

DO CAPITAL INFLOWS CAUSE CURRENCY BLACK MARKETS IN MENA COUNTRIES? CAUSALITY TESTS FOR HETEROGENEOUS PANELS

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Abstract

This paper tests causality between capital inflow components and currency black market premiums (BMP) in a panel of eight Middle Eastern and North African countries (MENA) over the period 1984-2004. Because of the high likelihood of heterogeneity in the data set, Mixed-Fixed Random Effects (MFR) and average Wald statistic approaches are employed in the analysis. Causality results and policy implications are different for middle income and low income countries. The interaction of capital inflow components and BMP with openness and human capital may act to mitigate the capital outflow associated with currency crises.

JEL Classification: C33, F3

Keywords: capital inflow, currency black market, causality, MFR, Wald statistics

I. Introduction

The advent of globalization has ubiquitously enhanced global financial markets' integration through a surge in private capital flows. The World Bank (1999) reports that net private capital inflows increased from about fifty billion U.S. dollars each year during the 1987-89 period to over one hundred and fifty billion dollars a year in the 1995-97 period. The same report reveals a change in the composition of capital inflows with foreign direct investment (FDI) constituting thirty-four percent of capital inflows and portfolio investment (equity and bonds) accounting for twenty percent in the 1990's. Bank loans reached forty-eight percent of capital inflows in the 1970's and thirty percent in the 1980's.

This paper examines the causal relationship between capital flows and currency crisis in the Middle East & North African (MENA) countries. Governments in MENA sought capital inflows to build capital stocks, acquire technology, and gain access to export markets. Reform efforts in MENA intensified in the late 1980's after the failure of the region's import-substitution strategies for development. The success story of the South East Asian tigers motivated other regions to follow export-led policies. However, attracting foreign capital to spur export promotion can exacerbate financial instability, especially since recent financial innovations have blurred the distinction between the different types of capital flows.

Three capital flow composition scenarios have been associated with currency crisis in the literature: (1) a low share of FDI in total capital inflows, (2) a high share of foreign currency denominated bank loans in a country's total borrowing versus FDI, or (3) a low relative share of portfolio flows versus FDI. One possible explanation (Radelet and Sachs (1998); Wei and Wu (2001)) of why a low FDI share in total capital flow is associated with a higher probability of crisis is that bank lending and other portfolio investments may be more sentiment driven than direct investment. As such, a small

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negative change in the recipient countries' fundamentals may cause a large outflow of portfolio capital. This can strain the recipient country's currency or financial system sufficiently to exacerbate or cause its collapse.

This paper distinguishes itself by studying the causal relationship between the three dimensions of capital composition and currency crisis in the MENA region over the 1984-2004 period. Changes in the currency *black market premiums* (BMP) are used as indicators of currency (financial) crisis. Given that the relationship between capital inflows and the black market premium may be heterogeneous across countries, there is the potential for serious errors in the analysis of these causal relationships if unrealistic homogeneity assumptions are imposed in the economic modeling. Thus, following Nair-Reichert and Weinhold (2001) the paper adopts a mixed, fixed, and random (MFR) coefficient approach. For robustness, the study will also utilize the Hurlin (2004) causality testing method to generate average Wald statistics for fixed effects heterogeneous panel data.

The remainder of the paper is organized as follows. Section II reviews relevant literature on the relationship between capital inflows and currency black markets. Section III presents the data and methodology for causality testing. Section IV discusses the MFR and Wald statistics causality results. Section V offers some concluding remarks and policy implications.

2. Related Literature

The deterioration of bank lending in the 1980's, resulting from an abysmal third world debt crisis, spurred the proclivity of many MENA countries toward more capital inflows (especially FDI) and openness. These policies have also been driven by the failure of import-competing policies in MENA countries, and the success of export-promoting in the Asian Newly Industrialized Countries. Several MENA countries, such as Algeria, Egypt, Morocco, Turkey, and Tunisia therefore introduced in the 1980's and 1990's legislation that advocates for more capital inflow. According to the UNCTAD report (2003), the average FDI flow in Egypt during the period 1990-2002 was 821 million U.S. dollars, while the average for Morocco was 755 million U.S. dollars. Among the MENA countries, Israel and Turkey attracted the highest levels of FDI, averaging 2287 and 1123 million U.S. dollars respectively, between 1990-2002.

Prasad and Wei (2005), Kregel (2004), and Krugman (2001), among others, have demonstrated that FDI amplifies business cycles through its high mobility and contributes to financial crises by exacerbating balance of payments (BOP) imbalances. Even though FDI may return after a crisis to replenish the foreign exchanges, it is obtained at prohibitively high costs. Transnational investors demand high compensations in the form of profits and dividends, royalties and license fees, management fees and employees' salaries, and interest paid on net loans from parent companies to subsidiaries. Also, Lee (1997) argues that if capital is highly mobile, attempts at sterilization may prove futile, because they can be rapidly overwhelmed by renewed inflows. Moreover, empirical evidence shows that high import propensity of FDI-related trade generates additional foreign exchange obligation for the host economies. Aizenman and Noy (2005) have empirically demonstrated a feedback relationship between FDI and manufacturing trade. Thus, FDI has not been borne out by the evidence as a low-cost, risk-free and risk-reducing financing source.

The Latin American, East Asian, and Russian financial crises of the 1990's, gave way to the debate among emerging market economies, not on whether capital movement needs to be controlled, but on the desirable composition of foreign capital (Prasad and Wei (2005)). Foreign direct investors are engaged in long-term productions. They are attracted to the developing host economies for the cheap inputs (efficiency FDI) or the actual and potential markets (market-seeking FDI). As a result, FDI is concerned with the market fundamentals. Moreover, FDI transforms itself into real production which, once constructed, cannot easily escape the country. However, two critical questions remain to be answered, first, whether all FDI is long-term production oriented and second, whether FDI loses mobility once it goes into investment projects. To answer the first question, one should note that the distinction between FDI and portfolio investment is rather arbitrary. FDI investment garners investors a commensurate stake in management. This means foreign investors have to acquire more than ten percent of equity, which is considered to represent lasting interest and control. However, this classification does not guarantee that FDI has to build production facilities or augment production capacity. Nor does it rule that FDI must gain steady income streams from real production. For instance, foreign investors can acquire domestic assets through merger and acquisition (M&A) without establishing new production facilities. In fact, the rise of FDI in the 1990's was largely driven by privatization and corporate restructuring in the emerging market economies.

Importantly, FDI obtained after M&A adjustment (especially efficiency-seeking FDI), is likely to be long-term production oriented and behave counter-cyclically, because an economic downturn means more attractive production opportunities for firms. By contrast, market-seeking FDI (especially M&A FDI), with the goal of realizing quick capital gains, tends to be pro-cyclical and volatile, given that transnational corporations (TNC's) are relatively large in their size. Moreover, FDI has much more mobility than domestic capital and domestic policies are less effective in steering the foreign-invested businesses. As discussed in Trade and Development Report (UNCTAD 1995), not only did financial deregulation in the Southeast Asian countries engender harmful boom-bust cycles, but the crowding of FDI into certain sectors worsened the intensity of the cycle.

The view that FDI goes into production and capital formation fundamentally confuses the type of assets FDI invests and the ways by which FDI finances its investment. The reinvested portion of retained earnings constitutes the largest component of FDI in many countries. But retained earnings are extremely mobile under the control of foreign investors (Singh 2001). A country with a large stock of FDI and a high rate of return on investment may face BOP difficulty if foreign investors decide to repatriate profits when anticipating a drying up of liquidity.

Foreign investors not only move retained earnings freely in and out of the country but also use the earnings for non-direct investment projects. As Kregel (1996) notes, although reinvested profits are recorded as FDI, they may in fact take the form of short-term portfolio investments. Goldstein and Razin (2005) contend that investors who know they are more likely to suffer a liquidity shock that forces them to sell early, are more likely to choose portfolio investments whereas investors who are not expecting a liquidity shock are more inclined to choose FDI. Existing statistical measures may not disentangle the use of retained earnings as means of acquiring financial assets from reinvestment in capital assets. In addition, the foreign subsidiary can borrow against its collateral domestically and lend the money abroad to the parent company. As Claessens

et al. (1993) point out, a direct investor can borrow in order to export capital, and thereby generate rapid capital outflows. Likewise, intra-company loans are also a major source of FDI, as parent companies can recall this debt on short notice (Razin 2002). This illustrates that even though FDI's tangible assets are erected in immobile production, its financing might be in the form of temporary intangible assets.

Kregel (1996) succinctly explains that, even if investors commit to financing long-term investment, recent innovations in financial markets have gone a long way towards eliminating the concept of a permanent investment in plant and equipment in much the same way that they have eliminated the concept of the maturity of a financial investment. Futures and options contracts allow investors to hold long maturity assets without being trapped into permanency. Classens et al (1993, 1995) and Kregel (1996) point out that with the growth of derivatives and hedge funds the distinction between FDI and portfolio flows has become much more blurred. Hence long-term flows are often as volatile as short-term flows, and the time it takes for an unexpected shock to a flow to die out is similar across both short and long term flows. Singh (2001) suggests that the flexibility of investments for TNC's imposes potential hazards on host economies. That is, FDI may have both short and long-term structural influence on the composition of a country's external payment flows. Unfettered FDI may create a time profile of foreign exchange outflows in the form of dividend payments or profits repatriation and new inflows which may be time inconsistent. Experience shows that such incompatibility, even in the short run, may easily produce a liquidity crisis which could degenerate into a solvency crisis with serious adverse consequences for economic development. Recognizing this ambiguity between FDI and portfolio flows, Singh (2001) reported that Bhagwati suggested to the IMF that emerging market countries should be allowed to impose exchange controls on capital flows. This suggestion was accepted by the IMF.

The Asian financial crisis of the 1990's demonstrates that the stability of FDI depends on the entry mode and the nature of FDI. As shown by UNCTAD's (1998) surveys, efficiency-seeking, export-oriented FDI is undeterred by crisis. Instead, the parent corporations may expand their investment in the affiliates to take advantage of the low-cost capital acquisition and production. BOP problems and the ensuing financial volatility discourage foreign investors in the case of market seeking FDI. In fact, Woodward (2001) contends that Malaysia may also have experienced the first FDI-led financial crisis and that Thailand had the second crisis in which FDI significantly contributed. Krugman (2001) enunciates that what induces FDI inflows are the falling asset prices and the opportunities of participating in corporate restructuring through M&A's. Aguiar and Gopinath (2004) find that the surge in M&A's in the crisis-wrecked Asian countries can be explained by the decline in the median value of offer price relative to book value in 1998 as a result of domestic cash-strapped firms selling their assets at a steep discount. Foreign investors were able to acquire these undervalued capital assets and sell them later when the economy recovers. Woodward (2001) argues that short-term foreign exchange benefits of the returned FDI are unlikely to be substantial because the main price paid by foreign investors for taking over a bankrupt business is taking over their debts. Therefore, the initial capital injection is limited. Also for domestic firms, selling off these productive assets at a steeply discounted rate leads to capital losses and degeneration of production capacity. On the other hand, when the capital markets recover and asset prices climb, foreign investors have a much larger claim on the host economy than what they paid for.

3. Data and Methodology

In this paper a panel of eight Middle Eastern and North African (MENA) countries over the period 1984-2004 is used to analyze the dynamic relationship between capital inflows and currency black market premiums (BMP).¹ Capital inflow components are FDI, bank loans, and portfolio investment (equity and bonds). Bivariate Granger causality relationships between the four variables are investigated consecutively. The model controls for gross domestic investment, economic growth, real exchange rates, the interest rate differential, taxes, aid, political instability, openness to trade (proxied by the ratio of exports and imports to GDP), and human capital (proxied by the adult literacy rate). Political instability is included to control for the negative influence of institutional factors on currency crisis and capital inflows. Openness also acts as a proxy for tariffs. Changes in the real exchange rate and the interest rate differential are emblematic of changes in the BOP. The list of countries and definitions of the data and their sources are included in Tables 1 and 2.

Table 1: Countries

Low	<i>Egypt, Yemen</i>
Middle	<i>Algeria, Iran, Jordan, Morocco, Syria, Tunisia</i>
OPEC	<i>Algeria, Iran</i>
Non-OPEC	<i>Egypt, Jordan, Morocco, Syria, Tunisia, Yemen</i>
Overall	<i>Algeria, Egypt, Iran, Jordan, Morocco, Syria, Tunisia, Yemen</i>

Table 2: Data definitions, period 1984-2004.

Series	Definition and Source
bmp	<i>black market premium (percentage difference between the black market and official exchange rates). Source: World Currency Yearbook.</i>
fdi	<i>foreign direct investment (B.O.P. USD). Source: World Bank Development Indicators CD-ROM , 2005 (WB)</i>
port	<i>portfolio inflows (USD). Source: International Financial Statistics, June 2005. (IFS)</i>
loans	<i>total international claims against country. Source: Consolidated Banking Statistics, Bank of International Settlements (BIS)</i>
fdiflows	<i>fdi/(loans+portfolio+fdi)</i>
portfdi	<i>portfolio/fdi</i>
lofdi	<i>loans/fdi</i>
taxes	<i>taxes as a percent of GDP. Source: World Bank (WB)</i>
gdi	<i>gross domestic investment as percent of GDP. Source: WB</i>
hk	<i>Adult literacy rate. Source: WB</i>
open	<i>ln((exports+imports)/gdp). Source: WB</i>
xrate	<i>real exchange rate: (xrate country/xrate US)*CPI. Source: IFS</i>
differ	<i>interest rate differential: MENA country interest rate-US interest rate-depreciation. Source: IFS</i>
gdppc	<i>gdp per capita. Source: WB</i>
aid	<i>aid as a percent of GNI. Source: WB</i>
govt	<i>Political instability: Source: International Country Risk Guide (ICRG)</i>

¹ Political instability, as defined by the International Country Risk Guide (ICRG), is an index with values ranging from 0 (stable) to 6 (highly unstable). For clarity, we redefine the index so that an increase in the political instability indicator represents a worsening of political instability. This is done by subtracting the original index values from 6. See Rijkhegthem and Weder (2001).

In many developing countries, because of excess demand for foreign currency, governments impose controls on trade and capital flows to suppress demand. When controls are imposed, central banks also set the exchange rate at an officially fixed level and require that all market participants trade at those fixed rates. In addition, they introduce guidelines for allocating their limited amount of foreign exchange. Thus, those in need of foreign exchange whose demands are not met have no choice but to engage in the black market activity (illegal) or parallel market activity (legal) at a rate much higher than the official exchange rate set by the government. The percentage difference between the black market and the official rate constitutes the black market premium (BMP). What macroeconomic factors determine the premium? On the supply side, a few studies such as Sheikh (1976), Martin and Panagaria (1984), and McDormott (1989), have emphasized the role of smuggling, under-invoicing of exports, and resale of officially allocated foreign exchange as the main sources of supply. On the demand side, de Macedo (1987) argues that in some countries the tariff rate on importation of some commodities is so high that it pays to smuggle the goods and finance them through the black market. Thus, a high tariff rate is identified as a major factor for increased demand for foreign exchange in the black market. Others (Dornbusch et al (1983), Agenor (1992), and Bahmani-Oskooee (2005)) have identified portfolio diversification as a major component of the demand for foreign exchange in the black market. Such models argue that the loss of confidence in domestic currency, fear of inflation, increasing taxation, and low real domestic interest rates contribute to an increased demand for foreign exchange.

All variables (defined in Table 2) are expressed in natural logarithmic forms except those which take on negative values. Modeling capital inflows (currency black markets) as a function of the growth of currency black markets (capital inflows) and the control variables, as opposed to levels, ensures that the results from a panel of countries applies as much as possible to individual countries. Growth rates are more predictive of variables' changes than their levels. Another advantage of using growth rates of the independent variables is that the variables are much more likely to be stationary, which is a prerequisite for causality testing.² Given the cross-sectional heterogeneity present in many panel data sets, even with a correctly specified model, it is reasonable to expect that one variable may help predict another for most but not all of the cross-sectional units. In a heterogeneous data set it is possible that the mean coefficient could take statistically significant (or insignificant) values of either sign without reflecting much underlying economic meaning. We should, therefore, be wary of judging the degree of causality by how significant the test statistic is.

To mitigate the problems associated with heterogeneity, this paper uses the following two approaches:

(a) The first is the mixed fixed and random (MFR) Model suggested by Hsiao (1989) and applied by NW (2001) in a dynamic panel context. Unlike traditional panel fixed effects estimators, MFR estimation allows for heterogeneous dynamics and thus avoids the serious Pesaran (2003) type biases induced by imposing unrealistic homogeneity conditions on coefficients of the lagged dependent variables.³

² Unit root tests using the Im-Pesaran-Shin (2002) test has been performed. Results are available upon request.

³ Pesaran (1992, 1995) argues that the imposition of homogeneity assumptions on the coefficients of lagged dependent variables when in fact the dynamics are heterogeneous across the panel can lead to serious biases that cannot be corrected with instrumental variables estimation.

(b) The second approach is Granger-causality testing using average Wald statistics. Recent theoretical developments in Granger causality methods have made tests using limited time series possible through the use of panel data (Larrain et al, 1997; Hurlin and Venet (HV), 2003; and Hurlin, 2004).⁴ This study employs bivariate Granger causality tests on capital inflows and currency black markets using Hurlin's (2004) methodology.

In this paper the main emphasis is on exploring causal relationships rather than contemporaneous correlations.⁵ The basic MFR model is:

$$\begin{aligned} gfdi_{it} = & \alpha_i + \gamma gfdi_{t-1} + \beta_1 gbmp_{t-1} + \beta_2 ggdp_{t-1} + \beta_3 ggdi_{t-1} + \beta_4 gxrte_{t-1} \\ & + \beta_5 gdiffer_{t-1} + \beta_6 gtaxes_{t-1} + \beta_7 gaid_{t-1} + \beta_8 gop_{t-1} + \beta_9 ghk_{t-1} + \beta_{10} ggovt_{t-1} \\ & + \beta_{11} ghk.bmp_{t-1} + \beta_{12} gop.bmp_{t-1} + \varepsilon_{t-1} \end{aligned} \quad (3)$$

Similar equations are set for the growth of the lagged dependent variables of bank loans, portfolio investment, and currency black market premiums (BMP) consecutively.

Besides the dynamic effect of growth, the lagged dependent variable provides an excellent proxy for many omitted variables. As NW demonstrate, the MFR procedure requires only the assumption of homogeneity in the distribution of the estimates on lagged dependent variable, rather than homogeneity of the parameters themselves. Thus MFR causality models allow for complete heterogeneity of the coefficients on the lagged dependent variable and hence avoid the potentially serious bias imposed by the assumption of homogeneity in the coefficients on these terms. As an added feature, in the course of its estimation MFR also provides important panel diagnostics. In particular, the variance of the coefficients on the x_i provides an indicator of heterogeneity in the panel. Where these variances are large compared to their respective coefficient, the researcher must treat the causality estimates from any estimation procedure as highly suspect.⁶ Weinhold (1999) uses simulations to demonstrate how such a specification outperforms traditional panel data causality procedures (such as Holtz-Eakin et al. (1988)) in the presence of heterogeneity. MFR estimated coefficients, standard errors, and variance of the indicated causal variables are reported, in the Annex, in Tables 5-16.

Hurlin (2004) adapt a simple Granger (1969) causality test for heterogeneous panel data models with fixed coefficients. Granger (1969) posits that for each individual (country) the variable x is causing y if we are better able to predict y using all available information than if we exclude x . Hurlin (2004), thus, contends that if x and y are observed on N individuals, we should be able to determine the optimal information set used to forecast y . The basic idea is to assume that there exists a minimal statistical representation common to x and y for at least a subgroup of individuals. Granger (1969) causality applies to homogenous time series when N causality relationships exist and

⁴ Coondoo and Dinda (2002) used panel data Granger causality to test for causality between pollution and per capita GDP.

⁵ To save on space the results from contemporaneous correlations or the Holtz-Eakin type of dynamic panel (based on one lag and no differencing) will not be reported. However, the model is the first difference of the one-lag model. Using two lags did not change the results.

⁶ Following NW, the RHS variables are orthogonalized. As explained by NW, MFR is achieved through a transformation formula developed by Hsia (1989). To do this transformation, we used a modified version of the code available on Weinhold's (1996) website.

when the individual predictors of y obtained conditionally on past values of y and x are identical. Heterogeneity exists when the individual predictors of y are not the same across countries. Hurlin (2004) and Hurlin and Venet (2001) incorporated Granger causality testing between variables x and y , taking into account potential cross-sectional heterogeneity in the panel by distinguishing between the heterogeneity in the causal relationship between x and y , and the heterogeneity of the data generating process (DGP). This is done by distinguishing between a heterogeneous non-causality (HENC) hypothesis and a homogenous non-causality (HNC) hypothesis adopted by Holtz-Eakin et al (1988). Under HENC, causality between two variables (not necessarily with the same DGP) may be present in one subgroup of countries and absent in another. Following Hurlin (2004), a Granger non-causality test statistic is generated by averaging standard individual Wald statistics. Hurlin and Venet (2001) and Hurlin (2004) characterize the distribution of this estimator and provide approximations for its first moments. From this characterization, an approximated standardized average Wald statistic is proposed to test the heterogeneous non-causality hypothesis (HNC) for small T and N sample. Hurlin's (2004) model is:

$$y_{it} = \alpha_i + \sum_{K=1}^K \gamma_i^{(K)} y_{it-K} + \sum_{K=1}^K \beta_i^{(K)} x_{it-K} + \varepsilon_{i,t} \quad (4)$$

where $\varepsilon_{i,t}$ are *iid* with $E(\varepsilon_{i,t}) = 0$ and finite heterogeneous variances $E(\varepsilon_{i,t}^2) = \sigma_{\varepsilon,t}^2$. x and y , observed on T periods and N individuals, are covariance stationary variables. α_i are assumed to be fixed. Lag orders K are identical for all cross-section units of the panel and the panel is balanced. Autoregressive parameters $\gamma_i^{(K)}$ of the lagged dependent variables and $\beta_i^{(K)}$ regression coefficients of the explanatory variables are different across groups. Importantly, unlike Weinhold (1996) and Nair-Reichert and Weinhold (2001), parameters $\gamma_i^{(K)}$ and $\beta_i^{(K)}$ are both constant, not random. That is, the model has fixed coefficients with fixed individual effects. Unlike Holtz-Eakin et al (1988), Hurlin's (2004) causality is more general where non-causality may exist for $N_1 < N$ individual processes with no causality from x to y , while causality may exist for $N_1 + 1, N_1 + 2, \dots, N$. If $N_1 = 0$, x Granger causes y for all individuals, irrespective of the homogeneity (or lack thereof) of the data generating process. Likewise, if $N_1 > 0$ then the causality relationship is heterogeneous. To allow for the possibility of non-causality in a subgroup N_1 and possible causality in other subgroup $N_1 + 1, N_1 + 2, \dots, N$, Hurlin (2004) proposed using the average of individual Wald statistics to test the homogeneous non-causality hypothesis (HNC) for subgroups (low-income, middle-income, oil, non-oil countries), $i = 1, \dots, N$, such that:

$$W_{N,T} = \frac{1}{N} \sum_{i=1}^N W_{i,T} \quad (5)$$

⁷ W_i are generated as summation of the F-statistic, $\frac{K}{N} \sum_{i=1}^N F_i$, $F_{K, df_u - df_r} = \frac{(RSS_{r,i} - RSS_{u,i})/K}{RSS_{u,i}/df_u - df_r}$ (6)

where RSS_r = restricted sum of squared residual and RSS_u = unrestricted sum of squared residuals computed from equation (1); K = number of lags or number of parameters $\beta_i^{(K)}$; df_u and df_r are the degrees of freedom of unrestricted and restricted regressions, respectively; $df_u - df_r = T - 2K - 1$; and T = number of years.

4. Causality Results

As mentioned in Section I, the three hypotheses associated with currency crises in the literature are: (1) a low share of FDI in total capital inflows, (2) a high share of foreign currency denominated bank loans in a country's total borrowing versus FDI, or (3) a low relative share of portfolio flows versus FDI. Bank loans and portfolio flows are defined as ratios of FDI so that a decrease in bank loans and portfolio flows indicates a relative increase in FDI. In testing the three hypotheses, we are concerned about possible endogeneity of capital inflows on BMP. Hence, we test for Granger causality rather than perform correlation-based regressions, using Hurlin's (2004) (Table 20) approach as well as MFR (Tables 5-16). A summary of the causality results is included in Tables 17 and 18. For the most part, the two approaches yield similar results. The results are consistent in nine out of the twelve tests performed (Table 20). This enhances the reliability of the results and their policy implications. The two approaches also supplement each other, each providing a different set of useful information about the data. Specifically, Wald statistics show causality results that are based on dynamic fixed effects heterogeneous panel data. MFR results are dynamic, mixed, fixed, and random effects panel data analyses, displaying signs and variance of the coefficients. The MFR results show relatively high coefficient variances, indicating the presence of significant heterogeneity among MENA countries. Thus causality approaches such as Holtz-Eakin et al (1988) that do not account for heterogeneity are flawed. To mitigate heterogeneity, the sample countries have been divided into low income and middle income countries. Table 3, in the Annex, and Table 4, below, summarize the descriptive statistics.

Table 4: Summary Statistics by Country for Select Variables. BMP=Blackmarket premium (difference in percentage)

BMP				LOFDI			
country	mean	min	max	country	mean	min	max
Algeria	220.2	11.11	418.6	Algeria	5315	3.76	51460
Egypt	8.83	-10.00	104.8	Egypt	10.48	2.77	47.80
Iran	967.1	88.26	3359	Iran	425.1	-119.17	4977
Jordan	3.30	0.000	10.34	Jordan	-37.35	-1573	420.34
Morocco	3.11	0.000	13.27	Morocco	745.9	5.53	9015
Syria	308.5	0.000	1046	Syria	297.3	1.93	5770
Tunisia	3.44	0.000	16.55	Tunisia	10.60	2.07	25.76
Yemen	16.27	0.000	64.10	Yemen	61.89	-3.97	398.1
FDIFLOW				PORTFDI			
country	mean	min	max	country	mean	min	max
Algeria	-0.053	-0.117	0.002	Algeria	-0.307	-0.949	0.143
Egypt	0.119	0.021	0.265	Egypt	-0.341	-5.163	0.259
Iran	-0.028	-0.389	0.041	Iran	-0.079	-0.947	0.034
Jordan	0.086	-0.025	0.341	Jordan	-0.670	-7.974	0.062
Morocco	0.034	0.000	0.151	Morocco	0.862	-0.096	10.55
Syria	0.134	-0.107	0.339	Syria	-0.016	-0.339	0.000
Tunisia	0.121	0.036	0.316	Tunisia	0.152	-0.032	0.807
Yemen	0.430	-3.022	15.53	Yemen	-1.288	-7.118	0.177

For the entire sample of MENA countries, the volatility of FDI relative to total capital inflow (FDI/capital) and portfolio investment relative to FDI is substantially lower than that of bank loans as a ratio of FDI. It is clear that the mean of the bank loans ratio is very high compared to that of FDI and portfolio investment. The tables also show that, on average, low income countries are less open and receive more aid than middle income countries. Table 4 shows that MENA countries mainly depend on bank loans. FDI net flows are very low and portfolio investment is mostly negative. Frankel and Rose (1996) find that a low ratio of FDI to debt is associated with a higher likelihood of currency crisis based on an empirical test of over 100 emerging market economies during 1971-1992. Moreover, a decline in FDI inflows by one percent of external debt is correlated with an increase in the probability of currency crisis by 0.3 percent. Calvo et al. (1996) also suggest that for the particular countries and time period which Frankel and Rose (1996) examined, portfolio investment displayed significantly higher volatility than FDI flows.

For middle income countries (Tables 5-10), there is a negative feedback relationship between the three capital inflows and the premium. Tables 5-7 display that a 1% increase in the black market premium causes a .69% fall in FDI in middle-income countries, and a 7034% decrease in loans and 11.6% increase in portfolio. On the other hand, a 1% increase in FDI, bank loans, and portfolio, causes 726%, 474%, and 206% decrease in black market, respectively (Tables 8-10). These results are consistent with the hypothesis that currency crisis is associated with lower FDI. The induced decrease in the premium from capital inflows will simultaneously stimulate capital outflows by exerting a dampening effect on FDI and bank loans, and a positive effect on portfolio investment. The simultaneous negative causative effects of the premiums on FDI and loans and the positive response of portfolio investment may not be coincidental.

Goldstein and Razin (2005) developed a model that describes an information-based tradeoff between direct investment and portfolio investment. This is consistent with Dooley's et al (1994) result that changes in FDI are associated with greater rather than lower variability in capital flows, causing a negative change in bank loans. The results also show that openness causes a negative change in portfolio. Thus, although the increase in capital inflows slows down the currency black market, the existence of a BMP may induce foreign investors to repatriate profits when anticipating a drying up of liquidity as a result of black markets. As Kregel (1996) notes, although reinvested profits are recorded as FDI, they take the form of an increase in short term portfolios. In addition the foreign subsidiary can lend the money abroad to the parent company. The negative causal impact of currency black market premiums on FDI and loans has been explained by Jansen (1995) and Seabria et al (2006). In response to capital outflows, foreign direct investors demand high compensation in the form of dividends on equity and interest paid on net loans. See tables 5 to 10 in the Annex.

Capital outflows can exacerbate balance of payments problems and accelerate financial crises. Notice that the results show that an increase in the real exchange rate (and domestic interest rate) significantly decreases FDI. Also given that MENA countries are typically capital-poor and technology deficient, FDI-related trade will likely have high import propensity, generating higher demand for foreign exchange. Seabria et al (2006) empirically support this argument.

It can be problematic to sever FDI from other types of capital because capital inflows are interrelated. First, if FDI-driven capital outflows exceed the FDI inflows there will be a need to secure financing from other sources, such as bank loans or foreign portfolio investment. Other forms of foreign capital will rise to finance the current account deficit generated by FDI. As Classens et al (1993) and Kregel (1996) point out the edge between FDI and portfolios is increasingly blurred. Second, direct investment by foreign investors would certainly give rise to related financial activities and transactions. Kregel (1996) has argued that FDI is exposed to currency risks and will almost always require the financial intermediary to cover the risks. To the extent that risks are covered, they will produce cross-border flows that put pressure on the foreign exchange market or the domestic money market, which may reinforce the destabilizing elements.

The World Bank (1996) has also acknowledged that during a crisis direct investors may contribute to capital withdrawals by accelerating profit remittances or reducing the liabilities of affiliates toward their mother companies. While these are non-FDI flows, they result from decisions made by foreign investors. It is difficult to determine the extent to which foreigners involved in direct investment extracted capital through non-FDI flows during a financial crisis because the data are available only with considerable delay. The same World Bank report reveals that the return of FDI after the Asian financial crisis entails an increase in portfolio investment in order to ward off exchange rate fluctuations and other risks. The inflow of FDI may lead to a higher level of inflow and outflow of other capital. This explains why the U.S. and other developed economies attempt to include portfolio investment in the formation of the Multilateral Agreement on Investment (MAI) because, as shown in WTO's-United States Report (2002), an agreement limited to FDI denies the benefit of a portfolio operation within a direct investment and thus will act to discourage FDI. Hu (2001) suggests that the surge in FDI flows in China will significantly increase attendant cross-border financial transactions (e.g. equity and debt financing, interest and currency swaps) which allow TNC's to hedge risks and repatriate earnings, capital gains, dividends, interest income, and principles.

Note that in middle income MENA countries, the interaction of human capital and openness with the black market premium has no causal relationship with FDI. However, interaction of human capital and openness with the BMP causes a decrease in bank loans (relative increase in FDI). Table 6 displays that a 1% increase in the interaction variables of human capital and openness with black market cause a decrease of 2232% and 4364% decrease in bank loans, respectively. Interaction of openness with the premium also causes a decline in portfolio inflows (relative increase in FDI). Table 7 shows that a 1% increase in the interaction variable of openness with black market causes a decrease of 4.6% in portfolio. That is, the presence of human capital and openness may decrease the transformation of FDI into bank loans and portfolio investments.⁸ Thus,

⁸ Also, interaction of bank loans with political instability (govt) decreases with the BMP. Otherwise, political instability does not have a significant causal relationship with capital flows and the BMP.

openness and human capital insulate FDI against negative causal responses to black market premium increases in MENA middle-income countries.

In middle-income countries (tables 5-10) the interactions of the three capital inflow measures with human capital and openness are independent of changes in BMP. However, as mentioned above, the interaction of human capital and openness with the black market Granger-causes a negative change in bank loans. That is, human capital development and openness discourage bank loans. Openness also causes a negative change in portfolio relative to FDI. Note that bank loans and portfolio are represented by their respective ratios to FDI. Thus a decrease in bank loans or portfolio indicates a relative increase in FDI. Frankel and Cavallo (2004) find that openness makes countries less vulnerable to sudden stops of capital inflows and currency crashes. This is also consistent with Edwards (2007) that having a flexible exchange rate (openness) greatly reduces the probability of capital outflows.

In low income countries, the negative unidirectional causality from portfolio to the black market premium (Table 16) is intuitively appealing given the rudimentary nature of financial markets in poor MENA countries. Tables 11-13 display that a 1% increase in black market premiums causes a .7% decrease in FDI in low-income countries, a 168.7% decrease in bank loans, and a .2% decrease in portfolios.

On the other hand, a 1% increase in FDI increases the BMP by 246.2%, decreases bank loans by 60.9 %, and decreases portfolios by 8.5% (Tables 14-16). The dormancy of financial markets in low income countries partly explains the positive, one-way causation from FDI to the premium, and the negative bidirectional causality between bank loans and the premium. Alfaro et al (2006) argue that in a small open economy financial markets allow the backward linkages between foreign and domestic firms to turn into FDI spillovers.

The more developed the local financial markets, the easier it is for credit constrained entrepreneurs to start their own firms. In this regard, although human capital has a significant positive impact on FDI, and no impact on bank loans, its interaction with currency black markets causes a negative effect on FDI and bank loans. However, the interaction of human capital with loans causes a decrease in the premium, while the interaction of loans with openness causes an increase in the premium. A 1% increase in the interaction variables of human capital and openness with the black market premium causes a 13% and .2% decrease, respectively, in FDI, a 365% and 13.3% decrease, respectively, in loans, and a positive 4.3% and a negative 1.1% change, respectively, in portfolio (Tables 11-13 in the Annex).

This paper examined causality instead of correlation between capital inflows and currency black market premiums in a panel of eight Middle Eastern and North African countries (MENA), over the period 1984-2004. For robustness two approaches are used to test for causality: mixed, fixed, and random (MFR, Tables 5-16) and average Wald statistics (Table 20). To mitigate heterogeneity, the sample countries have been subdivided into low-income and middle-income countries.⁹ See tables 19 and 20 below and tables 14 to 18 in the Annex.

⁹ The MFR procedure was also performed on the subset of OPEC countries in the sample. Overall, the results were similar to those for the middle income group, however the lack of data prohibited estimation in several cases.

Table 19: MFR Causality Test Summary for Interaction Terms

Causality	LOW	MIDDLE
hkfdiflow→BMP	0	0
opfdiflow→BMP	0	0
hklofdi→BMP	0	(+)**
oplofdi→BMP	(-)**	0
hkportfdi→BMP	(+)**	0
oportfdi→BMP	(+)*	0
hkbmp→fdiflow	(-)**	0
opbmp→fdiflow	0	0
hkbmp→lofdi	(+)**	(-)*
opbmp→lofdi	0	(-)**
hkbmp→portfdi	(+)**	0
opbmp→portfdi	0	(-)**

Table 20: Hurlin Causality Test Results

REGRESSION INFORMATION				Hurlin Test						Coef ¹⁰
depvar	causvar	grouping	Gro ups	D Fr ¹¹	D Fur ¹²	Wald	1 %	5 %	10 %	MFR
bmp	fdiflow	LOW INCOME	2	16	12	9.0583	x			(+)*
bmp	lofdi	LOW INCOME	2	16	12	7.7244	x			(-)**
bmp	portfdi	LOW INCOME	2	16	12	5.3990	x			(-)**
fdiflow	bmp	LOW INCOME	2	16	12	0.60517				(-)
lofdi	bmp	LOW INCOME	2	16	12	17.9611	x			(-)**
portfdi	bmp	LOW INCOME	2	16	12	0.4859				(-)
bmp	fdiflow	MIDDLE INCOME	6	48	36	1.6060			x	(-)**
bmp	lofdi	MIDDLE INCOME	6	48	36	3.5389	x			(-)*
bmp	portfdi	MIDDLE INCOME	6	51	41	3.5985	x			(-)*
fdiflow	bmp	MIDDLE INCOME	6	48	36	0.6838				(-)*
lofdi	bmp	MIDDLE INCOME	6	48	36	0.7450				(-)*
portfdi	bmp	MIDDLE INCOME	6	49	37	0.6192				(+)*

5. Conclusions and Policy Implications

In the middle-income countries of MENA, the three capital inflow measures exhibit bidirectional (feedback) causality with the currency black market premium. However, the interaction of the premium with openness and human capital insulates FDI against negative causal responses to black market premium increases (currency crises) through the relative decrease in transformation of FDI to bank loans and portfolios. Thus, an important policy implication is that middle-income MENA countries can develop their human capital stocks and open their economies to break the negative feedback from currency black markets and thereby avoid financial crises. By slowing down a relative

¹⁰ The sign of the coefficient appears in parentheses. *** Significance at 10% level; ** Significance at the 5% level; * significances at the 1% level

¹¹ Dfr = Degrees of freedom of restricted regression

¹² Dfur = Degrees of freedom of unrestricted regression

change (volatility) in bank loans and portfolio, openness and human capital help FDI exert its cushioning effect on the economy.

In low-income countries, FDI accelerates a currency crisis, but crisis can be mitigated through the negative feedback causality between bank loans and currency black market premiums. The interaction of human capital with loans, however, causes a decrease in the premium. The absence of causality between the premiums and portfolio investment indicates the rudimentary nature of financial markets in poor countries. This implies that development of financial markets and human capital in low-income MENA countries is crucial to mobilize savings and pave the way for more and diversified capital inflows. In this regard, Prasad et al (2007) argue that even successful developing countries have limited absorptive capacities of foreign resources, either because of their underdeveloped financial markets, or because their economies are prone to overvaluation caused by rapid capital inflows.

It is also abundantly clear from Tables 3-4 and the causality results in summarized in Tables 17-18, that a main problem facing MENA countries is that they have relatively lower FDI and portfolio investment and higher foreign bank loans. Such a composition of capital inflow has been identified as being associated with a higher incidence of currency crises, as hypothesized in this paper. However, the interaction of capital inflow components and the black market premium with openness and human capital may act to mitigate the capital outflows associated with currency crisis.

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Annex

Table 3: Summary Statistics by Country Group

Summary Statistics: Overall												
stats	bmp	fdiflow	lofdi	portfdi	gdigdp	aid	taxes	hk	open	ggdppc	xrate	differ
mean	191.3	0.105	853.7	-0.211	22.65	3.366	-2.902	59.75	-0.515	1.182	46.35	11.03
N	168	168	168	168	168	168	168	168	168	168	168	168
sd	472.8	1.254	4650	1.461	4.947	3.78	0.606	16.11	0.46	4.113	180.8	26.35
min	-10	-3.022	-1573	-7.974	11.9	0.005	-4.023	24.7	-2.412	-16.51	-0.432	-15.69
max	3359	15.53	51460	10.55	34.5	24.51	-1.165	95.17	0.436	12.68	1265	188.81
Summary Statistics: Low Income												
stats	bmp	fdiflow	lofdi	portfdi	gdigdp	aid	taxes	hk	open	ggdppc	xrate	differ
mean	12.55	0.275	36.19	-0.814	19.14	5.218	-2.996	45.32	-0.624	1.481	5.8	25.44
N	42	42	42	42	42	42	42	42	42	42	42	42
sd	21.87	2.517	81.61	1.728	5.359	2.853	0.189	10.46	0.328	2.069	7.915	36.28
min	-10	-3.022	-3.977	-7.118	11.9	1.194	-3.496	24.7	-1.069	-2.655	0.088	-10.84
max	104.85	15.53	398.1	0.259	34.4	13.70	-2.634	63.19	0.094	7.106	31.73	112.2
Summary Statistics: Middle Income												
stats	bmp	fdiflow	lofdi	portfdi	gdigdp	aid	taxes	hk	open	ggdppc	xrate	differ
mean	250.95	0.049	1126	-0.01	23.83	2.749	-2.87	64.56	-0.479	1.082	59.86	6.228
N	126	126	126	126	126	126	126	126	126	126	126	126
sd	533.11	0.111	5347	1.308	4.211	3.858	0.689	14.75	0.491	4.599	207.2	20.06
min	0	-0.389	-1573	-7.974	13.3	0.005	-4.023	32.5	-2.412	-16.51	-0.432	-15.69
max	3359	0.341	51460	10.55	34.5	24.51	-1.165	95.17	0.436	12.68	1265	188.8

Table 5: MFR REGRESSION, fdiflow on bmp for the MIDDLE income group. Number of Groups=6

	Bhat	t	p	se	coefvar
L.bmp	-.687	-5.188	0	.132	4387.208
L.gdi	-.083	-.63	.265	.132	144.074
L.aid	-.026	-.195	.423	.132	.809
L.ggdppc	.033	.25	.402	.131	7.515
L.xrate	1.119	8.454	0	.132	10481.698
L.taxes	.002	.015	.494	.132	.762
L.differ	-.113	-.855	.197	.132	4.24
L.op	.066	.501	.309	.132	198.743
L.hk	.046	.351	.363	.132	10.281
L.govt1	.006	.045	.482	.132	45.776
L.hkbmp	.072	.55	.292	.131	15.636
L.opbmp	.1	.752	.227	.132	460.058
L.govtbmp	.078	.592	.278	.132	191.881

**Table 6: MFR REGRESSION, lofdi on bmp for the MIDDLE income group.
Number of Groups=6**

	Bhat	t	p	se	coefvar
L.bmp	-7433.751	-5.272	0	1410.156	3.073e+11
L.gdi	-2461.707	-1.745	.042	1410.82	2.601e+10
L.aid	1840.97	1.304	.097	1411.691	7.093e+08
L.ggdppc	-108.878	-.078	.469	1391.478	8.946e+08
L.xrate	10730.418	7.606	0	1410.741	1.173e+11
L.taxes	-277.789	-.197	.422	1411.739	2.941e+08
L.differ	-1104.552	-.785	.217	1407.554	2.770e+09
L.op	-4442.183	-3.178	.001	1397.92	1.750e+11
L.hk	105.459	.075	.47	1411.042	2.588e+08
L.govt1	-275.339	-.195	.423	1411.193	1.208e+08
L.hkbmp	-2232.872	-1.592	.057	1402.369	7.054e+10
L.opbmp	-4364.79	-3.094	.001	1410.532	1.667e+11
L.govtbmp	-784.568	-.556	.29	1411.097	5.309e+08

**Table 7: MFR REGRESSION, portfdi on bmp for the MIDDLE income group.
Number of Groups=5**

	Bhat	t	p	se	coefvar
L.bmp	11.59	5.151	0	2.25	12433167
L.gdi	-2.631	-1.11	.135	2.369	59743.599
L.aid	.051	.022	.491	2.283	193.224
L.ggdppc	-.141	-.058	.477	2.446	3262.364
L.xrate	12.5	6.115	0	2.044	1982005.2
L.taxes	-.171	-.072	.472	2.396	97.584
L.differ	-.617	-.133	.447	4.635	226.911
L.op	-4.633	-2.156	.017	2.149	47533.185
L.hk	.465	.073	.471	6.377	4555.396
L.govt1	-.106	-.05	.48	2.134	75526.252
L.hkbmp	-2.735	-1.171	.122	2.335	43743.937
L.opbmp	-4.563	-2.012	.024	2.268	234765.8
L.govtbmp	-.217	-.098	.461	2.211	262404.2

Table 8: MFR REGRESSION, bmp on fdiflow for the MIDDLE income group. Number of Groups=6

	Bhat	t	p	se	coefvar
L.fdiflow	-725.951	-1.701	.046	426.785	9004542.7
L.gdi	174.81	.41	.341	426.637	940624.78
L.aid	-4818.819	-11.288	0	426.903	3.467e+08
L.ggdppc	36.626	.087	.465	420.408	288411.42
L.xrate	322.563	.756	.226	426.64	2827395.6
L.taxes	-2.257	-.005	.498	426.922	497642.55
L.differ	-823.118	-1.931	.028	426.213	10035762
L.op	68.266	.161	.436	423.193	1700223.3
L.hk	-5.887	-.014	.495	426.705	24310.764
L.govt1	-14.71	-.034	.486	426.705	1480768.9
L.hkfdiflow	-442.71	-1.037	.151	426.786	18388907
L.opfdiflow	61.815	.145	.443	426.802	15107363
L.govtfdiflow	-23.241	-.054	.478	426.761	51719.449

Table 9: MFR REGRESSION, bmp on lofdi for the MIDDLE income group. Number of Groups=6

	Bhat	t	p	se	coefvar
L.lofdi	-474.097	-4.151	0	114.219	3.996e+11
L.gdi	-39.488	-.343	.366	115.172	1.940e+08
L.aid	-789.732	-6.853	0	115.242	2.139e+08
L.ggdppc	-26.87	-.237	.407	113.542	5.508e+08
L.xrate	426.151	3.7	0	115.168	41581150
L.taxes	-38.429	-.333	.37	115.247	352919.6
L.differ	186.113	1.618	.054	115.023	1.044e+08
L.op	-22.297	-.195	.423	114.079	87956331
L.hk	5.602	.049	.481	115.196	18622493
L.govt1	-41.418	-.36	.36	115.191	35789374
L.hklofdi	181.942	1.729	.043	105.217	2.995e+10
L.oplofdi	-117.069	-1.019	.155	114.838	4.012e+08
L.govtlofdi	-443.527	-3.891	0	114.001	7.517e+09

Table 10: MFR REGRESSION, bmp on portfdi for the MIDDLE income group. Number of Groups=4

	Bhat	t	p	se	coefvar
L.portfdi	-206.118	-7.37	0	27.968	968539.39
L.gdi	47.848	.94	.175	50.915	19468.907
L.aid	-22.092	-.715	.239	30.907	18040.747
L.ggdppc	-4.569	-.125	.451	36.596	1088.769
L.xrate	-640.162	-2.088	.02	306.597	904143.99
L.taxes	1.919	.052	.479	36.956	876.205
L.differ	4.856	.086	.466	56.456	4.312
L.op	-11.331	-.193	.424	58.716	3168.271
L.hk	-8.269	-.088	.465	94.335	6522.174
L.govt1	-13.748	-.411	.341	33.446	2567.391
L.hkportfdi	-9.15	-.319	.375	28.666	22922.939
L.opportfdi	-18.934	-.652	.258	29.046	33946.506
L.govtportfdi	-18.008	-.586	.28	30.744	8798.829

Table 11: MFR REGRESSION, fdiflow on bmp for the LOW income group. Number of Groups=2

	Bhat	t	p	se	coefvar
L.bmp	-.709	-.246	.404	2.882	3.44
L.gdi	1.772	.601	.276	2.947	18.609
L.aid	.28	.095	.463	2.949	.624
L.ggdppc	.765	.259	.399	2.95	7.018
L.xrate	-1.874	-.635	.266	2.952	.772
L.taxes	1.178	.399	.347	2.952	8.423
L.differ	2.01	.686	.249	2.929	24.853
L.op	.431	.146	.442	2.946	1.028
L.hk	5.444	1.845	.038	2.951	182.866
L.govt1	-.044	-.015	.494	2.948	.016
L.hkbmp	-13.135	-4.465	0	2.942	1065.935
L.opbmp	-.212	-.072	.472	2.95	.294
L.govtbmp	.685	.234	.409	2.934	2.823

Table 12: MFR REGRESSION, lofdi on bmp for the LOW income group: Number of Groups=2

	Bhat	t	p	se	coefvar
L.bmp	-168.657	-2.214	.018	76.175	161897.01
L.gdi	7.437	.095	.463	78.283	5.372
L.aid	-19.872	-.254	.401	78.315	6962.919
L.ggdppc	17.443	.223	.413	78.261	2685.026
L.xrate	61.103	.78	.221	78.311	28205.448
L.taxes	9.094	.116	.454	78.312	668.369
L.differ	39.525	.506	.309	78.117	7435.119
L.op	29.603	.379	.354	78.137	6400.842
L.hk	18.204	.233	.409	78.221	2069.337
L.govt1	18.972	.242	.405	78.258	2511.192
L.hkbmp	-365.007	-4.671	0	78.141	835784.29
L.opbmp	-13.256	-.169	.433	78.298	8.044
L.govtbmp	5.767	.074	.471	77.765	8.062

Table 13: MFR REGRESSION, portfdi on bmp for the LOW income group. Number of Groups=2

	Bhat	t	p	se	coefvar
L.bmp	-.203	-.085	.467	2.392	15.159
L.gdi	1.118	.457	.326	2.447	11.727
L.aid	1.158	.473	.32	2.448	22.536
L.ggdppc	.329	.134	.447	2.447	20.795
L.xrate	10.576	4.319	0	2.449	1363.557
L.taxes	.181	.074	.471	2.448	1.292
L.differ	-.626	-.256	.4	2.443	6.01
L.op	-.561	-.23	.41	2.444	1.762
L.hk	.223	.091	.464	2.442	29.111
L.govt1	.56	.229	.41	2.443	8.127
L.hkbmp	4.317	1.766	.045	2.444	230.246
L.opbmp	-1.075	-.44	.332	2.446	43.281
L.govtbmp	.131	.054	.479	2.435	1.681

Table 14: MFR REGRESSION, bmp on fdiflow for the LOW income group. Number of Groups=2

	Bhat	t	p	se	coefvar
L.fdiflow	246.218	4.757	0	51.756	9601015
L.gdi	-.207	-.004	.498	51.687	4838.157
L.aid	6.899	.133	.447	51.748	1142.502
L.ggdppc	.755	.015	.494	51.709	764.836
L.xrate	-19.602	-.379	.354	51.748	59836.627
L.taxes	-10.088	-.195	.423	51.758	9574.261
L.differ	5.246	.102	.46	51.584	10.222
L.op	-1.992	-.039	.485	51.583	2192.918
L.hk	7.969	.154	.439	51.691	10153.854
L.govt1	-.68	-.013	.495	51.648	1122.059
L.hkfdiflow	7.863	.152	.44	51.742	14124.069
L.opfdiflow	12.086	.234	.409	51.722	27469.654
L.govtfdiflow	11.27	.218	.415	51.661	14590.317

Table 15: MFR REGRESSION, bmp on lofdi for the LOW income group. Number of Groups=2

	Bhat	t	p	se	coefvar
L.lofdi	-60.93	-2.253	.016	27.04	17281.363
L.gdi	-10.934	-.404	.345	27.042	48.379
L.aid	-25.006	-.924	.182	27.055	3149.562
L.ggdppc	-9.31	-.345	.367	27.023	179.442
L.xrate	-98.421	-3.638	.001	27.054	43351.52
L.taxes	-6.019	-.222	.413	27.053	136.823
L.differ	14.624	.542	.296	26.978	430.679
L.op	16.068	.596	.278	26.969	293.254
L.hk	-33.725	-1.248	.112	27.022	2666.079
L.govt1	4.759	.176	.431	26.996	240.255
L.hklofdi	17.051	.631	.267	27.011	146.951
L.oplofdi	-76.22	-2.823	.005	27.004	28610.436
L.govtlofdi	-3.738	-.138	.446	27.015	7.885

Table 16: MFR REGRESSION, bmp on portfdi for the LOW income group. Number of Groups=2

	Bhat	t	p	se	coefvar
L.portfdi	-8.535	-1.309	.101	6.52	160452.48
L.gdi	-2.215	-.339	.369	6.527	21747.942
L.aid	2.387	.365	.359	6.531	1834.329
L.ggdppc	-3.103	-.476	.319	6.526	12790.926
L.xrate	-13.024	-1.994	.028	6.532	318201.44
L.taxes	.229	.035	.486	6.531	6452.647
L.differ	2.354	.361	.36	6.512	1913.28
L.op	3.332	.512	.307	6.511	949.544
L.hk	2.181	.334	.37	6.525	13566.126
L.govt1	-4.97	-.762	.226	6.518	18754.432
L.hkportfdi	12.052	1.848	.038	6.521	144753.15
L.opportfdi	9.746	1.494	.074	6.521	163563.01
L.govtportfdi	2	.306	.381	6.527	13824.293

Table 17: MFR Causality Test Results for MIDDLE INCOME group

Variables	Causality
bmp (-) ↔ fdiflow (-)	Bidirectional
bmp (-) ↔ lofdi (-)	Bidirectional
bmp (+) ↔ portfdi (-)	Bidirectional

Table 18: MFR Causality Test Results for LOW INCOME group

Variables	Causality
bmp ← fdiflow (+)	Unidirectional from fdiflow to bmp
bmp (-) ↔ lofdi (-)	Bidirectional
bmp ← portfdi	Unidirectional from portfdi to bmp