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INSTITUTIONAL QUALITY, CAPITAL FLIGHT AND CAPITAL FLOWS

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This paper examines the determinants of capital flight using panel data for 53 developing and 21 developed countries from 1984-2004. Our empirical results show, first, that institutional quality is a key determinant of capital flight for developing countries. Second, capital control is not an effective tool to mitigate flight of capital. Capital flees less to the extent that a country is financially more open and more developed. Third, capital flight increases with the standard of living up to a certain level of income, but thereafter decreases as income rises. Finally, upgrading institutional quality not only encourages private capital inflows but also discourages capital flight.

JEL Classification: F32, F34, O11
Keywords: Capital flight, political risk, institutional quality

I. INTRODUCTION

Capital flight has been an important issue encountered by developing countries. It erodes the tax base, worsens income distribution and impedes economic growth by diverting domestic investment resources abroad. Economists and policy makers try to solve the problem by identifying the determinants of capital flight. However, no consensus has been reached in

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defining and measuring capital flight. Previous empirical results did not present a complete analysis of the factors affecting flight. This paper employs various measures of capital flight extant in the literature and upgrades the empirical investigation on the causes of flight with a new set of data.

Previous theoretical studies on capital flight (Khan and Haque, 1985, Eaton, 1987, Diwan, 1989) seek to explain the simultaneous occurrence of capital flight and large foreign borrowing in developing countries. The main point of these studies is that capital flight takes place as a result of an asymmetric risk of expropriation facing domestic and foreign investors. Their basic assumption was that domestic assets held by residents may be exploited by the government, whereas the risk of similar assets held abroad is negligible. On the other hand, foreign debt is implicitly guaranteed by the debtor's government. The result is that the domestic resident faces a higher risk of expropriation, leading to investment abroad whereas foreign funds finance domestic investment.

The other studies focused on political risk as an important determinant of capital flight: Alesina and Tabellini (1989) modeled that capital flight occurs when two social groups behave noncooperatively. The uncertainty about which group will be in control in the future generates the political risk, which in turn causes economic uncertainty about future economic policies such as the risk of future taxation. Tornell and Velasco (1992) modeled capital flight as a response to the tragedy of the commons, which occurs because of a weak system of property rights in poor countries. The weak system of property rights allows each interest group to have common access to other groups' domestic capital markets. Thus capital flight can emerge as an attempt to place one's wealth beyond the reach of competing interest groups.[1]

These theoretical studies suggest that a weak economic environment and political instability lead to capital flight. Previous empirical studies (Cuddington, 1987; Dooley, 1988; Pastor, 1990; Mikkelsen, 1991; Boyce, 1992; Schineller, 1997; Hermes et al., 2001) that investigated the causes of capital flight focused on return differential and unsound

[1] Among other theoretical studies on capital flight are Ize and Ortiz (1987) and Bhattacharya (1999).

macroeconomic variables such as high inflation rates, overvalued exchange rates and government budget deficits. Recently, researchers have paid attention to political risk, which triggers uncertainty about future economic policies. A few empirical papers (Lensink et al., 2000; Collier et al., 2001, 2003; Le and Zak, 2006; Le and Rishi, 2006) have shown that political risk is a statistically significant factor leading to capital flight. However, they used cross-section data, or small-panel data, with a limited set of political risk variables.

This paper explores the determinants of capital flight using panel data for 53 developing countries and 21 developed countries from 1984–2004. This paper is different from earlier empirical studies in three ways. First, we estimate the significance of institutional quality risks extensively to identify the role of political risks on capital flight. As an explanatory variable, we use institutional quality, measured by the extensive data set of political risk variables that obtained from the International Country Risk Guide (ICRG) by the PRS Group, which broadly measures institutional quality of an economy.[2] Second, we construct various measures of capital flight and extend the time span for the estimation. We use six types of capital flight, which consist of three hot-money measures and three residual measures (the World Bank, Morgan Guarantee and Cline). The data to construct capital flight are acquired from the fifth edition of the IMF Balance of Payments (BMP5). Finally, we examine whether there is any difference between the factors that explain capital flight in developing and developed countries.

Previous empirical studies found that sound macroeconomic environment is a prerequisite for avoiding flight of capital in developing countries. However, we find that institutional quality overshadows macroeconomic factors in determining capital flight. For developing countries, but not for developed countries. Secondly, we find that capital controls are not an effective tool to mitigate flight of capital. Capital flees less to the extent that a country is more open financially. Available liquidity or "financial depth" also prevents short-term capital from fleeing. Thirdly, the relationship between capital flight and per capita income is

[2] Alfaro et al. (2008) use the same data to empirically examine the determinants of private capital inflows in developing countries.

not linear. Capital flight increases with the standard of living, up to a certain level of income, but thereafter decreases as income rises. Finally, upgrading institutional quality promotes economic growth for capital-scarce economies since it not only encourages capital inflows but also discourages capital flight.

In section 2, we describe data and empirical specifications and analyze empirical results. The final section summarizes the paper's main findings and their policy implications.

II. EMPIRICS

2.1 Data and the empirical specification

We estimate the following equation to investigate the determinants of capital flight.

$$\begin{aligned} SCF_{it} = {} & \beta_0 + \beta_1(QUALITY_{it}) + \beta_2 \ln(PGDP_{it}) + \beta_3(FI_{it}) \\ & + \beta_4(M2_{it}) + \beta_5(FOPEN_{it}) + \beta_6(TOPEN_{it}) \\ & + \beta_7 CRISIS_{it} + \beta_8 X_{it} + \beta_9(LA) + \beta_{10}(AFRICA) \\ & + \beta_{11}(INDEBTED) + \varepsilon_{it} \end{aligned} \tag{1}$$

where *SCF* denotes the ratio of capital-flight stock to nominal GDP; *QUALITY*, institutional quality; *PGDP*, per capita nominal GDP; *FI*, the exchange-rate-adjusted interest rate differential between foreign and domestic assets; $M2$, liquidity or financial depth; *FOPEN*, financial openness; *TOPEN*, trade openness, *CRISIS*, a crisis indicator; *X*, a set of macroeconomic variables; *LA*, a Latin American indicator; *AFRICA*, a Sub-Saharan African indicator; and *INDEBTED*, an indicator for severely indebted countries, respectively. The subscripts, *i* and *t*, stand for country *i* and year *t*, respectively. Detailed definitions and sources of the variables in equation (1) are provided in Appendix C.

The dependent variable is the capital-flight stock divided by nominal GDP. There are generally two lines of methods for measuring capital flight: the residual method and the hot-money method.[3] We use three

[3] We do not use the Dooley method (1986), which measures the stock of privately held foreign

variants of the residual method (the World Bank, Morgan Guarantee and Cline) and three types of hot money (Hot Money 1, Hot Money 2 and Hot Money 3). To measure capital flight stock, the annual flows of flight are estimated by adding trade mis-invoicing to those obtained from three residual measures and three hot-money measures. Then the interest rate of US Treasury Bills is employed to convert these flows into stocks. The details on measurement of capital flight are described in Appendix B.

The explanatory variables for capital flight in equation (1) can be divided by two groups. The first group represents economic and political infrastructure, economic motivations for cross-border transactions, and the crisis indicator on which this paper focuses as the possible determinants of capital flight. Among the variables in this group, the first one is institutional quality, a composite index in International Country Risk Guide (ICRG) published by the PRS Group that appraises the political instability of a country and comprises twelve sub-components.[4] The index ranges from 0 to 100, where a higher point means lower risk. Thus the coefficient of institutional quality is expected to be negative.

The second variable is per capita GDP. According to the neoclassical growth model, capital should flow from rich to poor countries since poor countries have a lower capital/labor ratio, and thus a higher rate of return on capital. In practice, however, we did not observe such flows. Lucas (1990) argued that the return differential between poor and rich countries practically disappears when market imperfections and external effects of human capital have been taken into account. On the other hand, Tornell and Velasco (1992) asserted that capital may flow from poor to rich countries despite the lower rate of return on capital in rich countries because of a weak system of property rights in poor countries. Empirical evidence on the relationship between capital flight and per capita income has been inconclusive. Collier et al. (2003) found that the estimated coefficients of per capita GDP are not significant for estimated results and their signs are mixed.

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assets that do not generate income reported to the domestic authorities. The reason is that the annual changes in total stock of capital flight proposed by Dooley are simply those estimates according to the residual method. See Claessens and Naude (1993).

[4] Starting in 1984, monthly data are available, and we chose the December rating as representative of a particular year.

The third variable is the financial incentive for capital flight, measured as the exchange rate adjusted interest rate differential between US and domestic financial assets. It is expected to have a positive relationship with capital flight.

The fourth variable is financial depth[5], measured by M2/GDP. The lack of suitable domestic liquid assets causes capital to flee abroad. Net capital outflows will decrease to the extent that the menu of financial instrument available to domestic residents both liquid and non-liquid, increases. Thus, financial depth is expected to be negatively correlated with capital flight.

The fifth variable is financial account openness that is the opposite concept from capital control. If the imposition of capital controls reduces flight, financial openness should have a positive coefficient. On the other hand, countries whose capital account is more open may have a more advanced domestic financial market and more opportunities for profitable investment. In this case financial openness is negatively associated with capital flight.

The sixth variable that is also relevant to flight is openness of trade in goods and services. More trade requires an increase in working balances held in foreign banks and allows for more chances of capital flight through trade-faking. On the other hand, higher trade openness enhances economic stability and growth, thus leading to lower net capital outflows. Thus the coefficient of trade openness is expected to have an ambiguous sign.

Finally, the crisis indicator is also included in this group because a currency or financial crisis may be associated with capital flight. There are three cases that can occur: capital flight causes the crisis; or, conversely the crisis generates capital flight. Or they occur at the same time. We want to examine the second case and to avoid the first case that raises an endogeneity problem. For estimation, thus, the crisis indicator is lagged one year. We use a sudden-stop episode constructed by Cavallo and Frankel (2008) as a crisis indicator.

The second group of explanatory variables in equation (1) comprises

[5] Due to lack of data, we do not use other measures of financial development, private credit and stock-market capitalization. Private credit is defined as credit extended to the private sector by deposit money banks and other financial institutions. Stock-market capitalization refers to the total value of listed shares traded on the official bourses.

macroeconomic variables, which influence the future expected economic motivations for capital flight, and regional and debt-related country indicators. Several macroeconomic variables are chosen in a way that they significantly affect capital flight in previous empirical studies. For estimation, macroeconomic variables are added to the first group of explanatory variables one by one because macroeconomic variables are highly correlated with each other, and we would like to examine whether the importance of institutional quality survives with each macroeconomic variable that may significantly affect capital flight. And all macroeconomic variables are lagged one year to account for possible endogeneity. Regional and indebted country indicators are also added to this group. General evidence shows that Sub-Saharan Africa has significantly greater capital flight than other regions. Latin America has also experienced episodes of debt, crises currency crises and capital flight. We control for these episodes by introducing three regional indicator variables.

Regarding macroeconomic variables, first, the degree of currency overvaluation (*OVER*) is a factor that affects the rate of returns for both domestic and overseas investors. If domestic currency is expected to be devalued, the value of domestic savings is reduced, and thus wealth would be reallocated toward foreign holdings (Cuddington, 1987, Pastor, 1990, and Collier et al., 2001). Second, domestic inflation (*INFLATION*) reduces real returns on domestic capital. More capital tends to flee abroad to the extent that the government depends on taxing domestic financial assets through money creation (Dooley, 1988, Pastor, 1990, Loungani and Mauro, 2000). Third, government budget (*BUDGET*) is also influential to capital movements. Larger budget deficits motivate domestic investors to move capital abroad to escape higher future taxation risk through expectations of higher future inflation (Boyce, 1992, Schineller, 1996, Loungani and Mauro, 2000). Fourth, high indebtedness measured by total debt/GDP (*TDEBT*) can be interpreted as a signal for high future taxation, increasing capital flight (Mikkelsen, 1991, Collier et al., 2001, 2003). Fifth, capital availability (*KAVAIL*) within a country also has an influence on capital flight because an increase in capital inflows provides more resources, thus leading to more capital flight. On the other hand, capital

availability may reflect that the investment climate of borrowing countries found favor with creditors. Thus domestic residents have less incentive to invest abroad. Previous studies (Cuddington, 1987; Pastor, 1990; Boyce, 1992) support the first case. Sixth, the level of international reserves (*RESERVE*) also affects capital flight. The country that holds larger reserves would experience less capital flight since the size of reserves is an indicator of a likelihood of the balance-of-payments crisis. Boyce (1992) showed the negative relationship between capital flight and reserves for the Philippines. However, higher reserves might permit more capital flight. Public officials can divert resources from government coffers for capital flight. Even private owners of capital may hold more foreign assets when they expect domestic currency to be devalued due to a higher inflationary environment created by higher level of reserves. Finally, net inflow of foreign direct investment (*FDINET*) is an indicator of soundness for foreign investment. A low inflow of foreign direct investment is closely associated with a country's weak institutions and general economic mismanagement. Using cross-sectional data, Kant (1996) showed that there is a strong relationship between capital flight and foreign direct investment.[6]

2.2 Estimation results

The data set covers 53 developing countries, listed in Appendix A, from 1984–2004[7]. Table 1 reports summary statistics for the variables used in estimation. The countries are chosen based on the availability of data on capital flight and other variables for estimation. Since the countries in our sample have different histories and political and financial institutions, we assume the error term $\varepsilon_{it} = \eta_i + \upsilon_{it}$ where $\upsilon_{it} \sim iid$ $\mathrm{N}(0, \sigma_v^2)$. As expected, the Breusch-Pagan specification test detects the presence of η_i for all regressions of our study. η_i can be either fixed or drawn from random distribution. We employ the Hausman specification test to determine whether the appropriate error terms are fixed or drawn

[6] Other economic variables used in previous studies are tax rates, labor's share of income, black-market premiums, growth and relevant proxy variables. We do not use these variables in estimation due to scarce data or statistical insignificance of their estimated coefficients.

[7] Due to lack of data in some developing countries, the data structure is an unbalanced panel.

from random distribution. However, both fixed-effect and random-effect estimation results will be reported, if needed.

[Table 1] Summary Statistics

	Obs.	Mean	Std. Dev.	Min.	Max.
Dependent Variable					
HM1	1468	-37.211	106.62	-798.627	114.938
HM2	1468	-38.385	107.903	-798.500	122.195
HM3	1468	-36.895	104.834	-797.955	208.679
World Bank	1628	-8.169	111.227	-802.95	553.582
Morgan	1628	-31.595	222.579	-2821.834	463.65
Cline	1628	-77.227	283.778	-3450.279	117.747
Independent Variable					
PGDP	1105	59.567	13.372	13	90
M2	1444	4484.695	4332.769	195.08	24481
FI	1307	0.839	0.916	0.0001	11.04
M2	1621	37.318	27.308	0.868	181.09
FOPEN	993	28.615	108.668	0.019	1779
TOPEN	1626	74.230	55.731	4.002	442.38
OVER	1447	33.281	19437.79	-294582.8	312612.1
INFLATION	1551	45.034	363.055	-100	11750
BUDGET	1321	-2.606	199.068	-5707.538	2614.343
TDEBT	1233	63.781	49.192	3.467	581.31
KAVAILABLE	1424	4.253	42.411	-881.328	659.029
RESERVE	1542	33.238	36.297	0.042	305.557
FDINET	1428	1.960	3.050	-10.783	40.584

Notes: The numbers denote data for 53 developing countries. The dependent variables are the stocks divided by nominal GDP, measured as percentages.

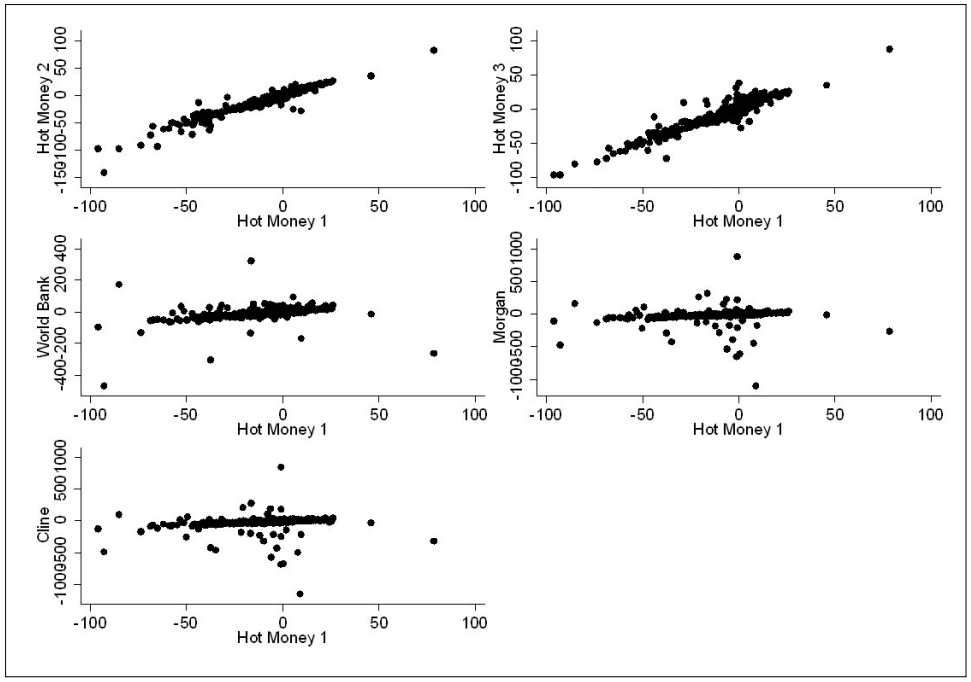
Source: Authors' calculation from IFS (IMF), BOP (IMF), WDI (World Bank), and GDF (World Bank) CD-ROM.

The base equation

We estimate equation (1) for three hot-money measures and three residual measures of capital flight, first, excluding macroeconomic variables. Figure 1 plots the annual flows of Hot Money 1 (HM1) against those for each of the other flight measures for 53 developing countries over our sample period. The figure indicates that hot-money measures match each other, but do not match residual measures.

Tables 2 and 3 present fixed-effect and random-effect estimation results, respectively. The Hausman tests favor the fixed-effect results for hot-money measures and the random-effect results for residual measures of flight capital, but fixed-effect and random-effect estimated results for both measures are very similar.

[Figure 1] Capital flight: HM1 versus Other Measures (Developing countries)



All estimated coefficients of institutional quality are negative and statistically significant at least at 5% except in one case, Hot Money 3 (HM3) of random-effect results. The results imply that low institutional quality significantly raises capital flight.

The estimated coefficient of per capita income should be positive according to neoclassical theory, but negative according to theories of Lucas (1990) and Tornell and Velasco (1992). As shown in Collier et al. (2003), however, we also find that they are statistically insignificant with mixed signs. Assuming a nonlinear relationship between flight and per capita income, we add the square of per capita GDP to equation (1). The results show that per capita GDP has an inverted-U relationship with

capital flight at a 1% significance level for all cases. For our sample of developing countries, capital flight increases with the standard of living up to a certain level of income, but thereafter decreases as income rises.[8]

[Table 2] Hot Money and Residual Measures: Fixed Effects

	HM1	HM2	HM3	WB	MORGAN	CLINE
QUALITY	-0.637*	-0.794*	-0.553*	-0.616**	-0.82*	-1.254*
	(0.183)	(0.195)	(0.188)	(0.259)	(0.279)	(0.305)
ln(PGDP)	565.394*	652.387*	509.939*	422.067*	532.846*	827.642*
	(79.687)	(84.743)	(80.337)	(76.696)	(83.508)	(94.936)
$[\ln(PGDP)]^2$	-33.124*	-38.645*	-29.541*	-25.174*	-31.728*	-53.190*
	(5.040)	(5.344)	(5.107)	(4.723)	(5.178)	(5.932)
FI	15.262**	19.336*	11.755***	12.526**	19.391*	26.435*
	(6.018)	(6.624)	(6.149)	(5.595)	(6.702)	(7.512)
M2	-0.929*	-0.979*	-0.877*	0.234	-0.040	-0.157
	(0.263)	(0.280)	(0.280)	(0.271)	(0.294)	(0.332)
FOPEN	-0.109*	-0.145*	-0.097*	-0.066	-0.060	-0.236**
	(0.034)	(0.045)	(0.033)	(0.085)	(0.084)	(0.105)
TOPEN	0.207	0.384**	0.128	-0.245	-0.248	0.547**
	(0.142)	(0.156)	(0.142)	(0.256)	(0.271)	(0.273)
CRSIS(-1)	-5.252	-7.502	-10.035***	8.437	4.461	-5.573
	(6.401)	(6.865)	(5.910)	(7.025)	(8.256)	(4.754)
CONSTANT	-2357.3*	-2699.5*	-2143.7*	-1704.8*	-2155.9*	-3207.8*
	(312.1)	(332.9)	(313.8)	(308.0)	(333.2)	(379.2)
Hausman test	82.91*	975.59*	42.00*	-7.15	1.07	8.43
R -squared	0.316	0.378	0.250	0.142	0.181	0.447
Observations	615	615	615	615	615	615

Notes:

1. HM1 denotes Hot money 1. The others are HM2 (Hot money 2), HM3 (Hot money 3), WB (the World Bank measure), MORGAN (Morgan Guarantee measure), CLINE (Cline measure), respectively. The parenthesis, (-1), stands for one year lagged. See Appendix C for definitions of the explanatory variables.
2. Huber-White-sandwich corrected standard errors in the parentheses
3. *, ** and *** indicate that the estimated coefficients are statistically significant at 1%, 5% and 10% levels, respectively.

[8] For example, consider the fixed-effect result for HM1, shown in column 2 of Table 2. The income level where capital flight is maximized is roughly 5,130 US dollars. (565.394 - 2*33.124*ln(PGDP) = 0, ln(PGDP) = 8,543, PGDP = 5,130)

[Table 3] Hot Money and Residual Measures: Random Effects

	HM1	HM2	HM3	WB	MORGAN	CLINE
QUALITY	-0.357**	-0.499*	-0.291	-0.521**	-0.698**	-1.089*
	(0.169)	(0.181)	(0.177)	(0.258)	(0.278)	(0.301)
ln(PGDP)	535.308*	616.511*	475.968*	406.472*	514.659*	827.169*
	(86.151)	(93.043)	(86.597)	(80.561)	(88.198)	(102.318)
$[\ln(PGDP)]^2$	-32.146*	-37.309*	-28.310*	-24.457*	-30.954*	-53.170*
	(5.441)	(5.870)	(5.483)	(5.021)	(5.502)	(6.434)
FI	10.595***	14.050**	7.523	10.667***	16.975**	21.545*
	(6.412)	(7.043)	(6.504)	(5.721)	(6.835)	(8.227)
M2	-0.566**	-0.582**	-0.496***	0.367	0.119	-0.053
	(0.253)	(0.267)	(0.260)	(0.238)	(0.276)	(0.331)
FOPEN	-0.122*	-0.160*	-0.111**	-0.074	-0.069	-0.254**
	(0.046)	(0.058)	(0.044)	(0.090)	(0.089)	(0.117)
TOPEN	-0.128	-0.028	-0.212	-0.412***	-0.444***	0.058
	(0.161)	(0.167)	(0.158)	(0.227)	(0.238)	(0.266)
LA	15.432	17.248	8.342	13.391	16.461	55.386***
	(17.395)	(17.801)	(18.056)	(24.614)	(25.340)	(30.138)
AFRICA	66.509*	69.166*	64.391*	48.132**	59.016**	78.320*
	(16.847)	(16.972)	(16.987)	(23.810)	(24.401)	(27.925)
INDEBTED	18.707	18.226	7.161	26.759	28.608	71.583*
	(11.880)	(12.373)	(11.486)	(19.490)	(20.021)	(22.169)
CRSIS(-1)	-3.182	-4.989	-8.142	9.431	5.691	-1.324
	(6.909)	(7.438)	(6.179)	(7.414)	(8.919)	(6.557)
CONSTANT	-2204.7*	-2519.7*	-1970.7*	-1641.8*	-2079.9*	-3221.0*
	(337.6)	(365.2)	(338.8)	(322.3)	(352.8)	(404.5)
R -squared	0.351	0.322	0.342	0.322	0.357	0.465
Observations	615	615	615	615	615	615

Notes: For others, see the notes in Table 2.

The financial incentive for capital flight has positive and significant coefficients for all cases except HM3 of random-effect results, implying that capital goes wherever its return is higher.

Regarding financial variables, previous studies have shown that financial depth does not significantly affect flight (Collier et al., 2001). The effectiveness of capital controls is inconclusive. Pastor (1990) found that capital controls were effective at preventing flight for South American countries; but the capital control variable was statistically insignificant in studies by Schineller (1997) and Loungani and Mauro

(2000).[9] We find that the effects of financial variables are not identical between hot-money measures and residual measures. For hot-money measures, the coefficients of both financial development and financial openness are negative at the 1% significance level, implying that countries that are more open and more developed financially would experience smaller flight of short-term capital. But the statistical significance of both financial variables disappears for residual measures except the Cline measure where the coefficient of financial openness is negative at the 1% significance level. We also use the interaction of financial depth and financial openness, *M2*FOPEN*, as an explanatory variable and re-estimate the same equation, but the results for its statistical significance (not shown here) remain the same as in the case where they are used separately.

The role of trade openness is not unambiguous. Only two out of six cases show its statistical significance. Their signs are positive for fixed-effect results and negative for random-effect results, respectively. On the other hand, Mikkelsen (1991) found a positive relationship between trade and flight in the case of Mexico.

With one exception, the lagged crisis indicator shows no statistical significance, implying that sudden stop episodes did not lead to capital flight in our sample. The crisis and capital flight can simultaneously occur, too. Thus we re-estimated the equation with the present value of the crisis indicator. But none of its estimated coefficients were statistically significant (not shown here).

In addition, we use three regional and debt indicator variables (*LA*, *AFRICA*, and *IDEBTED*) in the random-effect model. The results show that the coefficients of all three indicators are positive, but an African indicator only has significant coefficients at the l% to 5% levels. One exception is the Cline measure, for which all three indicators have statistical significance.

Macroeconomic variables

Now, we include macroeconomic variables and re-estimate equation

[9] These studies used the IMF Annual Report on Exchange Arrangements and Exchange Restrictions to measure the capital control variable. Instead, we use a broader measure, financial openness, as a substitute for capital control.

(1). Due to limited space, we consider only two cases of capital flight, HM1 and Cline, which are the narrowest definitions of hot-money and residual measures, respectively. The Hausman test supports the random-effect estimation results for HM1 and Cline, shown in Tables 4 and 5, respectively.

The results for HM1 show that the significant role of institutional quality remains intact except when government budget or capital availability is added. Among macroeconomic variables, domestic inflation and international reserves affect short-term capital flight at a 5% significance level, but the other variables have no statistical significance. The coefficient of the inflation rate has a negative sign, which is opposite of results found in previous studies. When its present or one-year lead value is used, the results (not shown here) are not different. On the other hand, when the present value of inflation volatility is used as an explanatory variable, its estimated coefficient becomes positive but statistically insignificant. In contrast to Boyce (1992) who used time-series data, we find that larger reserve holdings increase short-term capital flight.

Without macroeconomic variables, per capita GDP, its squared term, interest-rate differential, financial depth and financial openness all significantly affect HM1 at least at the 10% level as shown in column 1 of Table 3. When macroeconomic variables are included, per capita GDP and its squared term are still statistically significance at the 1% level. The coefficients of the other variables show expected signs, but not all are statistically significant: the significance of financial incentive is maintained for three out of seven cases while those of financial depth and financial openness do so for five cases. The role of trade openness is not clear; its estimated coefficients that are significant show mixed signs.

For the Cline measure, the estimation results are more clear cut. With the exception of one case, capital flight is always significantly affected by the quality of institutions, per capita GDP, its squared term, and financial incentive. Financial openness is negatively associated with flight in most cases, but financial depth never shows statistical significance. The coefficient of international reserves is positive but insignificant, but higher foreign indebtedness significantly raises capital flight. Once the

[Table 4] Hot Money 1 (HM1): Random Effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
QUALITY	-0.395**	-0.379**	-0.163	-0.195***	-0.180	-0.377**	-0.260**
	(0.179)	(0.176)	(0.181)	(0.101)	(0.175)	(0.162)	(0.111)
ln(PGDP)	494.452*	471.936*	505.539*	260.334*	507.325*	446.926*	405.011*
	(101.716)	(99.742)	(94.153)	(62.545)	(88.473)	(78.143)	(91.976)
$[\ln(PGDP)]^2$	-29.777*	-28.345*	-30.095*	-15.750*	-30.763*	-27.268*	-24.283*
	(6.370)	(6.240)	(5.966)	(3.936)	(5.579)	(5.013)	(5.761)
FI	10.928	10.411	11.415***	6.812***	7.479	14.759**	2.787
	(7.212)	(6.767)	(6.312)	(3.753)	(6.784)	(5.814)	(5.270)
M2	-0.558**	-0.626**	-0.558**	-0.319*	-0.389	-0.464***	-0.144
	(0.281)	(0.278)	(0.258)	(0.114)	(0.241)	(0.240)	(0.177)
FOPEN	-0.125***	-0.126*	-0.172*	-0.009	-0.134*	-0.115**	-0.012
	(0.049)	(0.048)	(0.050)	(0.009)	(0.052)	(0.046)	(0.008)
TOPEN	-0.117	-0.098	-0.266	0.178*	-0.316**	0.209	-0.265***
	(0.176)	(0.165)	(0.171)	(0.065)	(0.155)	(0.144)	(0.144)
OVER(-1)	-0.000						
	(0.002)						
INFLATION(-1)		-0.006**					
		(0.002)					
BUDGET(-1)			0.002				
			(0.002)				
TDEBT(-1)				-0.021			
				(0.030)			
KAVAIL(-1)					-0.159		
					(0.131)		
RESERVE(-1)						0.188**	
						(0.087)	
FDINET(-1)							0.639
							(1.565)
LA	16.643	15.958	11.858	13.987	12.873	18.892	5.986
	(18.112)	(17.795)	(16.096)	(12.835)	(13.352)	(17.696)	(14.102)
AFRICA	67.878*	66.396*	63.764*	41.973**	58.045*	52.297*	50.116*
	(18.347)	(18.256)	(16.937)	(16.758)	(12.761)	(18.093)	(15.199)
INDEBTED	24.384***	24.569**	17.009	18.316***	13.703	26.270**	11.973
	(12.740)	(12.514)	(11.762)	(11.070)	(9.314)	(12.013)	(10.743)
CRISIS(-1)	-5.056	-4.150	4.912	-3.293	-2.739	-6.184	0.171
	(7.416)	(6.974)	(5.240)	(4.261)	(7.298)	(6.469)	(4.757)
CONSTANT	-2030.5*	-1941.8*	-2099.3*	-1086.4*	-2066.1*	-1842.2*	-1664.0*
	(401.8)	(394.4)	(367.7)	(248.9)	(346.0)	(305.7)	(361.7)
R -squared	0.386	0.370	0.460	0.080	0.474	0.178	0.349
Observations	551	583	520	509	600	591	560

Notes:

1. The parenthesis, (-1), stands for one year lagged. See Appendix C for definitions of the explanatory variables.
2. Huber-White-sandwich corrected standard errors in the parentheses
3. *, ** and *** indicate that the estimated coefficients are statistically significant at 1%, 5% and 10% levels, respectively.

[Table 5] Cline Measure (CLINE): Random Effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
QUALITY	-1.143*	-1.173*	-1.020*	-0.063	-0.917*	-1.015*	-0.350**
	(0.327)	(0.318)	(0.341)	(0.140)	(0.306)	(0.305)	(0.154)
ln(PGDP)	807.539*	774.048*	837.101*	19.654	800.301*	848.174*	354.144*
	(118.970)	(113.033)	(105.195)	(75.595)	(109.145)	(97.688)	(99.598)
$[\ln(PGDP)]^2$	-52.178*	-50.124*	-53.560*	-1.801	-51.454*	-55.645*	-22.504*
	(7.462)	(7.095)	(6.775)	(4.740)	(6.893)	(6.098)	(6.246)
FI	22.748**	20.019**	22.113*	10.016***	16.268***	30.132*	9.987
	(9.079)	(8.505)	(8.006)	(5.245)	(8.865)	(7.900)	(6.401)
M2	-0.058	-0.064	-0.057	-0.186	-0.004	0.042	0.164
	(0.362)	(0.351)	(0.338)	(0.172)	(0.327)	(0.336)	(0.220)
FOPEN	-0.265**	-0.267**	-0.355*	-0.001	-0.274**	-0.238**	-0.011
	(0.129)	(0.121)	(0.133)	(0.013)	(0.124)	(0.115)	(0.010)
TOPEN	0.077	0.094	-0.066	-0.270**	-0.313	0.510***	-0.498*
	(0.285)	(0.273)	(0.298)	(0.113)	(0.242)	(0.300)	(0.162)
OVER(-1)	-0.002						
	(0.004)						
INFLATION(-1)		-0.017*					
		(0.005)					
BUDGET(-1)			0.003				
			(0.003)				
TDEBT(-1)				0.361*			
				(0.051)			
KAVAIL(-1)					-0.247		
					(0.289)		
RESERVE(-1)						0.145	
						(0.097)	
FDINET(-1)							-0.306
							(1.730)
LA	54.350***	56.408***	44.227	3.362	41.370***	53.991***	22.738
	(31.554)	(31.959)	(28.552)	(21.492)	(21.649)	(32.771)	(24.679)
AFRICA	76.259**	74.754**	73.095*	-2.807	63.670*	55.392***	45.182***
	(30.732)	(31.275)	(27.009)	(24.553)	(19.605)	(29.984)	(23.255)
INDEBTED	75.235*	76.767*	72.036*	36.169***	60.596*	79.012*	50.110*
	(25.100)	(25.524)	(20.824)	(19.003)	(15.491)	(24.937)	(18.874)
CRISIS(-1)	-1.618	-1.474	6.270	0.071	1.186	-3.795	1.188
	(7.250)	(6.734)	(4.849)	(4.759)	(7.713)	(6.178)	(4.981)
CONSTANT	-3124.1	-2987.0	-3265.8	-72.835	-3087.0	-3264.3	-1395.6
	(471.3)*	(448.9)*	(406.9)*	(299.485)	(428.0)*	(390.9)*	(392.3)*
R -squared	0.477	0.472	0.557	0.214	0.578	0.331	0.602
Observations	551	583	520	509	600	591	560

Notes: See the notes of Table 4.

foreign debt ratio is incorporated, most of the other explanatory variables including institutional quality lose their significance, implying that foreign debt is a strong factor affecting capital flight. Though capital availability and the net inflow of FDI have insignificant coefficients, their negative signs indicate that capital tends to flee less as more capital flows into the country. Thus countries that have a good investment climate win the favor both of creditors and of domestic residents and let them invest at home.

Regarding indicator variables, sudden stop episodes never significantly affected capital flight. The estimated coefficients of dummy variables for Sub-Saharan African and severely indebted countries are mostly positive and significant for both HM1 and Cline measures.[10] However, the Latin American indicator has no statistical significance for HM1, but does so in four out of seven cases for Cline, suggesting that capital flight from Latin America has not been based on short-term capital outflows.

In sun, in most cases, (i) institutional quality, per capita income and interest-rate differentials are the factors that significantly affect capital flight measured by both hot-money and residual methods. (ii) Financial depth and financial openness are negatively correlated with flight of short-term capital. However, they do not have statistical significance with residual flight measures with the exception of Cline where financial openness significantly decreases flight. (iii) The role of trade openness is ambiguous. (iv) When macroeconomic variables are incorporated, the random-effect results show that only a few of them have statistical significance while the role of the other explanatory variables including institutional quality remains mostly intact. Capital flees more to the extent that a country is more indebted. Short-term capital outflows are positively associated with the magnitude of international reserve holdings. Larger inflows of foreign capital lead to a smaller flight of domestic capital. (v) A crisis is not a causal factor for capital flight, and the degree of capital flight has been significantly larger in Sub-Sahara African and severely

[10] Boyce and Ndikumana (2001) estimated capital flight from 25 sub-Saharan African countries in the period 1970 to 1996. The accumulated stock of flight capital for these countries was $285 billion while their external debt stood at $178 billion in 1996, indicating that sub-Saharan Africa was, in fact, a net creditor vis-à-vis the rest of the world.

indebted countries.[11]

The sub-components of institutional quality

Institutional quality is a composite index, containing twelve sub-components.[12] The estimation results demonstrate that low institutional quality significantly increases flight. However, that does not mean that all sub-components are significant factors affecting capital flight. We replace the institutional quality index with each of its sub-components and re-estimate equation (1). The equation is also estimated with all sub-components of the institutional quality for a robustness check. For estimation, macroeconomic variables are excluded because their inclusion does not virtually affect the significance of institutional quality, as shown in Tables 4 and 5, and produces too many cases (7 x 12 = 84), to be presented here. Tables 6 and 7 present the random-effect estimation results for HM1 and Cline.[13]

Most of the sub-components show the expected signs in their estimated coefficients. Among them, corruption, government stability, and law-and-order significantly affect capital flight for both HM1 and Cline. These variables are closely associated with a threat to domestic and foreign investment, and with the risk of future taxation. For HM1, another significant variable is the investment profile, which is also related to the risk of investment. For Cline, there are many other significant variables:

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[11] We also examined the determinants of private capital outflows recorded in balance of payments that are normal and legal asset transactions, and compared them with those of capital flight. What differs from cases of capital flight is, first, that the importance of institutional quality is considerably reduced. Second, trade openness has positive and significant coefficients, implying that openness in the real side causes openness in the financial side. Third, all coefficients of financial depth are significant at the 1% level and positive, reflecting that a country faces more capital flow abroad but less capital flight to the extent that it is financially more developed. The estimation results are available upon request.

[12] The subcomponents are (1) government stability (*Gov_stability*), (2) socioeconomic conditions (*Socio*), (3) investment profile (*Investment*), (4) internal conflict (*Int_conflict*), (5) external conflict (*Ext_conflict*), (6) corruption (*Corruption*), (7) military in politics (*Mil_politics*), (8) religious tensions (*Rel_tension*), (9) law and order (*Law_order*), (10) ethnic tensions *(Ethn_tension*), (11) democratic accountability (*Democracy*), and (12) bureaucracy quality (*Bureaucracy*). See the ICRG for details on their definitions.

[13] The Hausman test favors the fixed-effects results for HM1. The reason that the random-effects results for HM1 are presented in Table 6 is that they show the effects of dummy variables and can be compared with those of Cline. Moreover, the results of two estimation methods are practically equivalent.

[Table 6] The Sub-components of Institutional Quality, HM1: Random Effects

	(1)	(2)	(3)	(4)	(5)	(6)
ln(PGDP)	586.204*	535.230*	541.625*	537.360*	527.988*	525.726*
	(87.734)	(85.973)	(85.389)	(84.951)	(85.798)	(86.792)
$[\ln(PGDP)]^2$	-35.901*	-32.528*	-32.656*	-32.091*	-32.212*	-32.126*
	(5.599)	(5.457)	(5.433)	(5.342)	(5.463)	(5.479)
FI	12.004***	10.821***	11.860***	12.503***	10.983***	11.509***
	(6.685)	(6.424)	(6.542)	(6.561)	(6.524)	(6.508)
M2	-0.619**	-0.511**	-0.525**	-0.575**	-0.486**	-0.489***
	(0.252)	(0.249)	(0.250)	(0.251)	(0.247)	(0.257)
FOPEN	-0.120*	-0.126*	-0.122*	-0.123*	-0.127*	-0.126*
	(0.046)	(0.046)	(0.046)	(0.044)	(0.047)	(0.046)
TOPEN	-0.089	-0.114	-0.122	-0.123	-0.162	-0.133
	(0.192)	(0.159)	(0.161)	(0.158)	(0.161)	(0.160)
Corruption	-4.508**					
	(1.765)					
Bureaucracy		-2.356				
		(1.584)				
Gov_stability			-1.024***			
			(0.568)			
Investment				-2.644*		
				(0.925)		
Int_conflict					0.340	
					(0.714)	
Ext_conflict						0.568
						(0.777)
LA	13.659	16.988	16.554	14.838	16.987	17.837
	(17.748)	(17.948)	(17.874)	(18.741)	(16.854)	(17.796)
AFRICA	56.873*	62.211*	68.007*	71.585*	60.059*	60.318*
	(17.799)	(17.353)	(17.083)	(18.013)	(16.110)	(17.084)
INDEBTED	18.874	19.351	19.683	18.544	18.002	18.600
	(12.825)	(12.103)	(12.287)	(12.648)	(11.575)	(12.121)
CRISIS(-1)	-2.551	-2.971	-2.404	-4.688	-2.947	-3.169
	(6.922)	(7.141)	(7.096)	(6.816)	(7.254)	(7.220)
CONSTANT	-2374.1*	-2198.0*	-2239.8*	-2231.2*	-2164.4*	-2157.3*
	(342.7)	(336.142)	(333.6)	(334.9)	(334.9)	(340.1)
R -squared	0.365	0.379	0.348	0.329	0.405	0.391
Observations	608	617	617	617	617	617

Notes:

1. See note 12 for definitions of the explanatory variables.
2. Huber-White-sandwich corrected standard errors in the parentheses
3. *, ** and *** indicate that the estimated coefficients are statistically significant at 1%, 5% and 10% levels, respectively.

[Table 6] (Continued)

	(7)	(8)	(9)	(10)	(11)	(12)	(13)
ln(PGDP)	531.559*	535.340*	541.305*	525.551*	527.932*	518.571*	630.475*
	(86.341)	(86.828)	(85.470)	(85.843)	(88.244)	(83.776)	(89.678)
$[\ln(PGDP)]^2$	-32.390*	-32.652*	-32.378*	-31.847*	-32.153*	-31.496*	-38.200*
	(5.489)	(5.550)	(5.405)	(5.447)	(5.575)	(5.331)	(5.714)
FI	10.763***	11.303***	10.876***	10.142	10.897***	11.385***	16.295**
	(6.535)	(6.480)	(6.291)	(6.543)	(6.485)	(6.475)	(6.953)
M2	-0.497**	-0.490**	-0.555**	-0.510**	-0.494***	-0.538**	-0.545**
	(0.250)	(0.249)	(0.247)	(0.251)	(0.256)	(0.265)	(0.260)
FOPEN	-0.126*	-0.126*	-0.124*	-0.124*	-0.126*	-0.125*	-0.126*
	(0.046)	(0.046)	(0.046)	(0.046)	(0.047)	(0.046)	(0.046)
TOPEN	-0.164	-0.139	-0.142	-0.123	-0.151	-0.148	-0.177
	(0.161)	(0.160)	(0.158)	(0.163)	(0.160)	(0.159)	(0.182)
Corruption							-5.633*
							(2.083)
Bureaucracy							-1.192
							(2.046)
Gov_stability							0.360
							(0.854)
Investment							-3.561*
							(1.218)
Int_conflict							2.549*
							(0.796)
Ext_conflict							1.306
							(0.884)
Mil_politics	0.161						1.421
	(1.440)						(1.568)
Rel_tension		2.103					4.991**
		(2.118)					(2.147)
Law_order			-5.981*				-10.497*
			(1.582)				(2.096)
Ethn_tension				-2.081			2.039
				(1.823)			(2.337)
Democracy					0.312		0.726
					(1.931)		(2.216)
Socio						-1.187	0.005
						(0.981)	(1.092)
LA	16.264	14.730	9.901	20.113	16.924	15.356	-7.823
	(16.982)	(17.865)	(17.539)	(18.169)	(17.233)	(17.342)	(19.354)
AFRICA	60.811*	60.284*	65.030*	63.493*	61.190*	59.496*	57.148*
	(16.368)	(17.022)	(17.576)	(17.284)	(16.631)	(16.827)	(15.947)
INDEBTED	18.465	18.812	20.302***	18.143	18.404	17.903	19.163
	(11.574)	(12.144)	(11.994)	(11.937)	(11.682)	(11.838)	(13.220)
CRISIS(-1)	-2.755	-3.312	-2.987	-3.456	-2.999	-3.846	-4.430
	(7.321)	(7.067)	(6.855)	(7.217)	(7.211)	(6.977)	(6.839)
CONSTANT	-2181.6*	-2202.2*	-2237.4*	-2161.6*	-2167.0*	-2125.2*	-2580.1*
	(337.6)	(340.4)	(335.0)	(335.9)	(344.1)	(326.3)	(349.4)
R -squared	0.398	0.384	0.356	0.364	0.394	0.388	0.346
Observations	617	617	617	617	617	617	608

[Table 7] The Sub-components of Institutional Quality, CLINE: Random Effects

	(1)	(2)	(3)	(4)	(5)	(6)
ln(PGDP)	981.461*	801.154*	835.498*	811.043*	815.197*	846.209*
	(101.657)	(102.045)	(102.378)	(103.806)	(102.024)	(103.766)
$[\ln(PGDP)]^2$	-64.759*	-53.038*	-54.320*	-53.407*	-53.056*	-54.722*
	(6.437)	(6.512)	(6.535)	(6.498)	(6.485)	(-6.525)
FI	25.145*	23.309*	24.530*	23.099*	19.495**	20.101**
	(8.320)	(8.126)	(8.432)	(8.306)	(8.251)	(8.136)
M2	-0.068	0.122	0.123	0.124	0.028	-0.058
	(0.308)	(0.319)	(0.310)	(0.325)	(0.317)	(0.336)
FOPEN	-0.249**	-0.264**	-0.256**	-0.264**	-0.254**	-0.258**
	(0.117)	(0.117)	(0.119)	(0.117)	(0.119)	(0.117)
TOPEN	0.170	-0.008	0.057	0.039	0.029	0.039
	(0.277)	(0.257)	(0.264)	(0.261)	(0.261)	(0.259)
Corruption	-7.285*					
	(2.784)					
Bureaucracy		4.920***				
		(2.909)				
Gov_stability			-2.591*			
			(0.926)			
Investment				-0.781		
				(1.404)		
Int_conflict					-4.279*	
					(1.213)	
Ext_conflict						-3.956*
						(1.093)
LA	52.264***	60.747**	59.832***	60.431***	54.699***	55.284***
	(31.684)	(30.874)	(31.174)	(31.745)	(28.892)	(31.372)
AFRICA	50.575***	61.686**	78.700*	65.691**	70.664*	72.716**
	(29.268)	(27.763)	(27.384)	(28.573)	(27.034)	(28.201)
INDEBTED	71.801*	70.722*	74.032*	71.890*	72.441*	73.624*
	(24.739)	(21.411)	(21.951)	(21.960)	(21.181)	(22.324)
CRISIS(-1)	0.669	-1.273	0.657	-1.564	-0.470	-0.548
	(6.925)	(7.631)	(7.250)	(7.329)	(6.969)	(7.193)
CONSTANT	-3745.0*	-3094.0*	-3269.4*	-3139.0*	-3160.4*	-3296.2*
	(403.2)	(400.4)	(401.7)	(412.7)	(401.8)	(410.2)
R -squared	0.479	0.489	0.454	0.477	0.475	0.474
Observations	608	617	617	617	617	617

Note: See the notes of Table 6.

[Table 7] (Continued)

	(7)	(8)	(9)	(10)	(11)	(12)	(13)
ln(PGDP)	817.234*	822.463*	827.892*	776.925*	835.202*	807.957*	1066.33*
	(104.843)	(102.870)	(100.827)	(100.422)	(107.918)	(99.188)	(95.702)
$[\ln(PGDP)]^2$	-54.016*	-54.551*	-53.585*	-50.688*	-54.771*	-53.379*	-68.612*
	(6.703)	(6.589)	(6.422)	(6.356)	(6.789)	(6.329)	(5.9108)
FI	22.501*	23.093*	22.128*	16.816**	22.182*	22.666*	20.707**
	(8.250)	(8.206)	(8.087)	(8.487)	(8.134)	(8.188)	(8.004)
M2	0.139	0.231	0.076	0.171	-0.009	0.135	-0.198
	(0.315)	(0.322)	(0.305)	(0.307)	(0.342)	(0.333)	(0.405)
FOPEN	-0.263**	-0.267**	-0.262**	-0.253**	-0.265**	-0.265**	-0.228**
	(0.117)	(0.119)	(0.118)	(0.116)	(0.114)	(0.118)	(0.108)
TOPEN	0.008	0.007	0.010	0.117	0.026	0.027	0.096
	(0.257)	(0.261)	(0.258)	(0.272)	(0.261)	(0.258)	(.280)
Corruption							-7.231**
							(2.992)
Bureaucracy							11.164*
							(3.229)
Gov_stability							-0.874
							(1.142
Investment							0.258
							(1.336)
Int_conflict							-0.400
							(1.265)
Ext_conflict							-1.144
							(1.055)
Mil_politics	2.690						7.283**
	(2.050)						(3.118)
Rel_tension		6.629*					12.752*
		(2.590)					(3.169)
Law_order			-11.046*				-6.378**
			(2.061)				(2.968)
Ethn_tension				-13.063*			-11.845*
				(3.130)			(3.771)
Democracy					-5.924***		-7.960***
					(3.516)		(4.424)
Socio						-0.150	0.743
						(1.606)	(1.566)
LA	59.570***	53.627***	47.761	80.957*	56.796***	60.486***	39.841
	(31.066)	(30.822)	(30.821)	(30.140)	(31.028)	(31.152)	(32.240)
AFRICA	62.426**	57.869**	68.771**	74.871**	59.950**	62.322**	59.890**
	(28.031)	(28.338)	(28.546)	(29.483)	(27.137)	(28.332)	(27.878
INDEBTED	72.432*	71.640*	74.483*	68.282*	70.543*	71.635*	70.333*
	(21.557)	(20.837)	(22.436)	(21.763)	(21.702)	(21.730)	(23.726)
CRISIS(-1)	-0.479	-1.719	-0.857	-3.546	-0.525	-1.110	0.0143
	(7.821)	(7.219)	(6.692)	(7.223)	(7.089)	(7.530)	(6.737)
CONSTANT	-3160.5*	-3186.1*	-3225.6*	-3010.3*	-3219.5*	-3118.6*	-4157.2*
	(412.3)	(402.8)	(396.6)	(396.5)	(421.6)	(387.8)	(382.3)
R -squared	0.485	0.481	0.483	0.425	0.485	0.484	0.527
Observations	617	617	617	617	617	617	608

bureaucracy, internal conflict, external conflict, religious tensions, ethnic tensions and democratic accountability. Unlike other variables, religious tensions and bureaucracy have positive estimated coefficients. "Religious tension" assesses the domination of society and/or governance by a single religious group, implying that less capital runs away to the extent that cultural homogeneity is stronger. The coefficient of bureaucracy is expected to be negative, which is not the case for Cline. Its random-effect estimated coefficient for HM1 shows an expected sign, but it is insignificant. However, its fixed-effect coefficient (not shown here) is negative and significant.

When all twelve sub-components of the institutional quality are used as explanatory variables as shown in the last columns of Tables 6 and 7, the results differ in a few cases from previous results. The statistical significance of corruption and law-and-order remain intact but that for government stability disappears. For Cline, internal conflict and external conflict also lose their significance because some of the sub-components are highly correlated with each other. For example, the correlation coefficient between government stability and the investment profile is 0.59 and that between internal conflict and external conflict is 0.57.

For the other explanatory variables, per capita income, its squared term, financial incentive, and financial openness always have significant coefficients. Financial depth has a significant role for HM1 while it never does for Cline. Trade openness is related negatively with HM1 and positively with Cline, but its estimated coefficients all are statistically insignificant. HM1 is correlated only with the sub-Saharan African indicator. On the other hand, all three country indicators including Latin America have statistical significance for Cline.

Developed countries

Capital flight has generally been regarded as a problem of developing countries, but could also be a problem for developed countries too. Is there any difference in the determinants of capital flight between developing and developed countries? To answer this question, we employ the same method that we used for developing countries to obtain capital flight data of 21 developed countries, listed in Appendix A, from

[Table 8] Developed countries, HM1: Random Effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
QUALITY	-0.134	-0.229	-0.225	-0.170	-0.063	-0.070	-0.121	-0.1017
	(0.350)	(0.370)	(0.357)	(0.353)	(0.364)	(0.358)	(0.336)	(0.344)
ln(PGDP)	1190.8*	1154.4*	1287.6*	1181.2*	1089.9**	1060.6*	1007.2**	855.2*
	(382.1)	(391.8)	(391.3)	(384.6)	(390.2)	(364.1)	(417.4)	(322.9)
$[\ln(PGDP)]^2$	-59.665*	-57.869*	-64.682*	-59.068*	-54.476**	-53.070*	-50.258**	-42.665*
	(19.3)	(19.796)	(19.773)	(19.442)	(19.668)	(18.386)	(21.134)	(16.299)
FI	2.850**	3.215**	2.500***	2.803**	0.583	2.264***	3.074*	2.065
	(1.301)	(1.371)	(1.321)	(1.317)	(2.699)	(1.317)	(1.402)	(1.285)
M2	-0.476*	-0.493*	-0.427*	-0.455*	-0.478*	-0.448*	-0.422*	-0.463*
	(0.084)	(0.084)	(0.085)	(0.088)	(0.095)	(0.082)	(0.096)	(0.073)
FOPEN	-0.447*	-0.419*	-0.445*	-0.444*	-0.396*	-0.350**	-0.482*	-0.387*
	(0.151)	(0.154)	(0.146)	(0.149)	(0.151)	(0.164)	(0.159)	(0.130)
TOPEN	-0.498*	-0.483*	-0.515*	-0.512*	-0.438*	-0.467*	-0.510*	-0.456*
	(0.098)	(0.100)	(0.100)	(0.099)	(0.096)	(0.092)	(0.098)	(0.087)
OVER(-1)		29.211**						
		(12.266)						
EXCHG(-1)			0.632*					
			(0.089)					
INFLATION(-1)				0.244**				
				(0.095)				
BUDGET(-1)					-0.684			
					(0.463)			
KAVAIL(-1)						-0.451		
						(0.353)		
RESERVE(-1)							-0.188	
							(0.128)	
FDINET(-1)								-2.410*
								(0.606)
CRISIS(-1)	15.340***	13.125**	16.429***	15.658**	14.251**	14.625***	14.035***	16.371**
	(8.208)	(6.375)	(9.299)	(8.036)	(6.355)	(8.651)	(7.437)	(6.724)
CONSTANT	-5879.8*	-5687.7*	-6341.5*	-5842.1*	-5398.3**	-5244.0*	-4983.4**	-4225.9*
	(1894.0)	(1943.0)	(1938.1)	(1906.0)	(1940.5)	(1807.7)	(262.8)	(1607.4)
R -squared	0.273	0.296	0.304	0.257	0.245	0.299	0.264	0.392
Observations	154	144	144	154	142	154	154	154

Notes: See the notes of Table 4.

[Table 9] Developed countries, CLINE: Random Effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
QUALITY	-0.261	-0.432	-0.501	-0.351	-0.190	-0.210	-0.253	-0.183
	(0.822)	(0.868)	(0.840)	(0.826)	(0.874)	(0.817)	(0.821)	(0.796)
ln(PGDP)	1321.9**	1264.48**	1206.5	1298.1***	1107.2***	1218.9***	1209.4	515.5
	(698.4)	(727.9)	(765.4)	(706.4)	(657.6)	(667.9)	(742.5)	(616.0)
$[\ln(PGDP)]^2$	-65.849**	-63.087**	-60.261	-64.366***	-54.694***	-60.633***	-60.084	-25.003
	(35.199)	(36.658)	(38.634)	(35.623)	(32.916)	(33.615)	(37.532)	(30.999)
FI	-2.290	-1.770	-3.040	-2.408	-11.605***	-2.754	-2.153	-4.176
	(3.045)	(3.026)	(3.134)	(3.033)	(6.793)	(3.136)	(3.120)	(3.163)
M2	-0.427**	-0.454**	-0.307***	-0.375**	-0.398***	-0.405**	-0.394**	-0.396**
	(0.179)	(0.182)	(0.184)	(0.189)	(0.216)	(0.183)	(0.191)	(0.157)
FOPEN	-0.759**	-0.703**	-0.797**	-0.751**	-0.630***	-0.682***	-0.781**	-0.615**
	(0.334)	(0.344)	(0.323)	(0.329)	(0.340)	(0.374)	(0.346)	(0.274)
TOPEN	-1.867*	-1.846*	-1.896*	-1.902*	-1.804*	-1.843*	-1.875*	-1.766*
	(0.189)	(0.198)	(0.194)	(0.191)	(0.198)	(0.192)	(0.187)	(0.170)
OVER(-1)		-47.872**						
		(21.758)						
EXCHG(-1)			1.471*					
			(0.214)					
INFLATION(-1)				-0.606**				
				(0.252)				
BUDGET(-1)					-1.070			
					(0.982)			
KAVAIL(-1)						-0.357		
						(0.779)		
RESERVE(-1)							-0.115	
							(0.204)	
FDINET(-1)								-5.792*
								(1.214)
CRISIS(-1)	31.201	27.595	33.098	31.992	26.288	30.657	30.401	33.678
	(31.270)	(27.137)	(33.792)	(30.736)	(26.019)	(31.350)	(30.758)	(27.695)
CONSTANT	-6503.5***	-6192.1***	-5896.3	-6409.9***	-5508.8***	-6000.6***	-5954.2	-2529.9
	(3483.1)	(3633.9)	(3805.9)	(3520.8)	(3307.2)	(3342.7)	(3688.6)	(3088.0)
R -squared	0.250	0.266	0.242	0.218	0.226	0.253	0.249	0.340
Observations	154	144	144	154	142	154	154	154

Notes: See the notes of Table 4.

1984–2004 and then re-estimate equation (1). For comparison, the same explanatory variables are used in addition to *EXCHG*, the change in the

nominal exchange rate, since exchange-rate variability is closely related with macroeconomic instability.[14] Based on the Hausman test, the random-effect estimation results for HM1 and Cline are shown in Tables 8 and 9, respectively.

There are several differences between developing and developed countries, first, none of estimated coefficients for institutional quality are statistically significant for developed countries, reflecting that political risk is relatively low and is not relevant. Instead, significant factors are macroeconomic variables such as currency overvaluation, exchange-rate variability, inflation and net inflow of FDI. All these macro variables show expected signs for the hot money measures. Second, capital flees less to the extent that an economy is financially developed and more open financially and in trade of goods and services. Contrary to the case of developing countries, particularly, trade openness significantly and negatively affects both capital flight measures, implying that trade faking is not prevalent among developed countries. Third, hot money (HM1) responds to interest-rate differentials, but a broader measure of capital flight (Cline) does not. The final observation is that the lagged crisis indicator is positively and significantly associated with flight of hot money. That is, the crisis triggered short-term capital outflows for the sample of developed countries. In sum, capital flight of developed countries is influenced by economic or financial factors rather than by institutional factors.

III. CONCLUDING REMARKS

Suggested policies against capital flight in the literature are to adopt sound macroeconomic policies, to change legal and institutional systems to ensure no risk of expropriation, to provide attractive financial assets for domestic residents and imposing capital controls.

Using panel data for 53 developing countries, we confirm in this study that institutional quality is the most influential factor in explaining the causes of capital flight; the relationship remains robust even when

[14] *EXCHG* positively and significantly affects capital flight for developing countries too. However, its estimated coefficients have extremely low values (for example, it is 1.62e-11 (7.92e-12) for HM1), and thus they are not shown in Tables 4 and 5.

macroeconomic variables that significantly affected capital flight in previous studies are taken into account. Most macroeconomic variables such as currency overvaluation and government budget deficits lose their statistical significance once institutional quality is added. Among sub-components of political risk, the common factors affecting capital flight are corruption, government stability and law-and-order, all of which are associated with the risk of expropriation and future taxation of domestic residents. For capital-scarce developing economies, overall, upgrading institutional quality should be the first priority to avoid flight of capital.

Implications of our other findings are summarized as follows: first, the relationship between capital flight and per capita income is not linear but shows an inverted U curve, reflecting that a country would experience a rise in capital flight at the early stage of development, but gradually repatriate funds held abroad as income rises. Second, capital goes wherever its return is higher. Third, previous analysis suggested that policy makers who liberalize capital flows may initiate a sudden flight of capital. But our results are exactly the opposite. Capital-account liberalization not only dampens capital flight but also promotes international flows of private capital. Flight of short-term capital can also be avoided by deepening the financial markets, providing various financial assets for domestic residents at attractive terms and thereby reducing the risks of financial investment at home. Fourth, we use data of Cavallo and Frankel (2008) and show that a sudden stop or currency crisis does not lead to capital flight in our sample of countries. However, there are various definitions for crisis episodes (for example, Frankel and Rose (1996) and Frankel and Wei (2004)). Further, empirical investigation may be needed to confirm the exact role of an economic crisis in flight of capital. Finally, Alfaro et al. (2008) empirically show that the lack of capital inflows from rich to poor countries is mainly due to low institutional quality. Our results reveal that the inflows of foreign capital including FDI are negatively correlated with capital flight. Thus we can conclude that high institutional quality not only encourages capital inflows but also discourages capital flight, thus enhancing economic growth for capital-scarce economies.

Appendices

A. Country list

Developing countries	Ecuador	Pakistan	Canada
	Egypt	Papua New Guinea	Denmark
Angola	El Salvador	Philippines	Finland
Argentina	Guinea	Poland	France
Bahamas, The	Honduras	Saudi Arabia	Germany
Bahrain, Kingdom of	Hungary	Senegal	Greece
Bangladesh	Indonesia	Singapore	Iceland
Bolivia	Israel	South Africa	Ireland
Botswana	Jamaica	Sri Lanka	Italy
Brazil	Kenya	Sudan	Japan
Bulgaria	Korea	Thailand	Netherlands
Burkina Faso	Kuwait	Togo	New Zealand
Cote d'Ivoire	Libya	Trinidad and Tobago	Norway
Cameroon	Malawi	Turkey	Portugal
Chile	Malaysia	Uganda	Spain
China,P.R.: Mainland	Mali		Sweden
Colombia	Malta	*Developed Countries*	Switzerland
Congo, Republic of	Mexico		United Kingdom
Costa Rica	Morocco	Australia	United States
Cyprus	Oman	Austria	

B. Measurement of capital flight

We use two methods of measuring capital flight. The first one is the residual or World Bank method, and the second is the hot-money method. Most of the data needed to calculate capital-flight measures are obtained from Balance of Payments (BOP) published by the IMF. In the previous literature, capital flight was defined and calculated on the basis of the old version of BOP (BMP4), which was operational up to 1992, but we use its new version (BMP5) since our data cover through 2004.

Residual Method

This measures capital flight by the *residual* of the *sources* of funds (net increases in external debt and the net inflow of foreign investment) over the *uses* of funds (the current account deficit and additions to foreign reserves). For the residual measure, several variables are redefined to minimize the discrepancies between the old and new versions of BOP. First, the capital account has been renamed the financial account in BMP5. The capital account of BMP5 consists mostly of unilateral capital transfer in the current account of BMP4. Thus capital account deficit/surplus is also added as an element of the *uses* of funds. Second, only foreign direct investment (FDI) was counted as foreign investment in previous studies. Following Claessens and Naude (1993), however, we also include equity securities in portfolio investment. Thus, the *sources* of funds are the sum of net increases in external debt, net FDI and net equity securities. We use three variants of the residual method: the World Bank, Morgan Guaranty and Cline methods. Table A-1 shows how to calculate these three measures.

[Table A-1] Capital Flight: Residual Method

A. Current Account (BOP, 4993)
A1. Travel (credit) (BOP, 2236)
A2. Net reinvested FDI income (BOP, 2333+3333)
A3. Other investment income (credit) (BOP, 2370)
B. Capital Account (4994)
C. Net Equity Flows
C1. Net foreign direct investment (BOP, 4500)
C2. Portfolio investment: Net equity securities (BOP, 4610+4652)
D. Change in deposit money banks' foreign assets (IFS, 7A.DZF)
E. Changes in reserves (BOP, 4802)
F. Net errors and omissions (BOP, 4998)
G. Change in debt (GDF)
World Bank: A+B+C+E+G
Morgan Guaranty: A+B+C+E+G-D
Cline: A+B+C+E+G-D-(A1+A2+A3)

Source: BOP, Balance of Payments, IMF.
IFS, International Financial Statistics, IMF.
GDF, Global Development Finance, the World Bank.

Hot-Money Method

The hot-money measures of Cumby and Levich (1987) are most widely used in the literature, but they are also obtained from the old version of BOP. The items of short-term capital flows in the old version are not compatible with those in the new version. Loungani and Mauro (2000) employ the new version of BOP to define three hot-money measures. Table A-2 presents three measures of hot money (Hot Money 1, Hot Money 2 and Hot Money 3), which are based on definitions offered by Loungani and Mauro.

[Table A-2] Capital Flight: Hot Money Method

Hot money 1
Net errors and omissions (BOP, 4998)
plus Net flows of non-FDI, non-portfolio investment assets and liabilities held by entities other than the monetary authorities, general government, and banks. (BOP, 4710+4725+4734+4746+4760+4775+4784+4796)
Hot money 2
Hot money 1
plus Net flows of non-FDI, non-portfolio investment assets and liabilities held by banks (BOP, 4722+4733+4743+4772+4783+4793)
Hot money 3
Hot money 2
plus Net flows of portfolio investment assets and liabilities in the form of debt securities (BOP, 4619+4669)

Source: Loungani and Mauro, 2000.
BOP, Balance of Payments, IMF.

Trade Mis-invoicing

The other types of capital flight are export under-invoicing and import over-invoicing. They can be identified by differences in statistics of the reporting country and its trading partners as shown in Table A-3. One adjustment should be made to calculate trade mis-invoicing. Reported imports and exports are normally expressed on a CIF (cost, insurance, freight) and FOB (free-on-board) basis, respectively. To measure them on a comparable basis, imports are adjusted downward by a country-specific

CIF/FOB ratio. However, the data are available only for 20 countries in our sample. As the BOP manual suggests, thus, we use CIF/FOP = 1.1 for all countries. Since both export under-invoicing and import over-invoicing add to capital flight, the two are combined for the net effect of trade mis-invoicing on capital flight

[Table A-3] Trade Mis-invoicing

Export mis-invoicing	$= M_W/1.1 - X_C$
Import mis-invoicing	$= M_C/1.1 - X_W$
where	
M_W	Imports from that country as reported by the world, CIF
X_C	Exports as reported by the country, FOB
M_C	Imports as reported by the country, CIF
X_W	Exports to that country as reported by the world, FOB

Source: Direction of Trade, IMF.

C. Data descriptions and sources

Variable	Description and Source
PGDP	GDP per capita, ppp (current US dollar) (WDI)
FI	Financial Incentive. $\frac{(1+Tbill)(1+\ln(NER)-\ln(NER_{-1})}{1+i}$ where *TBill* is the U.S. Treasury bill interest rate (line 60C, IFS), *i* is the domestic deposit rate (line 60l, IFS, and *NER* is nominal exchange rate (domestic currency per dollar) (line ac, IFS). (IFS)
M2	Money and quasi money (% of GDP) (WDI)
TOPEN	Trade Openness. Sum of exports and imports of goods and services (% of GDP) (WDI)
FOPEN	Financial Openness. Gross private capital flows (% of GDP), which are the sum of the absolute values of direct, portfolio, and other investment inflows and outflows recorded in the balance of payments financial account, excluding changes in the assets and liabilities of monetary authorities and general government. (WDI)
OVER	Real Exchange Rate Overvaluation. Difference between real exchange rate and HP detrended real exchange rate (Hodrick and Prescott filtering parameter: lamda = 10^2) where real exchange rate (RER_i) $=100\times NER\times CPI_{US}/CPI_i$. (Author's calculation using IFS)
EXCHG	Annual change in nominal exchange rate (%) (Author's calculation using IFS)

INFLATION	Annual change in consumer prices (%) (WDI)
BUDGET	Government budget deficit/surplus (% of GDP) (IFS)
TDEBT	Total debt (% of GDP) (Author's calculation using GDF and BOP)
KAVAIL	Gross private capital inflows (% of GDP) (Author's calculation using BOP)
RESERVE	Total reserves minus gold (% of Imports of goods and services) (Author's calculation using IFS)
FDINET	Foreign direct investment, net flows (% of GDP) (WDI)
CRISIS	A Crisis Dummy. A sudden-stop episode constructed by Cavallo and Frankel (2004) is used as a crisis dummy. $CRISIS_{it}$ takes value 1 if a sudden stop hits country "i" at year "t" and 0 otherwise. A sudden stop is a situation in which at a year "t", the financial account surplus of country "i" (prevailing at year "t-1") falls at least two standard deviations below the sample mean; the current account deficit falls by any amount either in "t" or in "t+1"; and GDP per capita falls by any amount either in "t" or in "t+1". The data set covers 141 countries in total, for the period 1970–2002. The total number of episodes captured using this methodology is 86. (Cavallo and Frankel, 2008)
LA	Latin American dummy = 1 if a country belongs to Latin America and 0 otherwise. (WDI)
AFRICA	Sub-Saharan African dummy = 1 if a country belongs to Sub-Saharan Africa and 0 otherwise. (WDI)
INDEBTED	Dummy for severely indebted countries = 1 if a country belongs to severely indebted countries (World Bank Classification) and 0 otherwise. (WDI)

Source: IFS, International Financial Statistics, IMF.
BOP, Balance of Payments, IMF.
WDI, World Development Indicators, the World Bank.
GDF, Global Development Finance, the World Bank.

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