# Evaluation of Exchange-Rate Regimes, and Capital– Market Liberalization in the Presence of Sudden Stops

by

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**The choice of macroeconomic policies is cast traditionally in terms of the well-known policy tri-lemma. This is a way of describing succinctly a choice among three policy goals: pegging the exchange rate, keeping the capital markets open, or conducting a business-cycle stabilizing monetary policy. The tri-lemma arises**

**because only two of these policy goals can be achieved at any point of time. Both foreign and domestic economic shocks (including policy mistakes) may move the equilibrium nominal exchange rate away from the pegged rate. If the official rate is overvalued, the defense typically requires higher interest rates and fiscal contraction to reduce the current account deficit. If the excess demand has become large, either because policy was slow to react or because the country has been hit**

**by a strong and long-lasting shock, the required policy actions may not be viable; either for political-economic reasons or because of the damage they will inflict on the banking system or aggregate demand. Under those circumstances an attack on the exchange rate is likely to succeed. Therefore, there is a fourth policy goal: keeping the economy out of sudden stops to international capital flows, or other violent types of financial crises.**

**Our focus is on the evaluation**

**Exchange-rate regimes and capital-market liberalization, in the presence of sudden stops.**



**We challenge two established puzzles in the literature.**

**The first puzzle is the failure of the literature to find any systematic difference in macroeconomic performance across Exchange-rate regimes.**

**The second is the absence of any empirical relation between the macroeconomic performance and capital-market regimes: liberalization, or capital controls.**

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**<u>The</u> <u>key</u> <u>point</u>: The literature ignores a *latent* crisis state of the economy, which is summarized by the estimated probability of crisis.**

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*Positive Effects* **of fixed exchange rate: By fixing their currencies to international moneys (the Dollar, the Euro, or the Yen), fiscally-disciplined emerging economies, could rapidly accumulate exchange reserves through export growth, are able to maintain a high saving ratio, and can provide certainty to business**

**and stable profit margins to investors. Such policy environment typically lowers Country-specific spreads, and leads to stable domestic rates of interest.**



*Negative effects*: **Each one of the International-financial crises since 1994--Mexico, in 1994, Thailand, Indonesia and Korea in 1997, Russia and Brazil in 1998, and Argentina and Turkey in 2000--has in some way involved a fixed or pegged exchange rate regime. At the same time, countries that did not have pegged rates--among them South Africa, Israel in 1998, Mexico in 1998, and**

**Turkey in 1998--avoided crises of the type that afflicted emerging market countries with pegged rates.**



*Dollar Debt*: **THE "ORIGINAL SIN" CONCEPT UNDERPINS A CRUCIAL VULNERABILITY OF THE ECONOMY (especially fixed exchange-rate REGIMES). THE PHRASE REFERS TO THE INABILITY OF A COUNTRY TO BORROW ABROAD IN ITS OWN CURRENCY, BECAUSE NO FOREIGN CREDITOR IS WILLING TO GAMBLE ON THE EXCHANGE-RATE INSTABILITY, in case the regime collapses abruptly. IF A COUNTRY ISSUED DEBT IN DOMESTIC CURRENCY, IT**

**WOULD HAVE AN INCENTIVE TO INFLATE ITS WAY OUT OF DEBT. INVESTORS, WHO EXPECT THAT THE GOVERNMENT WILL SUCCUMB TO SUCH TEMPTATION, REFUSE TO BUY DOMESTIC CURRENCY DEBT.**

**A SUDDEN STOP OF CAPITAL INFLOWS TENDS TO MESS UP THE BALANCE SHEETS OF FIRMS.**

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*EMPIRICAL LITERATURE*

**Marianne Baxter and Alan Stockman (1989) and Robert Flood and Andy Rose (1995) find that there are no significant differences in**

**business cycles across exchange rate regimes. A recent study Frankel and Wei (2004) explores how output lost in crises is related to various controls, including the exchange rate flexibility, currency mismatch, FDI, etc. The exchange rate flexibility variable is found as not statistically significant.**



*CAPITAL ACCOUNT OPENNESS*

**Similarly, Eichengreen (2001) points to the rather complex role played by capital account liberalization; and Rodrik (1998) finds no statistical association between capital account openness and growth. A recent study by**

**Prasad et al (2005) also finds that a robust causal relationship between the degree of financial integration and growth performance for developing countries does not exist in the data.**

## 0.1 The Statistical Model

The indicators of the exchange rate and the liberalization regimes are dummy variables, $D_1$ and $D_2$ :

$$D_{1,j,t} = \begin{cases} 1 & \text{if peg} \\ 0 & \text{if float} \end{cases}, \tag{1}$$

and:

$$D_{2,j,t} = \begin{cases} 1 & \text{if capital controls} \\ 0 & \text{if liberalization} \end{cases}. \tag{2}$$

$Y_{1,j,t}$ = GDP per capita growth rate
$Y^*_{2,j,t}$ = *latent* variable indicating the crisis prone state of the economy.
If $Y^*_{2,j,t} \geq 0$, a sudden stop crisis occurs, if $Y^*_{2,j,t} < 0$, the sudden stop crisis does not occur.

'The *observable* crisis variable is a binary variable, $Y_{2,j,t}$:

$$Y_{2,j,t} = \begin{cases} 1 & if\ Y^*_{2,j,t} \geq 0 \\ 0 & \text{otherwise} \end{cases}. \tag{3}$$

The equation of the latent variable, $Y^*_{2,j,t}$:

$$Y^*_{2,j,t} = \beta_2 Z_{j,t} + \gamma_2 D_{1,j,t} + \delta_2 D_{2,j,t} + \phi_2 Y_{1,j,t} + \varepsilon_{2,j,t}, \tag{4}$$

where, $\varepsilon_{2,j,t}$ is a country specific time variant *i.i.d.* random shock.

The growth rate is a linear function of the policy regime indicators $(D_1, D_2)$, and a vector of standard controls $(X)$ :

$$Y_{1,j,t} = \beta_1 X_{j,t} + \gamma_1 D_{1,j,t} + \delta_1 D_{2,j,t} + \phi_1 \hat{Y}^*_{2,j,t} + \varepsilon_{1,j,t}, \tag{5}$$

where, $\hat{Y}^*_{2,j,t}$ is the *best predictor* by the market participants of $Y^*_{2,j,t}$.
The projection of $Y^*_{2,j,t}$:

$$P_{j,t} = \Pr(\beta_2 Z_{j,t} + \gamma_2 D_{1,j,t} + \delta_2 D_{2,j,t} + \phi_2 Y_{1,j,t} > -\varepsilon_{2,j,t}). \tag{6}$$

Assume that $\varepsilon_{2,j,t} \sim N(0,1)$. Then,

$$P_{j,t} = \Phi \left( \beta_2 Z_{j,t} + \gamma_2 D_{1,j,t} + \delta_2 D_{2,j,t} + \phi_2 Y_{1,j,t} \right), \tag{7}$$

where $\Phi$ is the cummulative distribution function of a unit normal distribution.

The corresponding projected probability:

$$\hat{P}_{j,t} = \Phi \left( \hat{\beta} Z_{j,t} + \hat{\gamma}_2 D_{1,j,t} + \hat{\delta}_2 D_{1,j,t} + \hat{\phi}_2 Y_{1,j,t} \right) \tag{8}$$

$$Y_{1,j,t} = \beta_1 X_{j,t} + \gamma_1 D_{1,j,t-1} + \delta_1 D_{2,j,t-1} + \phi_1 \Phi^{-1} \left( \hat{P}_{j,t} \right) + \varepsilon_{1,j,t}, \tag{9}$$

## 0.2

# What happens if one ignore the crisis probability variable in the growth equation?

$$E \left( \hat{\gamma}_1^{IV} \right) = \frac{\partial E \left( Y_{1,j,t} \mid X_{j,t},\ D_{1,j,t}^{IV},\ D_{2,j,t}^{IV} \right)}{\partial D_{1,j,t}} = \frac{1}{1 - \phi_1 \phi_2} \left( \gamma_1 + \phi_1 \frac{\partial \Phi^{-1} \left( \hat{P}_{j,t} \right)}{\partial D_{1,j,t}} \right)$$

and:

$$E \left( \hat{\delta}_1^{IV} \right) = \frac{\partial E \left( Y_{1,j,t} \mid X_{j,t},\ D_{1,j,t}^{IV},\ D_{2,j,t}^{IV} \right)}{\partial D_{2,j,t}} = \frac{1}{1 - \phi_1 \phi_2} \left( \delta_1 + \phi_1 \frac{\partial \Phi^{-1} \left( \hat{P}_{j,t} \right)}{\partial D_{2,j,t}} \right)$$

.

$$\phi_1 < 0, \phi_1 \phi_2 < 1,$$

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$$\begin{aligned} \frac{\partial \Phi^{-1} \left( \hat{P}_{j,t} \right)}{\partial D_{2,j,t}} &> 0 \\ \frac{\partial \Phi^{-1} \left( \hat{P}_{j,t} \right)}{\partial D_{2,j,t}} &< 0. \end{aligned}$$

$$\left( 1 - \phi_1 \phi_2 \right) E \left( \hat{\gamma}_1^{IV} \right) = \gamma_1 + \phi_1 \frac{\partial E \left( \Phi^{-1} \right)}{\partial D_{1,j,t}} < \gamma_1 > 0.$$

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$$(1-\phi_1\phi_2)\,E\left(\hat{\delta}_1^{IV}\right) = \delta_1 + \phi_1 \frac{\partial E\left(\Phi^{-1}\right)}{\partial D_{2,j,t}} > \delta_1 < 0.$$

Therefore, by ignoring the projected probability of sudden stops in the evaluation of the effect of the peg and the imposition of capital controls, the econometrician understates the direct effects of the policy regimes.

**Table 1:**
**The Frequency of Crises, Switches Between Float and Peg and Switches between Capital Controls and Liberalizations (%)**

| **Variable** | Frequency |
|---|---|
| Crsises | 22.61 |
| Switches to peg | 1.71 |
| Switches to float | 3.91 |
| Switches to controls | 1.03 |
| Switches to liberalizations | 0.9 |

**Table 2:**
**List of Countries**

| | | | |
|---|---|---|---|
| (1) | Algeria | (51) | Malawi |
| (2) | Argentina | (52) | Malaysia |
| (3) | Bangladesh | (53) | Maldives |
| (4) | Barbados | (54) | Mali |
| (5) | Belize | (55) | Malta |
| (6) | Benin | (56) | Mauritania |
| (7) | Bhutan | (57) | Mauritius |
| (8) | Bolivia | (58) | Mexico |
| (9) | Botswana | (59) | Morocco |
| (10) | Brazil | (60) | Myanmar |
| (11) | Burkina Faso | (61) | Nepal |
| (12) | Burundi | (62) | Nicaragua |
| (13) | Cameroon | (63) | Niger |
| (14) | Cape Verde | (64) | Nigeria |
| (15) | Central African | (65) | Oman |
| (16) | Chad | (66) | Pakistan |
| (17) | Chile | (67) | Panama |
| (18) | China | (68) | Papua New Guinea |
| (19) | Colombia | (69) | Paraguay |
| (20) | Comoros | (70) | Peru |
| (21) | Congo | (71) | Philippines |
| (22) | Cote d'Ivoire | (72) | Portugal |
| (23) | Dominican Rep. | (73) | Romania |
| (24) | Ecuador | (74) | Rwanda |
| (25) | Egypt, Arab Rep | (75) | Sao Tome and Pr |
| (26) | El Salvador | (76) | Senegal |
| (27) | Equatorial Guin | (77) | Seychelles |
| (28) | Ethiopia | (78) | Sierra Leone |
| (29) | Fiji | (79) | Solomon Islands |
| (30) | Gabon | (80) | Somalia |
| (31) | Gambia, The | (81) | South Africa |
| (32) | Ghana | (82) | Sri Lanka |
| (33) | Grenada | (83) | St. Vincent |
| (34) | Guatemala | (84) | Sudan |
| (35) | Guinea | (85) | Swaziland |
| (36) | Guinea-Bissau | (86) | Syrian Arab Rep |
| (37) | Guyana | (87) | Tanzania |
| (38) | Haiti | (88) | Thailand |
| (39) | Honduras | (89) | Togo |
| (40) | Hungary | (90) | Trinidad and To |
| (41) | India | (91) | Tunisia |
| (42) | Indonesia | (92) | Turkey |
| (43) | Iran, Islamic R | (93) | Uganda |
| (44) | Jamaica | (94) | Uruguay |
| (45) | Jordan | (95) | Vanuatu |
| (46) | Kenya | (96) | Venezuela |
| (47) | Lao PDR | (97) | Western Samoa |
| (48) | Lesotho | (98) | Zaire |
| (49) | Liberia | (99) | Zambia |
| (50) | Madagascar | (100) | Zimbabwe |

**Table 3:**
**Exchange Regime and Capital Controls: Cyclical Effects**

***Panel A: Dependent Variable: Growth Rates***

| Variables | OLS (i) | OLS (ii) | FE (iii) | FE (iv) |
|---|---|---|---|---|
| Switching to peg between t-2 to t-1 | **1.6423** | **4.6209** | **1.2041** | **5.0215** |
| | **(0.7503)*** | **(1.4795)**** | **(0.9958)** | **(1.7630)**** |
| Switching to float between t-2 to t-1 | 0.1761 | 0.6383 | -0.0539 | 0.2005 |
| | (0.6483) | (0.6692) | (0.7039) | (0.7401) |
| Switching to Capital Controls between t-2 to t-1 | **-1.8832** | **-4.7173** | **-1.9592** | **-6.3843** |
| | **(0.8616)*** | **(1.5363)**** | **(1.0495)** | **(2.0713)**** |
| The probability of having currency crisis this year ^ | | **-9.6164** | | **-12.7791** |
| | | **(5.0663)** | | **(4.9934)*** |
| ***Controllers*** | | | | |
| 1970 GDP per capita | **-0.0012** | **-0.0011** | -- | -- |
| | **(0.0005)*** | **(0.0005)*** | | |
| Currency crisis at time t-1 | 0.5612 | 2.7602 | 0.7579 | 2.5482 |
| | (0.5949) | (1.2740)* | (0.4506) | (0.8331)** |
| Currency crisis at time t-2 | -2.1345 | -1.5347 | -1.6442 | -2.2155 |
| | (0.6375)** | (0.7221)* | (0.4525)** | (0.4852)** |
| Growth rate at time t-1 | 0.2540 | 0.2552 | 0.1802 | 0.2267 |
| | (0.0464)** | (0.0469)** | (0.0275)** | (0.0312)** |
| Growth rate at time t-2 | 0.1093 | 0.1048 | 0.0069 | -0.0224 |
| | (0.0366)** | (0.0372)** | (0.0274) | (0.0313) |
| ***Panel B: Dependent Variable: Currency Crisis (0,1). 1 if REE(t)-REE(t-1)>15% - Probit (dF/dX) estimators*** | | | | |
| 1970's GDP per capita | | 0.0000 | | -- |
| | | (0.0000) | | |
| Switching to peg between t-2 to t-1 | | **0.3125** | | **0.2893** |
| | | **(0.0991)**** | | **(0.1028)**** |
| Switching to float t-2 to t-1 | | **0.0557** | | 0.0325 |
| | | **(0.0510)** | | (0.0516) |
| Switching to Capital Controls between t-2 to t-1 | | **-0.2656** | | **-0.3313** |
| | | **(0.0470)**** | | **(0.0524)**** |
| Currency crisis at time t-1 | | 0.2299 | | 0.1314 |
| | | (0.0377)** | | (0.0349)** |
| Currency crisis at time t-2 | | 0.0563 | | -0.0307 |
| | | (0.0296) | | (0.0256) |
| Government def t-1 ^^ | | 0.0000 | | 0.0000 |
| | | (0.0000) | | (0.0000) |
| Country fixed-effects | | **No** | | **Yes** |

**Note:**
Data includes 106 countries in the years 1970 to 1997
^ Currency crisis =1 if the real exchange rate increased by 15% between t-1 to t (1 STD)
All specifications include linear time trend
( ) Standard errors in parenthesis
* significant at 5%; ** significant at 1%

**Table 4:**
**Exchange Regime and Capital Controls: Cyclical and Persistent Effects**

***Panel A: Dependent Variable: Growth Rates***

| Variables | OLS (i) | FE (ii) |
|---|---|---|
| Peg at time t-1 | -0.6088 | -0.1813 |
| | (0.2899)* | (0.4787) |
| Switching to peg between t-2 to t-1 | 3.9786 | 4.9046 |
| | (1.2935)** | (1.4604)** |
| Switching to float between t-2 to t-1 | 0.4657 | 0.8090 |
| | (0.7124) | (0.8382) |
| Capital Controls at t-1 | -1.2843 | -1.1997 |
| | (0.4539)** | (0.9385) |
| Switching to Capital Controls between t-2 to t-1 | -1.2843 | -5.9101 |
| | (0.4539)** | (1.7511)** |
| The probability of having currency crisis this year ^ | -7.9131 | -13.7764 |
| | (6.0140) | (4.4409)** |
| ***Controllers*** | | |
| 1970 GDP per capita | -0.0013 | -- |
| | (0.0006)* | |
| Currency crisis at time t-1 | 2.3069 | 2.6221 |
| | (1.4183) | (0.7543)** |
| Currency crisis at time t-2 | -1.7389 | -2.3438 |
| | (0.7269)* | (0.4911)** |
| Growth rate at time t-1 | 0.2481 | 0.2247 |
| | (0.0456)** | (0.0312)** |
| ***Panel B: Dependent Variable: Currency Crisis (0,1). 1 if REE(t)-REE(t-1)>15% - Probit (dF/dX) estimato*** | | |
| 1970's GDP per capita | 0.0000 | -- |
| | (0.0000) | |
| Peg at time t-1 | -0.0192 | 0.0368 |
| | (0.0221) | (0.0361) |
| Switching to peg between t-2 to t-1 | 0.2798 | 0.2106 |
| | (0.1029)** | (0.1070)* |
| Switching to float t-2 to t-1 | 0.0801 | 0.1085 |
| | (0.0567) | (0.0674) |
| Capital Controls at t-1 | -0.0383 | -0.1021 |
| | (0.0283) | (0.0639) |
| Switching to Capital Controls between t-2 to t-1 | -0.2491 | -0.2820 |
| | (0.0513)** | (0.0646)** |
| Currency crisis at time t-1 | 0.2264 | 0.1255 |
| | (0.0373)** | (0.0345)** |
| Country fixed-effects | **No** | **Yes** |

**Note:**
Data includes 106 countries in the years 1970 to 1997
^ Currency crisis =1 if the real exchange rate increased by 15% between t-1 to t (1 STD)
All specifications include linear time trend
( ) Standard errors in parenthesis
* significant at 5%; ** significant at 1%

**Table 7:**
**Exchange Regime and Capital Controls: Cyclical and Persistent Effects**
**Fixed Effects Estimates**

***Panel A: Dependent Variable: Growth Rates***

| **Variables** | **(i)** | **(ii)** | **(iii)** |
|---|---|---|---|
| Peg at time t-1 | -0.2316 | -0.2489 | -0.1634 |
| | (0.4719) | (0.4717) | (0.4724) |
| Switching to peg between t-2 to t-1 | **1.7474** | **6.2424** | **8.0168** |
| | (1.1446) | (1.7852)** | (2.0441)** |
| Switching to float between t-2 to t-1 | -0.1928 | 0.3147 | 0.4185 |
| | (0.7819) | (0.8073) | (0.8081) |
| Fiscal deficit t-1 (Billions) | **0.0001** | **0.0001** | **0.0001** |
| | (0.0001) | (0.0001)* | (0.0001)* |
| Capital Controls at t-1 | **0.1109** | **-1.7246** | **-2.5289** |
| | (0.8135) | (0.9276) | (1.0162)* |
| Switching to Capital Controls between t-2 to t-1 | **-1.7266** | **-5.3025** | **-8.1364** |
| | (1.1289) | (1.7135)** | (2.2228)** |
| The probability of having currency crisis this year ^ | | **-13.2526** | **-20.7375** |
| | | (4.2074)** | (5.7751)** |
| ***Controllers*** | | | |
| Currency crisis at time t-1 | 0.6887 | 2.9102 | 4.1773 |
| | (0.4698) | (0.8505)** | (1.0817)** |
| Currency crisis at time t-2 | -1.5427 | -2.3514 | -2.5932 |
| | (0.4726)** | (0.5253)** | (0.5430)** |
| Growth rate at time t-1 | 0.1784 | 0.1681 | 0.1638 |
| | (0.0281)** | (0.0284)** | (0.0285)** |
| Growth rate at time t-2 | 0.0106 | 0.0022 | 0.0022 |
| | (0.0280) | (0.0283) | (0.0283) |
| Durbin-Watson statistic | 2.00 | 2.00 | 2.00 |

**Table 7 - Cont.**

***Panel B: Dependent Variable: Currency Crisis (0,1). 1 if REE(t)-REE(t-1)>15%***

| | Probit dF/dX | Linear Probability |
|---|---|---|
| Peg at time t-1 | 0.0287 | 0.0391 |
| | (0.0371) | (0.0335) |
| Switching to peg between t-2 to t-1 | **0.3053** | **0.2694** |
| | (0.1253)* | (0.0738)** |
| Switching to float t-2 to t-1 | -0.0121 | -0.0065 |
| | (0.0499) | (0.0470) |
| Capital Controls at t-1 | **-0.1521** | **-0.1311** |
| | (0.0780) | (0.0483)** |
| Switching to Capital Controls between t-2 to t-1 | **-0.2650** | **-0.3181** |
| | (0.0672)** | (0.0598)** |
| Currency crisis at time t-1 | 0.1552 | 0.1708 |
| | (0.0373)** | (0.0275)** |
| Currency crisis at time t-1 | -0.0469 | -0.0483 |
| | (0.0248) | (0.0277) |
| Fiscal deficit t-1 (Billions) | 0.0000 | 0.0000 |
| | (0.0000) | (0.0000) |
| Excluded variable | | |
| **Total external debt (Billions)** | **0.0023** | **0.0023** |
| | (0.0011)* | (0.0010)* |

**Note:**
Data includes 106 countries in the years 1970 to 1997
^ Currency crisis =1 if the real exchange rate increased by 15% between t-1 to t (1 STD)
All specifications include linear time trend
( ) Standard errors in parenthesis
* significant at 5%; ** significant at 1%

**Table 5:**
**The Effect of Sudden Stop Crisis and**
**Dollarization (Foreign Liabilities - Money Supply Ratio) on Growth**

| **Variable** | **(i)** | **(ii)** | **(iii)** |
|---|---|---|---|
| Foreign Liabilities - Money Suuply Ratio | 0.001 | -0.001 | 0.000 |
| (FLM) | (0.042) | (0.042) | (0.042) |
| Sudden Stop Crisis | -0.881 | -0.781 | -0.250 |
| | (0.384) | (0.378) | (0.431) |
| Growth at t-1 | | 0.173 | 0.172 |
| | | (0.021) | (0.021) |
| ***Interaction*** | | | |
| Sudden Stop Crisis * FLM | | | **-2.384** |
| | | | **(0.931)** |
| Country fixed effect | Yes | Yes | Yes |
| Observations | 2228 | 2228 | 2228 |

**Table 6:**
**The Effect of Sudden Stop Crisis on Dollarization (Foreign Liabilities - Money Supply Ratio)**

| Variable | (i) | (ii) | (iii) |
|---|---|---|---|
| Crisis at t-2 | -0.034 | | -0.034 |
| | (0.020) | | (0.020) |
| Peg at time t-2 | 0.042 | | 0.010 |
| | (0.024) | | (0.028) |
| Capital Controls at t-2 | -0.013 | | -0.009 |
| | (0.028) | | (0.028) |
| The probability of having currency crisis this year^ | | -0.200 | -0.176 |
| | | (0.070) | (0.083) |
| Country fixed effect | Yes | Yes | Yes |
| Observations | 1176 | 1176 | 1176 |

**Table 7:**
**The Effect of Sudden Stop Crisis and**
**Dollarization (Foreign Liabilities - Money Supply Ratio) on Growth**

| **Variable** | **(i)** | **(ii)** | **(iii)** |
|---|---|---|---|
| Foreign Liabilities - Money Suuply Ratio (FLM) | 0.001<br>(0.042) | -0.001<br>(0.042) | 0.000<br>(0.042) |
| Sudden Stop Crisis | -0.881<br>(0.384) | -0.781<br>(0.378) | -0.250<br>(0.431) |
| Growth at t-1 | | 0.173<br>(0.021) | 0.172<br>(0.021) |
| ***Interaction*** | | | |
| Sudden Stop Crisis * FLM | | | **-2.384**<br>**(0.931)** |
| Country fixed effect | Yes | Yes | Yes |
| Observations | 2228 | 2228 | 2228 |

**Table 8:**
**The Frequency of Sudden Stop and Domestic Prices Crises Using Reinhart-Rogoff (2004) Classification*,****

| | | Domestic Price Crises | | |
|---|---|---|---|---|
| | | **0** | **1** | |
| **Sudden Stops Crises** | **0** | 24.6 | 9.9 | 34.5 |
| | **1** | 29.3 | 36.3 | 65.5 |
| | | 53.9 | 46.1 | 100.0 |

**Notes:**
* Reinhart and Rogoff (2002) classified into 5 categories: (i) peg, (ii) limited flexibility, (iii) managed floating , (iv) freely floating and (v) freely falling. We aggregate it into 2 main categories: (i) peg_rr, including the first 3 and (ii) float_rr, including the other two.
** Data includes 58 countries in the years 1970 to 1997
Domestic prices crisis = 1 if the inflation rate is above 20% per year and 0 otherwise.
Sudden stop crisis = 1 if the real exchange rate depreciation is above 15% per year and 0 otherwise.

**Table 9:**
**Switches Between Float and Peg**
**Using Reinhart-Rogoff (2004) Classification*,****

| **Variable** | Frequency |
|---|---|
| Switches to peg | 10.18 |
| Switches to float | 9.97 |

**Notes:**
* Reinhart and Rogoff (2002) classified into 5 categories: (i) peg,
(ii) limited flexibility, (iii) managed floating , (iv) freely floating and (v) freely falling.
We aggregate it into 2 main categories: (i) peg_rr, including the first 3 and (ii)
float_rr, including the other two.
** Data includes 58 countries in the years 1970 to 1997

**Table 10:**
**Exchange Regime and Capital Controls**
**Using Reinhart-Rogoff (2004) Classification*,****
**Fixed-Effects Estimators**

***Dependent Variable: Growth Rates***

| **Variables** | **(i)** | **(ii)** | **(iii)** |
|---|---|---|---|
| Peg at time t-1 | 1.656 | 1.330 | 1.729 |
| | (0.557) | (0.549) | (0.565) |
| Capital Controls at t-1 | -0.439 | -0.587 | 0.156 |
| | (0.890) | (0.991) | (1.022) |
| Switching to Capital Controls between t-2 to t-1 | -5.852 | -3.374 | -6.155 |
| | (1.799) | (1.518) | (1.809) |
| The probability of having currency crisis this year^ | -14.843 | | -22.359 |
| excluding the effect of price crisis | (4.937) | | (7.996) |
| The probability of having currency crisis this year - real^^ | | -6.824 | 7.632 |
| including the effect of price crisis | | (4.084) | (6.578) |
| ***Controllers*** | | | |
| Growth rate at time t-1 | 0.176 | 0.191 | 0.183 |
| | (0.034) | (0.034) | (0.034) |
| Growth rate at time t-2 | 0.008 | 0.022 | 0.019 |
| | (0.035) | (0.035) | (0.035) |
| Currency crisis at time t-1 | 2.812 | 0.917 | 3.340 |
| | (0.978) | (0.629) | (1.069) |
| Currency crisis at time t-2 | -1.904 | -1.804 | -1.831 |
| | (0.479) | (0.483) | (0.481) |
| Price (CPI) crisis at time t-1 | -0.100 | 1.078 | -1.251 |
| | (0.491) | (0.772) | (1.133) |
| Price (CPI) crisis at time t-2 | 0.385 | 0.374 | 0.468 |
| | (0.488) | (0.491) | (0.490) |

**Notes:**
* Reinhart and Rogoff (2002) classified into 5 categories: (i) peg, (ii) limited flexibility, (iii) managed floating
, (iv) freely floating and (v) freely falling. We aggregate it into 2 main categories: (i) peg_rr, including the first 3 and (ii) float_rr, including the other two.
** Data includes 58 countries in the years 1970 to 1997
^ The estimated the likelihood for a currency crisis ignoring the effect of price crisis.
^^ The estimated probability for a currency crisis including the effect of past price crisis
All specifications include linear time trend
( ) Standard errors in parenthesis

**Figure 1:**
**The Marginal Effect of Switching from Float to Peg on Growth**

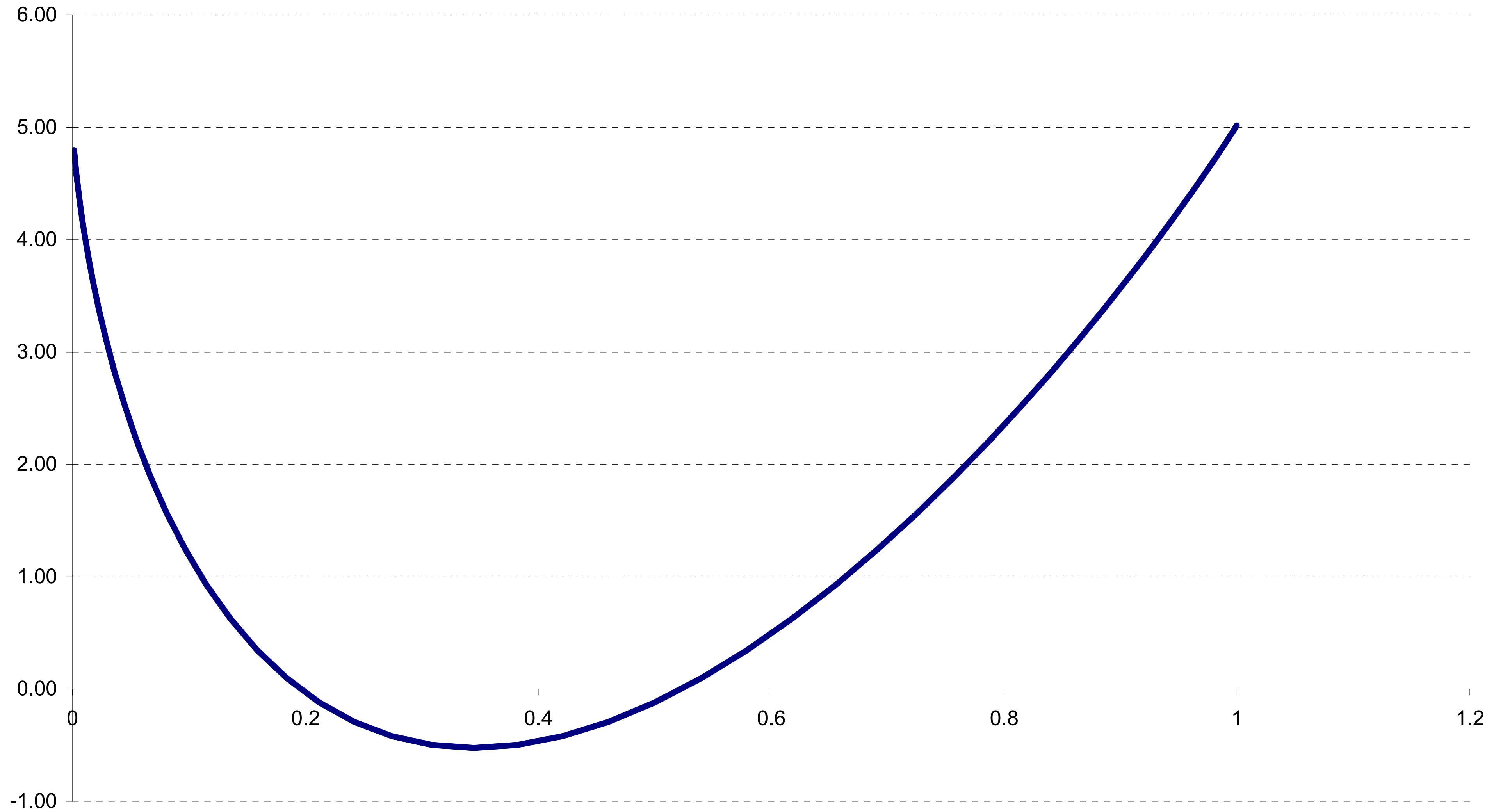


**Figure 2:**
**The Marginal Effect of Liberalization in Capital Controls on Growth**

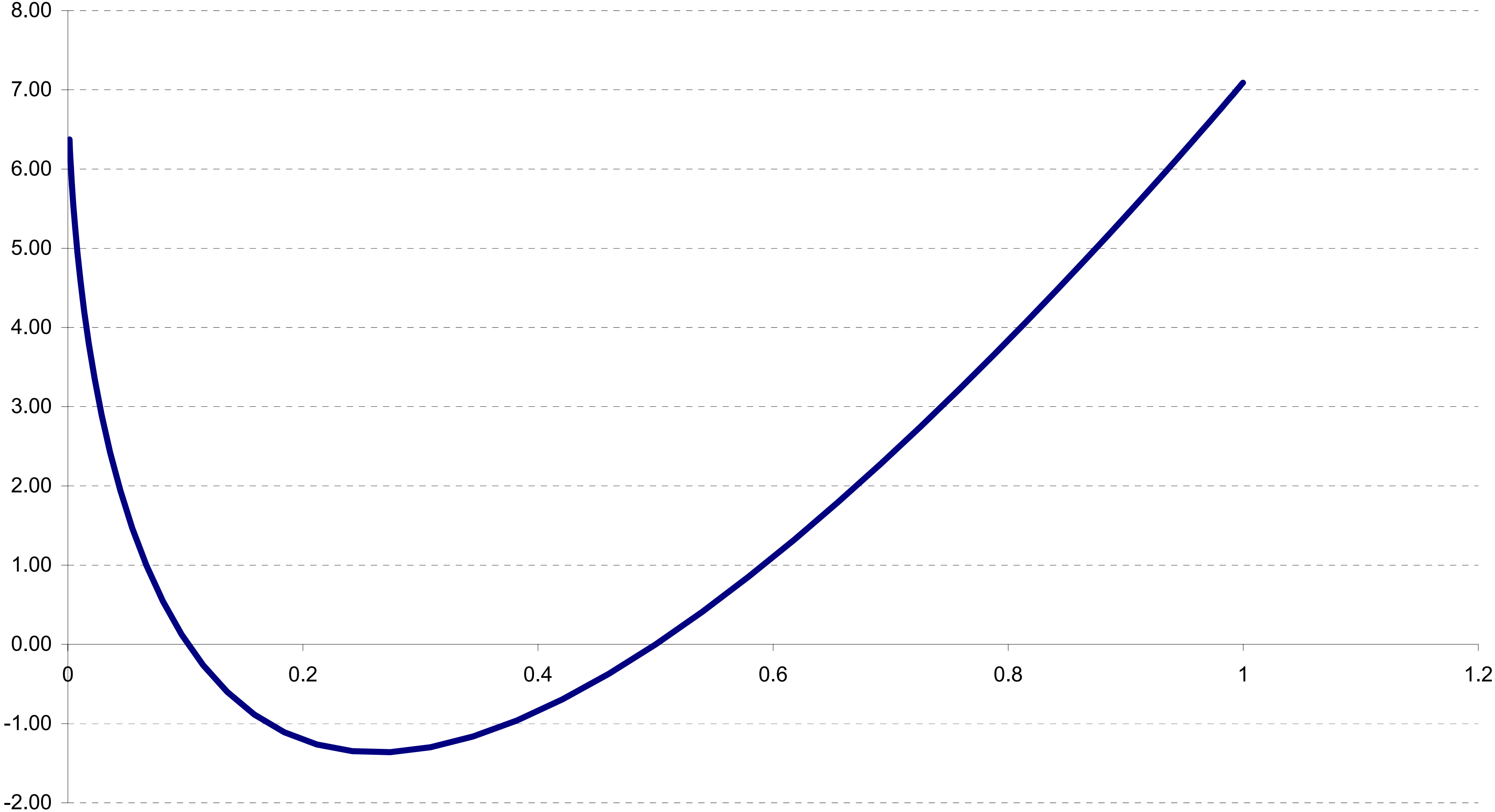


**Figure 3:**
**Switching from Float to Peg with and without Capital Controls**

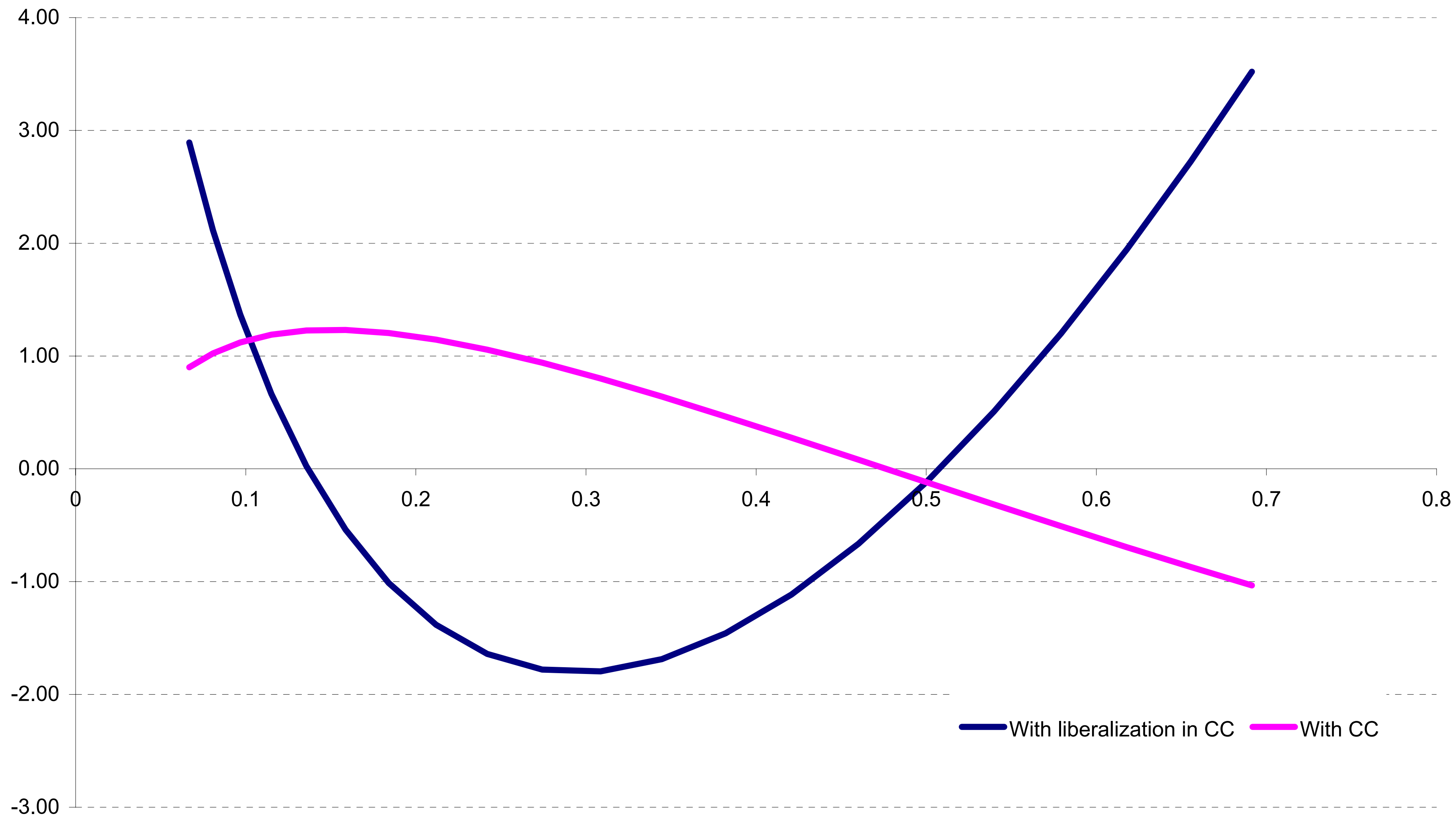
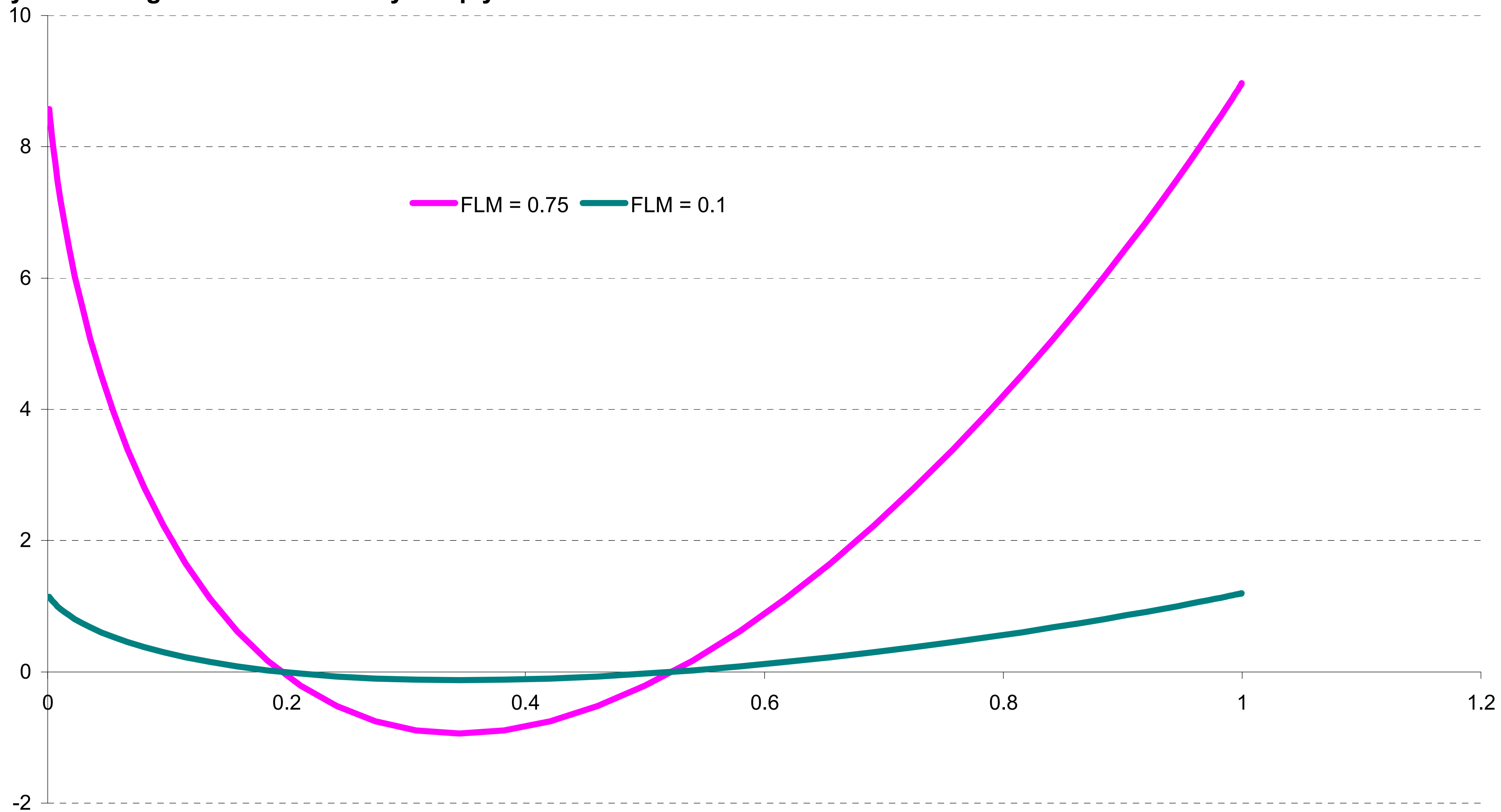


**Figure 4:**
**The Marginal Effect of Switching from Float to Peg on Growth**
**by The Foreign Liabilities - Money Suuply Ratio**



## 1 Theory

N = domestic entrepreneurs,

$I_t^a$ = investment by the individual entrepreneur,

The foreign lender imposes a limit on the entrepreneur borrowings so that the investment, $I_t^a$, is constrained by
$I_t^a \leq (1{+}\lambda)W_t$ ,

$W_t = \alpha y_t - p_t F_{t-1}$, is the entrepreneur's net worth. leverage is specified as $\lambda$ times

$y_t$ =domestic output (produced by a Cobb-Douglas technology with a capital input income share $\alpha$)

$F_{t-1}$ = initial debt, indexed to foreign goods,

$p_t$, =,relative price of foreign goods in terms of domestic goods (the real exchange

$p_t = \frac{[1-(1-\alpha)(1-\upsilon)]Y_t-(1-\upsilon)I_t}{\tilde{X}_t}$,

I=N$I^{a,}$ =aggregate domestic investment
$Y = Ny$ =aggregate output, respectively; the coefficient $\upsilon$ denotes the marginal propensity to import,

$\tilde{X}_t$ denotes the stochastic volume of exports, expressed in terms of foreign goods.

A foreign creditor will extend credit to its domestic entrepreneur's counterpart, if

(1+r$_{t)}\frac{p_t}{p_{t+1}} \geq (1 + r*)$,

r and r* denote the marginal productivity of capital and the foreign interest rate, respectively.

A foreign creditor i receives a private signal $\theta_i$ regarding $\tilde{X}_t$;

$$\theta_i = \tilde{X}_t + \varepsilon_{ti}.$$

The error term $\varepsilon_{ti}$ is assumed to be i.i.d. and uniformly distributed over [-$\varepsilon, \varepsilon$].

There exists a cut-off signal

$$\theta_i^* = \tilde{X}_t^* + \varepsilon_{ti}^*,$$

so that

$$\underset{N\tilde{}U[0,1]}{E}[(1+r_t)\frac{p(\tilde{N}_t^*, \tilde{X}_t^*)}{p_{t+1}}] - (1+r*) = 0.$$

The export threshold, $\tilde{X}_t^*$ , determines uniquely the outcome of the global game.

Prob $\{I_t = 0\} = G(\tilde{X}_t^*)$.

The associated expected level of aggregate investment is given by

$$(\bar{I})(1 - G(\tilde{X}_t^*)).$$

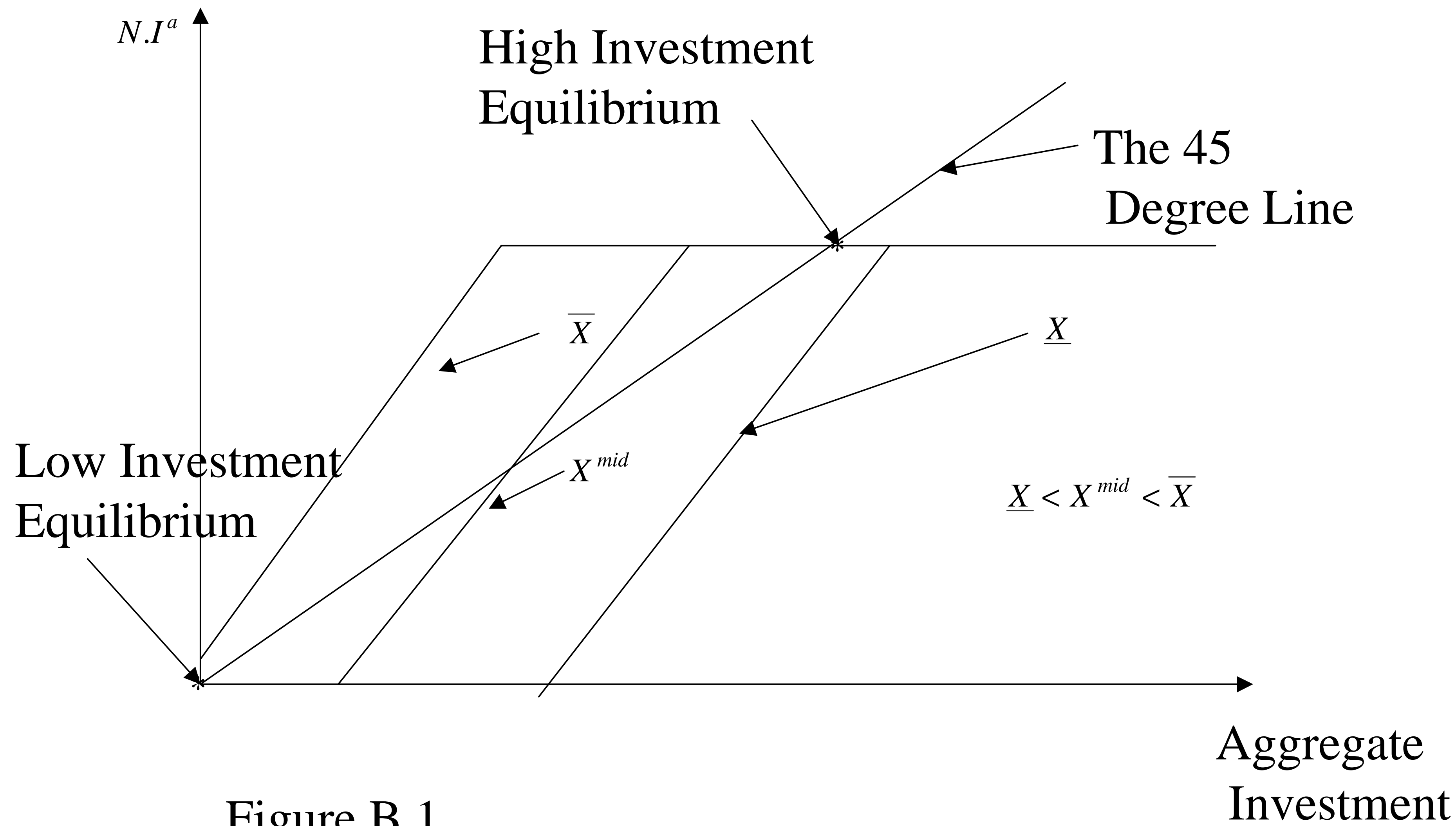



Figure B.1