

Macroeconomic Uncertainty and Private Investment in Argentina, Mexico and Turkey

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Abstract²

The paper by using micro-level data analyzes the impacts of macroeconomic uncertainty and country risk on real investment under financial liberalization. The results suggest that increasing macroeconomic volatility and country risk hurt fixed investment spending of real sector firms.

Keywords: Private investment; Macroeconomic uncertainty; Dynamic panel data estimators

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1. Introduction

There is a recent surge in articles analyzing the effects of macroeconomic uncertainty and volatility on fixed investment decisions of private firms. This renewal of interest can partly be explained by the increasing integration of global financial markets. It is argued that following financial liberalization serious bottlenecks have remained in the developing world including higher levels of uncertainty and volatility in key macro-prices as well as increasing sensitivity of domestic variables to changes in the international markets.

In retrospect, however, very little has been written about long-term effects of increasing uncertainty and volatility in global macroeconomic environment on the investment performances of developing countries. The majority of papers continue to focus on developed country experiences instead. The current paper argues that increasing volatility in macroeconomic environment, increasing country risk and increasing exposure of domestic variables to the changes in international markets negatively affect long-term fixed capital formation.

Given the lack of in-depth analysis of developing countries, the paper focuses on three countries, Argentina, Mexico, and Turkey (AMT) that appear as a trio where financial liberalization programs were first tested at a full scale.

2. Financial Liberalization and Macroeconomic Uncertainty

In a majority of developing countries financial liberalization was accompanied by sharp fluctuations in key macro prices. Fernandez-Arias (1994) found that changes in international interest rates explained up to 60 percent of deviation of portfolio inflows to 13 developing countries from their 1989 levels. Likewise, Calvo, Leiderman and

Reinhart (1993) concluded that in ten Latin American countries foreign factors accounted for 30-60 percent of the variance in real exchange rates and reserves. In this respect, Gabriele, Boratav and Parikh (2000), which analyzed the changes in instability of capital-flows to developing countries between 1970s and 90s discovered that “capital flows to developing countries are characterized by high, rising and unpredictable volatility” (p.1051).

Furthermore, capital-inflows led to a bias against tradable goods sectors in the recipient countries as a result of changes in relative goods prices. In this respect, appreciation of the domestic currency hurts traded goods vis-à-vis nontradables by generating a profitability squeeze in the real-sectors (Ros and Lustig, 2000). Consequently, UNCTAD (1998, cp.III) argued that many of the weaknesses in economic fundamentals such as currency appreciation and increasing exchange rate risk is directly or indirectly related with the capital-flows themselves.

3. Macroeconomic Uncertainty and Private Investment

Despite the presence of a consensus on financial liberalization and uncertainty/instability relationship, and despite the existence of rich theoretical research on the effects of uncertainty on investment, there is no agreement on the channels through which the relationship holds (e.g. under different assumptions on profit and utility functions, adjustment costs etc. Abel and Eberly, 1994 argued that uncertainty increases investment while Aizenman and Marion, 1995 argued the opposite).

In contrast to the theoretical work, the empirical research on the effects of uncertainty on fixed investment, especially using micro-level data, is more limited and is concentrated on a few industrialized countries. Despite this limitation, the existing

evidence suggests that increasing risk and uncertainty have a significantly negative effect on private fixed investment. For example, real exchange rate instability is found to have a significantly negative effect on investment in both developed and developing countries (Edwards, 1989; Pindyck and Solimano, 1993).

In the case of developed country experiences, Federer (1993) and Driver and Moreton (1991) found a negative impact of macroeconomic uncertainty on US equipment investment and the UK manufacturing investment respectively. Similarly, Darby et al. (1998) found a negative effect of real exchange rate uncertainty on investment in five OECD countries.

In the case of developing countries, Aizenman and Marion (1999), Edwards (1989), Moguillansky (2002), and Serven (1998) found a significantly negative relationship between private investment and several economic instability and uncertainty measures (including different measures of uncertainty in real exchange rates, inflation, capital-flows, etc.).

4. Hypothesis

Thus, increasing risk and uncertainty is expected to reduce new fixed investment spending of private sector firms. The hypothesis can be analyzed using the standard theory of capital where investors face two types of costs: 1) systemic risk from fixed investment that is subject to adjustment costs and uncertainty regarding future profitability and macroeconomic environment; 2) liquidity premium and opportunity cost of fixed investment that increases with rising uncertainty and risk.

The relationship is tested with the following equation for each country separately:

$$I_{it} = \alpha_1 I_{it-1} + \alpha_2 I_{it-2} + \alpha_3 KO_{it-1} + \alpha_4 KO_{it-2} + \alpha_5 CR_{it} + V_t + \varepsilon_{it} \quad (1)$$

where I_{it} is the real net fixed investment of firm i in year t and is measured by the logarithmic difference of net fixed capital stock at constant prices.

KO_{it} is Capital/Output ratio and is based on the assumption that output and capital are proportional. Hence, a decreasing KO ratio is expected to increase new investment. The lags result from the role of expectations and from adjustments costs and delivery lags.

CR_{it} is a vector of different country risk and macro-instability measures, which are discussed in the following section. Increasing risk and uncertainty is expected to have a negative effect on new fixed investment.

V_t is a vector of control variables including a dummy variable for time effects and KP , which is the relative price of fixed investment goods with an expected negative coefficient.

ε is the error term.

5. Data

The datasets are from the audited financial accounts of publicly traded industrial firms in AMT and cover biannually 1991:1-2001:2 for Argentina, 1990:1-2003:2 for Mexico and 1992:1-2003:2 for Turkey. The majority of data for Argentina and Mexico came from Economica, a commercial database and for Turkey from the dataset of the Istanbul Stock Exchange Market. There are 66, 80 and 181 firms in the final dataset for AMT with 50, 64 and 179 in manufacturing related activities respectively.

6. Country Risk and Uncertainty Measures

As country risk measures, Institutional Investor Country Risk Rating (IICR) and Political Risk Services' International Country Risk Guide Composite Risk Index (ICRG) are employed. Both indexes range between 0-100, with 100 representing the least risk.¹

Regarding uncertainty and instability measures, there is no consensus in the literature over what is uncertainty and what is sample variation. Therefore, we included both sample variation and uncertainty as control variables using manufacturing inflation and real exchange rates. The variables are measured by: a) bi-annual average standard deviations of monthly variables, b) bi-annual average standard deviations of monthly innovations to a forecasting equation based on an AR(1) process, c) bi-annual average monthly conditional variance from a GARCH (1,1) process (including a time trend and a monthly dummy variable). In the results only those by GARCH method are reported (with no significant difference from the results using other measures).

7. Methodology and Results

In equation 1, in order to correct for parameter endogeneity as well as the correlation between the lagged I and the firm specific effects and the error term, and given that the data consist of non-random stock market quoted firms, a Generalized Method of Moments (GMM) estimator² is applied by Arellano and Bover (1995)'s

¹ The indexes are interpreted as probabilities as suggested by Feder and Ros (1982), which then allows a logistic transformation such that $ICRGP = \ln[(ICRG/100)/(1 - (ICRG/100))]$. Because of space limitations only those by ICRGP are reported.

² In the GMM estimation, $2 \leq t \leq 6$ lagged values of transformed right hand side variables and time dummies at levels are used as instruments. The validity of the

orthogonal-deviations transformation that is used to have a consistent estimate for dynamic panel equations.

<Table 1>

The regression results in Table 1 suggest that increasing country-risk and uncertainty in key macro prices have a significantly negative effect on fixed investment decisions of private sector firms in all three countries.

8. Conclusion

Based on a micro-level company panel data analysis, our results suggest the presence of a direct link between macroeconomic uncertainty and private investment spending in three developing countries. Accordingly, increasing country risk and macroeconomic uncertainty in key macro prices (i.e. real exchange rate and manufacturing price inflation) significantly reduces new fixed investment of industrial firms.

The results suggest that the policy makers did not consider any strategy to link financial liberalization programs and accompanying short-term distortions with the long-term development objectives. Accordingly, there was an incomplete concern regarding determinants of productive investment. Therefore, for the health of industrial development there is a strong need to reorganize the financial system in developing countries in order to provide macro and microeconomic stability through preventing sharp fluctuations in the financial markets to reduce risks and uncertainties regarding key macro-prices.

instruments is checked by the Sargan-test of over-identifying restrictions. The White period 2-step method is used for GMM weighting matrices.

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Table 1: Regression results using GMM estimation for I_t as the dependent variable

Variable	Argentina			Mexico			Turkey		
	1	2	3	1	2	3	1	2	3
I_1	-0.212* (0.005)	-0.168* (0.009)	-0.198* (0.008)	-0.113* (0.011)	-0.092* (0.012)	-0.109* (0.015)	-0.432* (0.009)	-0.447* (0.026)	-0.413* (0.026)
I_2	-0.095* (0.003)	-0.048* (0.007)	-0.065* (0.005)	-0.041* (0.006)	-0.037* (0.007)	0.013*** (0.007)	-0.104* (0.004)	-0.053* (0.017)	-0.062* (0.018)
KO_{-1}	-0.049* (0.001)	-0.042* (0.002)	-0.043* (0.002)	-0.005* (0.002)	-0.002 (0.003)	-0.003 (0.003)	-0.003* (0.001)	-0.004*** (0.002)	-0.004*** (0.002)
KO_{-2}	0.006* (0.001)	0.017* (0.001)	0.015* (0.001)	-0.033* (0.002)	-0.032* (0.002)	-0.025* (0.002)	1.00E-04 (0.000)	-0.0004 (0.001)	-0.0002 (0.001)
ICRGP	1.683* (0.433)			0.972** (0.423)			0.413* (0.087)		
RERVG	-9095.4** (4473.300)			-159.5** (65.650)			-11.13 (22.239)		
INFVG	-444.1*** (241.928)			-19.03* (1.369)					
INFVG ₁							-38.89* (14.970)		
KP_{-1}	-9.376 (6.359)	-3.88 (13.278)	13.746 (15.790)	-2.168* (0.776)					
KP				0.004 (1.142)	-0.82 (0.750)		-4.636* (0.367)	-1.614 (1.905)	-9.3* (3.600)
Sargan	0.35	0.317	0.315	0.54	0.555	0.627	0.191	0.182	0.137
Wald-a	0	0	0	0	0	0	0	0	0
Wald-b	0	0	0	0	0	0	0	0	0

NOTE: All regressions include time dummies. (*), (**), (***) refer to significance at 1, 5 and 10 percent level respectively. Standard errors in parenthesis are heteroskedasticity consistent. I_t is real net fixed investment. KO is Capital/Output ratio, ICRGP is International Country Risk Guide Composite Risk Rating transformed as in footnote 1. RERVG and INFVG are real exchange rate and manufacturing inflation volatility measured by GARCH (1,1) method. KP is relative price of capital goods. Sargan is Sargan-test for overidentifying restrictions. Wald-a is Wald-test of joint significance for all variables excluding time dummies. Wald-b is Wald-test for time effects. All statistical test results are displayed by their p-values.