$KO_{i,t}$	-0.070	-0.261***	-0.029	-0.222***	-0.074	-0.281***	-0.060	-0.262***
	(0.087)	(0.053)	(0.083)	(0.048)	(0.079)	(0.064)	(0.087)	(0.059)
$Size_{i,t}$	0.0215	-0.019	0.035	-0.039	0.034	-0.044	0.032	-0.037
	(0.027)	(0.026)	(0.028)	(0.026)	(0.027)	(0.028)	(0.028)	(0.026)
$Share_{i,t}$	0.001	-0.00003	0.0002	0.0007	0.0005	-0.0003	0.0005	-0.0004
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
$Sales_{i,t-1}$	0.062	0.137***	0.009	0.069*	0.002	0.092**	0.016	0.089**
	(0.094)	(0.045)	(0.094)	(0.039)	(0.104)	(0.042)	(0.097)	(0.044)
$Risk_t^{Rer}$	-92.457***	-71.305**						
	(30.845)	(29.206)						
$Risk_t^{Rer}*FK_{i,t}$	1.923***	1.800**						
	(0.727)	(0.753)						
$Risk_t^{Inf}$			-0.035	-0.299***				
			(0.082)	(0.118)				
$Risk_t^{Inf}*FK_{i,t}$			0.002***	0.002***				
			(0.0004)	(0.0005)				
Int_t					-0.008***	-0.006***		
					(0.003)	(0.002)		
$Int_t*FK_{i,t}$					0.0004***	0.0002		
					(0.0001)	(0.00006)		
$SCFV_t$							-0.0004***	-0.0003***
							(0.0003)	(0.00005)
$SCFV_t*FK_{i,t}$							0.0000062***	0.000005***
							(0.000002)	(0.000001)
Hansen	0.970	1.00	0.980	1.00	0.980	1.00	0.971	1.00
m1	0.102	0.297	0.102	0.296	0.103	0.295	0.101	0.291
m2	0.940	0.715	0.955	0.734	0.974	0.792	0.924	0.690

Notes: Total profitability (*ΠΠ)* is net profits before taxes to net fixed assets ratio. *FK* is the net financial assets to net financial assets plus net fixed assets ratio in percentages, *Int* is average real interest rate measured by [(1+nominal 3-month T-bill rate)/(1+inflation rate)]-1. For other definitions, refer to Table 3.

Table 5: Dependent Variable: Operating Profitability (Π^k)

	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)
$\Pi^k_{i,\,t-1}$	0.147	-0.047	0.127	-0.066	0.132	-0.071
	(0.099)	(0.095)	(0.099)	(0.089)	(0.102)	(0.095)
$\Pi^k_{i,\,t-2}$	0.232***	0.349***	0.226***	0.341***	0.223***	0.355***
	(0.080)	(0.043)	(0.079)	(0.040)	(0.079)	(0.047)
$KO_{i,\,t}$	-0.379***	-0.377***	-0.386***	-0.371***	-0.380***	-0.369***
	(0.033)	(0.054)	(0.035)	(0.052)	(0.034)	(0.062)
$Size_{i,t}$	0.030*	0.044*	0.034*	0.054**	0.029*	0.047**
	(0.018)	(0.232)	(0.018)	(0.026)	(0.018)	(0.023)
$Share_{i,t}$	-0.001	-0.002**	-0.001	-0.002**	-0.001	-0.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$Sales_{i,t-1}$	0.034	0.107	0.046	0.103**	0.047	0.114*
	(0.064)	(0.068)	(0.061)	(0.048)	(0.061)	(0.061)
$Exports_{i,t-1}$	0.001	0.001	0.046***	0.013	-0.001	-0.002
	(0.001)	(0.002)	(0.016)	(0.016)	(0.003)	(0.003)
$Risk_t^{Rer}$	7.238	9.905				
	(5.766)	(0.856)				
$Risk_t^{Rer}*Exports_{i,\,t-1}$	-0.128	-0.431				
	(0.259)	(0.478)				
$Risk_t^{Inf}$			0.022	-0.121		
			(0.079)	(0.093)		
$Risk_t^{Inf}*Exports_{i,t-1}$			-0.008***	-0.002		
			(0.003)	(0.003)		
$SCFV_t$					-0.0001***	-0.0002**
					(0.00004)	(0.0001)
$SCFV_t*Exports_{i,t-1}$					0.000001	0.000001
					(0.000002)	(0.000004)
Hansen	0.985	1.00	0.990	1.00	0.971	1.00
m1	0.061	0.209	0.061	0.213	0.064	0.215
m2	0.887	0.931	0.907	0.924	0.869	0.899

Notes: Exports refer to the percentage share of exports in total sales. For other definitions refer to Tables 3 and 4.

Table 6: Dependent Variable: Total Profitability (*IT*)

	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)
$\Pi_{i,t-1}$	0.235*	-0.196	0.226	-0.236*	0.240*	-0.194	0.229*	-0.218
	(0.139)	(0.137)	(0.139)	(0.133)	(0.139)	(0.139)	(0.139)	(0.134)
$\Pi_{i,t-2}$	0.385***	0.372***	0.382***	0.345***	0.387***	0.375***	0.381***	0.356***
	(0.060)	(0.115)	(0.060)	(0.107)	(0.059)	(0.113)	(0.062)	(0.107)
$KO_{i,t}$	-0.070	-0.263***	-0.026	-0.227***	-0.071	-0.290***	-0.058	-0.275***
	(0.091)	(0.047)	(0.085)	(0.048)	(0.079)	(0.066)	(0.089)	(0.056)
$Size_{i,t}$	0.022	0.025	0.035	0.046*	0.034	0.033	0.032	0.038
	(0.026	(0.026)	(0.029)	(0.252)	(0.028)	(0.029)	(0.028)	(0.027)
$Share_{i,t}$	0.001	0.001	0.0004	-0.001	0.001	0.0004	0.001	0.0001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
$Sales_{i,t-1}$	0.061	0.138***	0.008	0.069	0.003	0.098**	0.015	0.092**
	(0.092)	(0.043)	(0.093)	(0.042)	(0.103)	(0.044)	(0.095)	(0.042)
$Exports_{i,t-1}$	0.001	-0.0002	0.002	0.002	0.001	-0.0002	0.002*	0.001
	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)
$Risk_t^{Rer}$	-92.725***	-63.659**						
	(31.661)	(25.612)						
$Risk_t^{Rer}*FK_{i,t}$	2.018***	1.990**						
	(0.770)	(0.805)						
$Risk_t^{Rer}*FK_{i,t}*Exports_{i,t-1}$	-0.004	-0.019**						
	(0.018)	(0.009)						
$Risk_t^{Inf}$			-0.048	-0.314**				
			(0.086)	(0.138)				
$Risk_t^{Inf}*FK_{i,t}$			0.002***	0.002***				
			(0.0006)	(0.001)				
$Risk_t^{Inf}*FK_{i,t}*Exports_{i,t-1}$			-0.000004	-0.00002				
			(0.00002)	(0.00001)				
Int_t					-0.009***	-0.005***		
					(0.003)	(0.002)		
$Int_t*FK_{i,t}$					0.0003**	0.0002**		
					(0.0001)	(0.0001)		
$Int_t*FK_{i,t}*Exports_{i,t-1}$					0.000002	-0.000003		
					(0.000005)	(0.000002)		
$SCFV_t$							-0.0004***	-0.0003***
							(0.0001)	(0.0001)
$SCFV_t*FK_{i,t}$							0.00001***	0.00001***
							(0.000002)	(0.000002)
$SCFV_t*FK_{i,t}*Exports_{i,t-1}$							-0.00000003	-0.0000001
							(0.00000004)	(0.0000001)
Hansen	0.977	1.00	0.976	1.00	0.975	1.00	0.968	1.00
m1	0.102	0.300	0.102	0.300	0.104	0.295	0.101	0.291
m2	0.942	0.749	0.954	0.789	0.974	0.786	0.924	0.667