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Institutional Quality and Illicit Financial Flows in Developing and Developed Countries: An Empirical Assessment

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by

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Abstract

This paper investigates the direct linkage between institutional quality and illicit financial flows (IFFs). Despite the methodological concerns regarding measures of IFFs, the international development community and researchers agree that a large amount of capital illegally flowing out of developing and developed countries has become a major developmental issue. This paper uses the IFFs dataset from research organization Global Financial Integrity (GFI), consisting of 47 developing and developed countries from the period of 2005 to 2014. Corruption and political stability are found to be correlated to IFFs, confirming the proposition that institutional quality affects IFFs because of poor governance.

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Glossary

GFI	Global Financial Integrity
CPI	Corruption Perception Index
Dooley	Dooley Model
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
HMN	Hot Money Narrow measure of capital flight
IFFs	Illicit Financial Flows
OECD	Organization for Economic Co-operation and Development
TM	Trade Mispricing model
WBR	World Bank Residual method
WDI	World Development Indicator database

Introduction

This paper investigates the linkage between institutional quality and illicit financial flows (IFFs)[1], holding other macroeconomic causes of flows constant. It infers poor institutional quality not only as an investment risk but also as a primary enabler of criminal activities that generate the illicit flows. Therefore, the testable model deviates slightly from the investment risk function presented in Le and Rishi (2006) and explicitly includes parameters of institutional quality to capture the effectiveness of domestic governance. The novelty of this paper is that it tries to find the direct linkage of institutional quality and IFFs using an econometric model of economic risk and governance indicators.

Background

Every year, billions of dollars are channeled out of developing countries illegally. Such illicit flows drain much-needed resources for domestic expenditure and investment, for both the private and public sectors. The impact is even more substantial for the least developed countries (LDCs) and low-income countries, given their smaller resource bases. In addition, these flows are corrosive to state institutions since they are criminal in nature (e.g., tax evasion, money laundering) and often aided by corrupt public officials (OECD, 2013). Corruption diverts resources from public to private consumption and weakens trust of citizens in public officials and institutions. On the other hand, activities such as money laundering undermine the integrity of the financial sector, whose functioning depends highly on the integrity of the system.

This phenomenon of illegal cross-border movement of funds is not new. However, "The order of magnitude of these estimates, much more so than their exactitude, warrants serious attention in both the developing countries and in the wealthier world," (Spenjers and Salomon, 2017).

The concept of illicit financial flows, however, is quite controversial. It is "marred by a lack of terminological clarity, which somewhat limits the emergence of effective policy options" (UNECA, 2013). Multiple definitions lead to multiple measures of illicit flows. However, despite the conceptual and

[1] This paper will use illicit financial flows, illicit capital flight and illicit capital flows interchangeably.

methodological concerns, the consensus among development experts and institutions is that the IFFs surpass the sum of official development assistance (ODA) and foreign direct investment (FDI) (OECD, 2013). According to estimates produced by research institute Global Financial Integrity (GFI), in 2014 the IFFs (outflows and inflows combined) from developing and emerging economies were believed to be between 2 trillion United States dollars (USD) and 3.5 trillion USD, likely to account for between about 14.1 percent and 24.0 percent of total developing country trade. Between 2005 and 2014, on average, the *illicit financial outflows* are estimated to have grown at a rate between 7.2 and 8.1 percent (620 billion USD to 970 billion USD in 2014) annually, and the *illicit financial inflows* are estimated to have grown at a rate of about 9.2 to 11.4 percent (1.4 trillion USD to 2.5 trillion USD in 2014).

The scale of these flows raises alarm. Even though the issue itself is not new and it is not abating (Boyce and Ndikumana, 2001), it has not moved to the forefront of the international development agenda until recently. Governments worldwide now acknowledge the severity of IFFs' impact and size, and are joining forces in combating all aspects of them. In 2015, member countries of the United Nations agreed to "substantially reduce IFFs" in their Sustainable Development Goals Framework as part of the 2030 Development Agenda.

This paper will be based on the IFFs definition developed by GFI which is currently in use across various international organizations. The fundamental operating premise behind this definition is that the transfers in question take place via unregistered channels because their background or purpose is illegal. A brief review of estimation methodologies is presented in the literature review section.

Empirical studies of illicit flows are rare. Most researchers consider illicit flows under the umbrella of a broader capital flight concept, which has been investigated substantially in literature. Recent studies on measures of illicit flows focus on decoupling the methods that measure the illicit component from overall capital flight measures. However, these methodologies are still evolving and resulting datasets vary, both in terms of size and availability. The attempts to quantify the causal impacts of illicit flows may be premature. Therefore, this paper will instead focus on the correlations of illicit flows.

Literature Review

As described above, most researchers have subsumed the IFFs under the concept of capital flight and explore primarily the causes of that phenomenon. Therefore, it is only appropriate to begin with an overview of how the concepts and measures of capital flight have developed over the years and how the IFFs are decoupled from capital flight conceptually and methodologically. This literature review is organized into four parts. It will start with an overview of different definitions of capital flight (and illicit capital flows). It then presents the review of different measures of capital flight, as well the measures used by the GFI to estimate the IFFs. It ends with a discussion on recent studies which investigate the determinants of capital flight and the association of capital flight on macro and non-macroeconomic variables.

Definitions of capital flight

There exists no conventional definition of capital flight; this is because it is conceptually difficult to make a distinction between 'normal' capital outflow and 'abnormal' capital flow, which is referred to as capital flight. To distinguish capital flight from 'normal' capital flow, researchers employ different criteria in their definitions. Dooley (1986) emphasizes the motivation behind the flows and sees capital flight as all resident capital outflows, aiming to move beyond the reach of domestic authorities. This criterion is like the one employed by Deppler and Williamson (1987), in which the definition of capital flight is "acquisition or retention of a claim on non-residents that is motivated by the owner's concern that the value of his asset would be subject to discrete losses or impairment if his claims continued to be held domestically." For some researchers, capital flight is a reaction to a potential investment calamity. For Cuddington (1986), capital flight is short-term private capital outflow, which occurs in the response "not only to political crisis but also to economic policy failure." This approach has been adopted in a more simplified fashion in recent literature. For example, Schneider (2003) sees capital flight as the outflow of resident capital from a country in response to economic and political risk in the domestic economy.

Another important, yet subtle, reason behind different definitions may be attributed to the way researchers understand capital flight. Capital flight includes both licit and illicit outflows. While capital flight, in

general, can be considered illicit because of the concealed and hidden nature of the transfer, some movement of funds across the border can be considered legal[2]. Also, it becomes rather ambiguous when honestly-acquired capital is moved across the border illegally beyond the reach of domestic corrupt officials or illegally-acquired capital is laundered out of the country to avoid detection or taxation. Ndikumara et. al (2014) argues that some capital flight is illicit if it involves "funds acquired illegally," "funds transferred abroad illegally," and "funds held abroad illegally." This formulation compares to the definition put forward by the GFI research institution, who defines IFFs as "cross-border transfers of funds that are illegally earned, transferred and utilized" (Kar and Spanjers, 2014; Spanjers and Salomon, 2017).

For clarity, this paper uses the capital flight definition proposed by Schneider (2003) and the IFFs definition proposed by the GFI. These definitions carry the following aspects:

1. capital flight encompasses all types of capital outflow from a country, regardless of their legality, including the illicit flows.
2. risk-aversion/profit-maximizing motive behind the capital flight falls under the scope of the portfolio choice model of asset allocation, and
3. even though generating activities of the IFFs are criminal in nature, the motive behind the cross-border movement of them is assumed to be risk-averse or profit-seeking.

Measures of capital flight

There are several methods attempting to estimate the magnitude of both licit and illicit capital flight.

Hot Money Measure

The Hot Money measure, developed by Cuddington (1986), focuses on the short-term capital outflows that correspond to political or financial crisis, heavier taxes or potential tightening of capital controls. The

[2] For example, funds declared to host-country authorities sometimes do get recorded in the BOP data, due to bureaucratic error.

common practice of measuring hot money is to treat the errors and omissions entry in the balance of payments as a measure of private capital flows. To the extent that net errors and omissions line item captures the flows of money, not the statistical errors, it must include only illicit flows.

World Bank Residual Method (WBR)

A second approach, which has been widely used by researchers and was developed by the World Bank (1985), is denoted as the World Bank Residual Method. It measures capital flight as the difference between sources of capital inflow (i.e., net increases in external debt and the net inflow of foreign direct investment) and uses of capital flows (i.e., the current account surplus/deficit and changes to foreign reserves).

There are several modifications proposed to original simple residual measures. Boyce and Ndikumana (2001) propose a modification to account for the long-term debt stock variations due to the exchange rate fluctuations by using currency composition. Ndikumana et al. (2014) propose an adjustment to account for debt write-offs, "given that they are reported as a reduction in the stock of debt, even though they have no corresponding outflow of debt repayment."

Dooley Model

Another important approach, developed by Dooley (1986), is known as a Dooley method, which sees capital flight as capital outflows aiming to move beyond the reach of domestic authorities. Therefore, the focus is on privately held foreign assets that do not generate income reported to domestic authorities; it is measured as the part of an increase in external holdings by citizens that yields investment income, which does not get reported. The main advantage of this method is its ability to differentiate between licit and illicit capital flight as those assets, which do not generate reported income, are believed to be the ones which try to avoid the existing controls and, thus, constitute an illicit capital outflow.

Trade Mispricing Model

The Trade Mispricing model measures capital flight by observing the amount of systematic faking of trade invoices, also known as trade misinvoicing. The BOP data and current account data used in the

Residual method can be distorted because of trade misinvoicing. The measurement assumes that domestic traders falsify the amount of imports/exports to keep capital abroad (Schneider, 2003). It is estimated by comparing a country's import and export data to that of its trading partner by using Direction of Trade Statistics Yearbook (IMF). However, as noted by Ndikumana et al. (2014), this measure does not capture the "related but distinct phenomenon of transfer pricing" in which same amounts are reported in both exporting and importing countries, despite using anomalous prices.

Measure of Illicit Financial Flows by the Global Financial Integrity

GFI estimates IFFs by including these components:

1. an estimate of trade misinvoicing, and
2. an estimate of funds that leave the domestic economy through private capital flows.

GFI uses the Trade Mispricing model to estimate the first type of flows. Traditionally, GFI has estimated the second type of flows using the World Bank Residual (WBR) method; however, as Kar and Spanjers (2014) notes, this is not necessarily an illicit outflow. This model does, to some extent, capture licit funds as well. To correct for this fact, GFI uses the Hot Money measure instead. As stated earlier, the net errors and omissions line item captures the flows of money, not the statistical errors, therefore it must include only illicit flows. As such, compared to estimates from WBR method, estimates produced by Hot Money measure are more conservative and representative of the 'illicit' part of capital flight.

Review of studies of determinants and associations of capital flight

The literature on capital flight concentrates primarily on two streams: study of determinants of capital flights and study of associations with macro and/or non-macroeconomic variables.

The determinant literature focuses on two approaches to explain the determinants of capital flight: investment climate approach and discriminatory treatment approach. The first approach examines the issue of capital flight as a portfolio diversification choice made by individuals, while the second approach focuses on the differences in guarantees given by the authorities to domestic and foreign investments.

Cuddington (1986) employs the first approach to show that overvaluation of exchange rates, high foreign lending and high domestic inflation cause capital flight. Dooley (1986), employing the second approach, shows that capital flight is generated by domestic investors who are facing discriminatory treatment from authorities. Hermes and Lensink (2001) find that development aid, in the form of loans and grants, has positive effect on capital flight. Collier et al. (2001) finds that there are large regional variations in the proportion of portfolio held abroad. These regional differences are driven by the variables that indicate domestic investment climate, such as exchange rate over-valuation, adverse risk ratings and high indebtedness. Hermes and Lensink, 2001; Le and Zak, 2006) find that political risk has effects on capital flight, despite how the capital flight is defined or measured. Analyzing on African countries, Ndikumana and Boyce, 2003; Ndikumana et al., 2015 find that external borrowing is a consistent determinant of capital flight. Their results show that, for every USD of external borrowing by a sub-Saharan country in any given year, approximately 80 cents – on average – leaves the country as capital flight.

The other stream of studies on capital flight focus on the association of capital flight and macro- and non-macro variables. Using the WBR capital flight data of 45 non-Organization for Economic Cooperation and Development (OECD) countries, Collier et al. (2004) shows that foreign aid reduces the capital flight. Considering corruption as a factor in raising investment risk, Le and Rishi (2006)[3] performed panel analysis on a large sample of developing countries and found that corruption impels capital flight by raising the domestic investment risk, while controlling for return differential, GDP and standard economic risk parameters. In a large sample study by Le and Zak (2006), political risk factors are found to have a significant positive relationship with capital flight, known as *ceteris paribus*. Cerra et al. (2008), using a large panel dataset of over 100 countries, show there exists a revolving door relationship between borrowing and capital flight. Cobham et al. (2017) find that untaxed capital from illicit flows can be significant to level of national income inequality at varying degrees across different countries.

[3] Based on the portfolio choice model of asset allocation that explicitly recognizes corruption as contributing to the variance of domestic investment risk. Le & Rishi (2006) employed the WBR method to estimate capital flight.

One common factor[4] among all the above-mentioned studies is the use of capital flight data estimated by employing the WBR method. Relatively few empirical studies have examined the effects of (illicit) capital flight using data generated by Hot Money measure and/or the Trade Mispricing model. In recent study on a group of Eastern European countries, Andriani and Zajaczkowska (2017) find that illicit financial flows reduce with the institutional quality and increases with tax levels. Even though there exists a significant amount of recent literature on the IFFs by the international development organizations through their advocacy works, the scientific studies on determinants and associations of IFFs are relatively rare.

This paper works to fill in this research gap by using the GFI measure of IFFs. The GFI measure aims to capture the illicit share of capital flight using the Trade Mispricing model and Hot Money measure. Given that the measures of estimating illicit flows are still evolving, it is only reasonable for this paper to explore the associations of illicit flows, instead of quantifying the determinants of the IFFs.

Ndikumana (2013) states that the enormous capital outflows from the African continent can hardly be explained any longer by insufficient investment opportunities in the countries of origin or as a reaction to political risks. Moreover, the assumptions of portfolio diversification alone may not be enough in explaining the IFFs originating in economically successful industrialized countries and fast-growing emerging countries, flows that mainly serve the purpose of tax evasion. Also, these (illicit) capital flows are oftentimes assisted by corrupt governments with a preference for foreign asset accumulation (Boyce and Ndikumana, 2011), thus generating them involves criminal activities such as corruption, money laundering and tax evasion (OECD, 2013).

The primary focus of this paper is finding institutional quality-IFFs linkage. It infers that poor institutional qualities impel the IFFs by enabling an environment that generates illicit transfers, as well as raising the risk of domestic investment. Therefore, the testable proposition can be stated as follows: Do

[4] Except Kent (1986) who uses Hot Money Measure to estimate the capital flight data, while Cobham et al., (2017) estimated illicit flows using the WBR and HMM methods.

poor institutional qualities impel the IFFs, *ceteris paribus*? This paper tests this proposition across a balanced panel of 47 countries over a 10 year period, from 2005 to 2014.

The Econometric Model

This section explores the linkage between IFFs and corruption in greater detail by modeling the relationship in the portfolio choice model based on Le and Rishi (2006) and Le and Zak (2006).

Consider an economy with many indefinitely-lived identical agents living in a low- or medium-income country. Agents consume from the return on wealth allocated to one-period investment in the domestic country or to a (single) foreign country. For simplicity, there is one investment in each country (which could be considered a portfolio of investments). Labor is excluded from the analysis. There is a single homogenous good produced in both countries. The population is constant, immobile and normalized to unity.

Let a_t denote investment in the domestic market at time *t*, that earns a rate of return r_t. Investments in the domestic market are assumed to be risky because of poor governance, $r \sim N(\mu,\theta^2)$. The domestic risk-free return is unavailable. Agents also invest a_t^f in a foreign country, earning a risk-free time-invariant rate of return r^f which can be considered as United States government bonds.

A representative agent maximizes lifetime utility by solving

$$Max_{c_t} E \sum_{k=0}^{n} \beta'^{t} \mathrm{U}(\mathrm{c}_t) \tag{1}$$

subject to

$$c_t = (1 + r_t)a_t + \left(1 + r^f\right) a_t^f - a_{t+1} - a_{t+1}^f \tag{2}$$

where U(c) is strictly increasing, continuous and concave.

Solving the necessary and sufficient conditions to optimize the utility maximization problem (1) yields[5]:

$$a_{t+1}^* = \frac{E(r_{t+1} - r^f)}{\theta\, VAR\,(r_{t+1})} \tag{3}$$

[5] See Le, Q.V. & Zak, P.J. (2006) "Political risk and capital flight" for detailed derivation of equation (3).

where $VAR\ (r_{t+1})$ is variance of the return on domestic investment, and $\theta = (E[U"(c_{t+1})]/E[U'(c_{t+1})]$ measures risk-aversion, which is assumed to be a constant.

Assuming individuals in the other countries are also solving the analogous problem, let us denote that the aggregate capital invested in a country at time *t* is

$$K_t = a_t^* + a_t^{for} + F_t^f \tag{4}$$

Where a_t^{for} represents capital invested by foreigners in the domestic market, F_t^f stands for total capital flight. Capital can be described as: $F_t^f = a_t^{f(l)} + a_t^{f(i)}$ where $a_t^{f(l)}$, denoting the licit capital flight and $a_t^{f(i)}$ denoting the illicit capital flight. Therefore, capital eq. (4) becomes $K_t = a_t^* + a_t^{for} + a_t^{f(l)} + a_t^{f(i)}$. Eq. (4) shows that, in equilibrium, the capital stock is formed from domestic investment and net foreign investment.

Substituting equation (4) into (3) yields,

$$\frac{F_t^f}{K_t} = 1 - \frac{a_t^{for}}{K_t} - \frac{E(r_t - r^f)}{\theta K_t\, VAR\ (r_t)}$$

$$\frac{F_t^f}{K_t} = 1 - \left[\frac{\theta\, VAR\ (r_t) a_t^{for} + E(r_t - r^f)}{\theta K_t\, VAR\ (r_t)}\right] \tag{5}$$

Furthermore, since $F_t^f = a_t^{f(l)} + a_t^{f(i)}$, equation (5) can be broken down into two parts as follows:

$$\frac{a_t^{f(l)}}{K_t} = \mu_l - \alpha\left[\frac{\theta\, VAR\ (r_t) a_t^{for} + E(r_t - r^f)}{\theta K_t\, VAR\ (r_t)}\right] \tag{6}$$

$$\frac{a_t^{f(i)}}{K_t} = \mu_i - \beta\left[\frac{\theta\, VAR\ (r_t) a_t^{for} + E(r_t - r^f)}{\theta K_t\, VAR\ (r_t)}\right] \tag{7}$$

where $\mu_l + \mu_i = 1\ and\ \alpha + \beta = 1$.

As in Le and Rishi (2006), using a linear production to transform the capital into output, $Y_t = \lambda K_t$, for $\lambda > 0$, Eq. (7) can be written in terms of relative to output:

$$a_t^{f(i)} = \frac{Y_t \mu_l}{\lambda} - \beta\left[\frac{\theta\, VAR\ (r_t) a_t^{for} + E(r_t - r^f)}{\theta\, VAR\ (r_t)}\right]$$

which is equivalent to:

$$a_t^{f(i)} = \frac{Y_t \mu_l}{\lambda} - \beta[a_t^{for}] - \beta[\frac{E(r_t - r^f)}{\theta\, VAR\,(r_t)}] \quad (8)$$

Eq. (8) shows that illicit capital flight is higher when the domestic return is low, the risk of investment is high, the risk aversion is high, the foreign investment is low and "β" parameter is small. The influence of discount parameter "β" in this illicit capital flight equation can be attributed to factors that enable the activities impelling the illicit capital flight. As mentioned in the previous section, the activities that generate illicit flows are not only driven by the risk-aversion motives, but also by the concealed purposes that are criminal in nature. For example, an individual may be transferring capital out of a domestic market because s/he is trying to gain better returns in a foreign market, to avoid taxation and/or to launder illegally-earned money. Therefore, discount parameter "β" indicates the existence and level of environment that enables such activities to occur[6]. The indicators that best represent the value of "β" may be the indicators that report the quality of institutions. Given the multi-dimensional nature of the institutional quality, several variables will be used to capture its various aspects. In this paper, "β" will be expressed as a function of following variables: voice and accountability, political stability, government effectiveness, regulatory quality, rule of law and corruption.

$\beta = h$ (voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, corruption) (9)

As in Le and Rishi (2006), the variance of the return is originated from three types of economic risk: inflation risk, interest rate risk and exchange risk. Assuming each type of risk is independently distributed,

$$VAR\,(r_t) = variance(inflation) + variance(exchange\ rate) + variance(interest\ rate) \quad (10)$$

[6] Given the existence of such environment, individuals may discount the future of funds in domestic markets more and move them abroad more.

Testable empirical model and proposition

Taking natural log on both sides of eq. (8) yields:

$$log(a_t^{f(i)}) = \log\{\left(\frac{Y_t \mu_l}{\lambda} - \beta\left[a_t^{for}\right]\right) + (-\beta\left[\frac{E(r_t - r^f)}{\theta\, VAR\,(r_t)}\right])\} \quad (11)$$

and let $A = a_t^{f(i)}$; B = $\frac{Y_t \mu_l}{\lambda}$; $C = \beta\left[a_t^{for}\right]$; D = $-\beta\left[\frac{E(r_t - r^f)}{\theta\, VAR\,(r_t)}\right]$.

Eq. (11) can then be simplified as: $log(A) = log\{(B - C) + D\}$,

Where the right-hand side of the above equation can be approximated by applying Taylor expansion[7] twice, which results in:

$$log(A) = \phi_0 \log(B) + \phi_1 \frac{C}{B} + \phi_2 \left(\frac{C}{B}\right)^2 + \phi_3 \frac{D}{B-C} + \phi_4 \left(\frac{D}{B-C}\right)^2 + \phi_5 \left(\frac{C}{B}\right)^3 + \phi_6 \left(\frac{D}{B-C}\right)^3 + \cdots \quad (12)$$

Based on eq. (12) the main testable model can be described as follows:

$$\begin{aligned}\log(IFFs) = {} & \alpha_0 + \alpha_1(Corruption) + \alpha_2(Regulatory\ quality) + \\ & \alpha_3(Government\ effectiveness) + \alpha_4(Voice\ and\ accountability) + \alpha_5(Rule\ of\ law) + \\ & \alpha_6(Political\ stability) + \alpha_7(r_t - r^f) + \alpha_8(var(inflation)) + \alpha_9(var(interest\ rate)) + \\ & \alpha_{10}(var(exchange\ rate)) + \alpha_{11}(FDI/GDP) + \alpha_{12}(\log(GDP)) + \phi\end{aligned} \quad (13)$$

It is important to note, however, that even though eq. (12) describes to have the term $\frac{D}{B-C}$, (i.e., $-\beta\left[\frac{E(r_t - r^f)}{\theta\, VAR\,(r_t)}\right]$ divided by the difference of GDP and FDI, this paper will include parameter "β," which is a linear combination of variables of institutional quality, separately and individually. This will enable the results of institutional quality parameters examined separately. Moreover, both terms for IFFs and GDP are in logarithmic form.

The main testable proposition of this paper is that poor institutional quality can impel the IFFs, given the return differential, GDP, FDI share of GDP, inflation risk, exchange rate risk and interest risk.

Data

Dependent variable - IFFs

[7] Log(a+b) = log(a*(1+b/a)) = log a + log (1+b/a). The second term on the righthand side of the equation can be approximated by using Taylor series expansion, log (1+b/a) = b/a – $b^2/2a^2$+$b^3/3a^3$+…

A balanced panel data of 47 countries over the period of 2005 to 2014[8] are considered in this study. Only countries with complete time series data for IFFs for the above-mentioned period are selected. This is (1) because of the issue of missing/zero values in original GFI dataset[9] and (2) to avoid the imputation of missing values[10]. Countries included in this dataset (47 countries) have, on average, higher flow of IFFs and stock GDP-PPP, compared to those not included in this study (65 countries). Moreover, they carry higher CPI and overall better institutional quality values than the excluded group. Summary of Student's t-tests performed are presented in Table A.2 of Annex A. Table A.3-7 present the results of t-tests using mean of all years, mean of 2005-2009, mean of 2010-2014, initial (earliest) year and latest year of each country. The countries included in this study are presented in the Table A.8 of Annex A. Regions represented are Africa (13), Asia (12), Europe (7) and Latin America and Caribbean (15). It is important to note that since only complete countries are included, results may suffer from loss of precision and have smaller population coverage. However, the author views that, given the complexity and still evolving nature of current estimation procedures, it is best to refrain from imputing the missing values to avoid misleading conclusions.

The dependent variable is the IFFs transformed into logarithmic form, estimated by the GFI research organization. As mentioned in the previous section, the concept and methodologies of IFFs measures are still in debate. However, the definition and measures[11] of IFFs employed by GFI are widely used in research and across international organizations.

Independent variables

[8] Data are available from Global Financial Integrity's webpage (http://www.gfintegrity.org/report/illicit-financial-flows-to-and-from-developing-countries-2005-2014/). 47 countries with complete time series data for all variables for 2005-2014 are selected out of a maximum set of 112 countries with some data for all variables.

[9] GFI's dataset contains a number of zero values for many countries. Though zero value represents "no reported IFF flow", it does not mean that such flow does not occur.

[10] Any imputation procedure for missing IFF values needs to take the country-specific political and economic situations into consideration. It also requires a review of country-level BOP, trade, and other official records.

[11] An overview of the definition and measure of the IFFs by the GFI is presented in the literature review section.

The main variable of interest among the parameters of institutional quality is corruption. This paper uses the Corruption Perception Index (CPI), developed by Transparency International, as a measure of corruption. Corruption is one of the most severe challenges for the economic and social development of developing and developed countries alike. Fighting corruption requires the ability to understand and measure it accurately. However, measuring corruption has, to date, proved to be elusive and difficult, as corruption is closely linked to quality of institutions and governance (Bjørnskov, 2011) and could well lie hidden beneath other economic and social shortfalls within a country. For example, a measure of corruption in the form of court bribery cases may be of little to no use for cross-country analysis since the measurement may simply reflect the quality of institution in a respective country or territory, in this case, judiciary institutions as opposed to corruption itself. Therefore, as Le and Rishi (2006) explained, researchers prefer to use perception based corruption measures based on surveys. The CPI is built by aggregating the opinions of a group of experts and business people and measures the perceived levels of public sector corruption in each country. The scores published before 2012 are normalized to make them comparable in size to the figures published after 2012.

A set of other variables of interest measures various aspects of institutions – namely Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Corruption and Rule of Law. Countries differ in quality of institutions, which could contribute toward shaping the overall investment climate of domestic economy. Le and Zak (2006) found that political instability accelerates the capital flight, while Hermes and Lensink (2001) found that policy uncertainty is statistically related to the capital flight when a set of economic control variables and political variables are included. Table 1 below shows the list of institutional quality variables considered, their definitions and the expected nature of relationship (positive/negative) with the illicit flows. The above variables are part of the Worldwide Governance Indicators dataset and downloaded from the World Bank's WDI database.

Table 1: Governance variables, their description and expected nature of relationship

Variable	Description	Expected Sign
Voice and Accountability	Captures perceptions of the extent to which a country's citizens can take part in selecting their government, as well as freedom of expression, freedom of association, and a free media	Negative
Political Stability and Absence of Violence/Terrorism	Measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism	Negative
Government Effectiveness	Captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies	Negative
Regulatory Quality	Captures perceptions of the ability of the government to formulate and implement sound policies and regulations that allow and promote private sector development	Negative
Corruption	Captures perceived levels of corruption, as determined by expert assessments and opinion surveys. Corruption is defined as the misuse of public power for private benefit	Negative
Rule of Law	Captures perceptions of the extent to which agents have confidence in and abide by the rules of society and the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence	Negative

Source: Worldwide Governance Indicators (http://info.worldbank.org/governance/wgi/index.aspx#doc). Transparency International.

Note: The Worldwide Governance Indicators report on six broad dimensions of governance for over 200 countries and territories over the period of 1996 to 2016. Out of six measures, only the "control of corruption" variable is not used. Instead, Corruption Perception Index from Transparency International is used as a measure of corruption in this analysis.

The other control variables considered are GDP and proportion of foreign direct investment (FDI) in GDP. Variables used as indicators of economic risk are variance of inflation, variance of interest rate and variance of exchange rate. Data for all five variables are downloaded from the WDI database of the World Bank for the period of 2005 to 2014.

Table A.1 in Appendix A provides the list of variables, year range and source information. Tables in Appendix B and C show the summary statistics of variables.

Empirical results

This section presents the econometric results obtained by empirically testing eq. (13) for a balanced panel of 47 developing and developed countries. Since the countries in the sample have a diverse socioeconomic background, a fixed-effect model is used for all regressions so that country-specific characteristics do not affect the results. The Hausman test conducted also confirms the suitability of fixed-effect method. GDP and IFFs are converted into natural logarithms.

Descriptive statistics of the sample are reported in Table B.1 and B.2 in Appendix B. The correlations between the institutional variables, on the one hand, and between the economic risk indicators, on the other, are provided in Table B.3 and B.4 in Appendix B.

Table C.1 reports the results of the fixed-effect panel regressions. Specification (A) reports the results of the full model that includes parameters for both institutional quality and economic risk to determine their combined significance. Specifications (B) and (F) test the correlations of institutional quality and economic risk separately. In specification (C), (D) and (E), the parameters of institutional quality, namely Corruption, Regulatory Quality, Government Effectiveness, Rule of Law and Political Stability, are tested independently to evaluate their direct relation to the IFFs and to test the stability of the model. In specification (G) through (K), the parameters of economic risk, variance of inflation, variance of interest rate and variance of exchange rate are tested independently for the same reason.

Associations with macroeconomic variables

The impact of GDP is positive and statistically significant at the 1 percent level in all specifications. All specifications consistently report that the stocks of IFFs and FDI share of GDP have a positive relationship that is statistically significant at the level of 1 percent. The impact of return differential is not found to be statistically significant.

Of three economic risk parameters, only the variance of exchange rate has a consistent negative sign, as expected, in all regressions in which it is included. It is statistically significant at the 5 percent level in full model (A) and (B), but loses its significance in the specification (D). Variances of inflation and interest rates are not statistically significant.

Associations with institutional quality variables

Corruption is included in all specifications involving institution parameters since it is the main variable of interest among them. In all specifications where it is tested to be statistically significant at the level of 10 percent or less, corruption is found to have a correlation on the IFFs. This result is consistent with Le and Rishi (2006), which finds that corruption affects capital flight, despite their estimated capital flight using

the WBR model, while illicit financial flows data were generated using the Trade Mispricing model and Hot Money measure.

Regulatory quality is also found to have a negative sign, as expected, in all specifications it is included [(A), (F) and (G)], however, it is not statistically significant in all of them. Political Stability is also found to be consistent, both in terms of sign and magnitude, in all specifications it is included [(A), (F) and (K)]. This result is consistent with Le and Zak's (2006) study, which finds that Political Instability is one of the key factors associated with capital flight. The other three variables, Government Effectiveness, Accountability and Rule of Law, are neither statistically significant nor are signs as expected.

In sum, out of six institutional quality parameters, Corruption and Political Stability are found to have statistically significant correlation with the IFFs, regardless of how other economic risk and macro variables are specified. However, it is important to note that, at best, only 25 percent of sample variation is explained by any specification in Table C.1.

Conclusions

It is difficult to quantify the direct socio-economic impacts of the IFFs; however, an increasing amount of literature has proven empirically that they are negative and have significant consequences. One direct impact of the IFFs is that they drain much-needed capital out of the private and public investment portfolios in many countries. This runaway capital could have been used to spur growth, build infrastructure and develop capacity in areas where it is needed most. One less explored, yet significant, impact of the IFFs is their effect on the institutions. Illicit flows are primarily generated by criminal activities, such as tax evasion and money laundering, and are often aided by corrupt offices/officials. Thus, the illicit flows undermine the credibility, integrity and accountability of state institutions through corruption. On the other hand, weak institutions may contribute to the existence of such flows due to poor regulatory enforcement.

This paper derived an econometric model, based on capital flight equations of Le and Zak (2006) and Le and Rishi (2006), that explicitly included institutional qualities as direct contributors of the IFFs

generation. Unlike in Le and Rishi (2006) which used the World Bank method to estimate the capital flight, this paper used estimates of illicit flows produced by GFI using narrower measures. Based on the model, an empirical model is proposed and tested. Results strongly suggest that corruption and political stability have significant impacts on the IFFs, similar to the findings of Le and Zak (2006) and Le and Rishi (2006) . Economic risk factors, however, seems to have limited to no effect on the IFFs. This reinforces the inference, made earlier in this paper, that the generating mechanism of the IFFs is primarily based on the quality of institutions; the weaker the institution, the more capital that will likely flow out of the country illegally, while holding other macro variables constant.

Appendix

Appendix A: Data sample

Table A.1

Variable information

Variable	Years Covered	Source
Illicit Financial Flows (IFFs) (log)	2005 – 2014	Global Financial Integrity (2017)
Return Differential ($R_i - R_f$)	2005 – 2014	World Development Indicators (2017)
Inflation (variance)	2005 – 2014	World Development Indicators (2017)
Exchange (variance)	2005 – 2014	World Development Indicators (2017)
Interest rate (variance)	2005 – 2014	World Development Indicators (2017)
Foreign Direct Investment *	2005 – 2014	World Development Indicators (2017)
Gross Domestic Product (GDP PPP) (log)	2005 – 2014	World Development Indicators (2017)
Voice and Accountability	2005 – 2014	Worldwide Governance Indicators (2017), downloaded from the WDI database
Political Stability and Absence of Violence/Terrorism	2005 – 2014	Worldwide Governance Indicators (2017), downloaded from the WDI database.
Government effectiveness	2005 – 2014	Worldwide Governance Indicators (2017), downloaded from the WDI database
Regulatory quality	2005 – 2014	Worldwide Governance Indicators (2017), downloaded from the WDI database
Rule of law	2005 – 2014	Worldwide Governance Indicators (2017), downloaded from the WDI database
Corruption Perception Index (CPI)	2005 – 2014	Transparancy International (2017)

Table A.2

Summary table with results from Student's t-tests

Note: 5 t-tests were performed using mean of all years, mean of 2005-2009, mean of 2010-2014, initial (earliest) year and latest year of each country.

	Mean of all years	Mean of 2005-2009	Mean of 2010-2014	Initial (earliest) Year	Latest Year	Discussion
IFFs (millions of US$)	-	-	-	-	-	No statistical difference between two groups.
GDP PPP (millions of US$)	-	-	-	-	-	No statistical difference between two groups.
CPI Index	**	*	**	-	**	When taken averages over the years, CPI data show statistical differences at , at least, 90% confidence level. Population of countries included in this study show, in general, higher level of corruption perception than those who reside in excluded countries.
Government Effectiveness	**	**	***	**	***	Two groups have statistically significant differences in government effectiveness data. This study found no statistically significant linkage between government effectiveness and IFF flows.
Political Stability	-	-	-	-	-	No statistical difference between two groups.
Regulatory Quality	***	***	***	**	***	Two groups have statistically significant differences in government effectiveness data. This study found no statistically significant linkage between regulatory quality and IFF flows.
Rule of Law	-	-	**	-	***	Two groups display statistically significant differences for last 5 years included in this study. No difference exists for the first 5-year period. This study found no statistically significant linkage between rule of law and IFF flows.
Voice and Accountability	***	***	***	***	***	Two groups have statistically significant differences in accountability index. This study found no statistically significant linkage between accountability index and IFF flows.
FDI (millions of US$)	-	-	-	-	-	No statistical difference between two groups.
Exchange Rate Variance	-	-	-	-	-	No statistical difference between two groups.
Inflation Variance	-	-	-	-	-	No statistical difference between two groups.
Return Differential	-	-	-	-	-	No statistical difference between two groups.
Interest Rate Variance	-	-	-	-	-	No statistical difference between two groups.

Note: "-" no statistically significant difference; * statistical difference at p<.01; ** statistical difference at p<.05; *** statistical difference at p<.01

Table A.3

Results of Student's t-test using mean of all years (2005-2014)

	Mean (Included dataset)	Mean (Excluded dataset)	t-statistics	P-value	Note
IFFs (millions of US$)	7,221.37	9,214.40	0.4763	0.6356	-
GDP PPP (millions of US$)	412,558.28	278,634.90	-0.7222	0.4715	-
CPI Index	7.85	7.11	-1.9445	0.0553	*
Government Effectiveness	25.32	23.88	-4.2815	0.0000	***
Political Stability	35.62	31.12	-2.0094	0.0471	**
Regulatory Quality	2.80	2.52	-2.4443	0.0161	**
Rule of Law	2.65	2.68	0.2576	0.7971	-
Voice and Accountability	2.92	2.49	-3.9104	0.0002	***
FDI (millions of US$)	2.68	2.50	-1.5454	0.1249	-
Exchange Rate Variance	2.86	2.51	-2.8046	0.0059	***
Inflation Variance	5,420.96	4,175.48	-0.4823	0.6303	-
Return Differential	21.06	19.78	-3.6866	0.0004	***
Interest Rate Variance	0.01	20.25	1.0000	0.3210	-

Note: "-" no statistically significant difference; * statistical difference at p<.01; ** statistical difference at p<.05; *** statistical difference at p<.01

Table A.4

Results of Student's t-test using mean of 2005-2009

	Mean (Included dataset)	Mean (Excluded dataset)	t-statistics	P-value	Note
IFFs (millions of US$)	6,228.21	5,532.96	-0.2826	0.7781	-
GDP PPP (millions of US$)	344,253.79	219,595.01	-0.8803	0.3805	-
CPI Index	33.90	30.02	-1.7701	0.0798	*
Government Effectiveness	2.77	2.52	-2.3053	0.0230	**
Political Stability	2.62	2.69	0.4961	0.6208	-
Regulatory Quality	2.88	2.50	-3.4422	0.0008	***
Rule of Law	2.65	2.51	-1.1621	0.2475	-
Voice and Accountability	2.86	2.50	-2.7505	0.0069	***
FDI (millions of US$)	4,373.57	3,659.70	-0.3956	0.6930	-
Exchange Rate Variance	0.01	1338888892.60	1.0000	0.3207	-
Inflation Variance	17.70	32.01	1.5346	0.1273	-
Return Differential	50.22	49.56	-0.5682	0.5715	-

Interest Rate Variance	89.05	125.26	1.1909	0.2363	-

Note: "-" no statistically significant difference; * statistical difference at p<.01; ** statistical difference at p<.05; *** statistical difference at p<.01

Table A.5

Results of Student's t-test using mean of 2010-2014

Variable Name	Mean (Included dataset)	Mean (Excluded dataset)	t-statistics	P-value	Note
IFFs (millions of US$)	8,375.38	9,317.78	0.2167	0.8290	-
GDP PPP (millions of US$)	496,102.93	350,248.83	-0.6153	0.5394	-
CPI Index	38.01	33.38	-2.0285	0.0449	**
Government Effectiveness	2.83	2.52	-2.6550	0.0091	***
Political Stability	2.68	2.67	-0.0752	0.9402	-
Regulatory Quality	2.97	2.48	-4.3536	0.0000	***
Rule of Law	2.71	2.49	-2.0185	0.0459	**
Voice and Accountability	2.87	2.51	-2.8531	0.0051	***
FDI (millions of US$)	6,638.45	4,766.56	-0.5391	0.5907	-
Exchange Rate Variance	0.01	48.45	1.0001	0.3208	-
Inflation Variance	13.33	11.38	-0.1887	0.8511	-
Return Differential	51.63	51.46	-0.1544	0.8776	-
Interest Rate Variance	89.05	125.26	1.1909	0.2363	-

Note: "-" no statistically significant difference; * statistical difference at p<.01; ** statistical difference at p<.05; *** statistical difference at p<.01

Table A.6

Results of Student's t-test using first available (earliest) year

Variable Name	Mean (Included dataset)	Mean (Excluded dataset)	t-statistics	P-value	Note
IFFs (millions of US$)	4,728.32	2,970.94	-1.1539	0.2509	-
GDP PPP (millions of US$)	289,361.57	172,914.00	-1.0365	0.3023	-
CPI Index	33.02	30.32	-1.2490	0.2147	-
Government Effectiveness	2.74	2.51	-2.0125	0.0466	**
Political Stability	2.59	2.70	0.7565	0.4510	-
Regulatory Quality	2.81	2.51	-2.5626	0.0116	**
Rule of Law	2.63	2.52	-0.8984	0.3709	-
Voice and Accountability	2.84	2.49	-2.7414	0.0071	***
FDI (millions of US$)	3,031.59	2,180.82	-0.6691	0.5045	-

Exchange Rate Variance	0.01	0.06	0.9672	0.3366	-
Inflation Variance	28.82	17.30	-0.4762	0.6360	-
Return Differential	49.75	50.43	0.2136	0.8313	-
Interest Rate Variance	89.05	125.26	1.1909	0.2363	-

Note: "-" no statistically significant difference; * statistical difference at p<.01; ** statistical difference at p<.05; *** statistical difference at p<.01

Table A.7

Results of Student's t-test using last available (latest) year

Variable Name	Mean (Included dataset)	Mean (Excluded dataset)	t-statistics	P-value	Note
IFFs (millions of US$)	8,283.18	8,061.44	-0.0538	0.9572	-
GDP PPP (millions of US$)	542,233.00	385,745.00	-0.5882	0.5574	-
CPI Index	39.81	34.32	-2.3768	0.0191	**
Government Effectiveness	2.84	2.50	-2.9288	0.0041	***
Political Stability	2.69	2.68	-0.0595	0.9527	-
Regulatory Quality	2.98	2.47	-4.4820	0.0000	***
Rule of Law	2.78	2.49	-2.7752	0.0065	***
Voice and Accountability	2.90	2.55	-2.7345	0.0072	***
FDI (millions of US$)	6,745.29	4,491.93	-0.6404	0.5229	-
Exchange Rate Variance	0.00	0.01	1.0223	0.3096	-
Inflation Variance	3.13	11.39	1.5877	0.1154	-
Return Differential	52.07	53.27	0.9868	0.3259	-
Interest Rate Variance	89.05	125.26	1.1909	0.2363	-

Note: "-" no statistically significant difference; * statistical difference at p<.01; ** statistical difference at p<.05; *** statistical difference at p<.01

Table A.8

List of countries included in this study and their regional affiliations

Country Name	Region	IFFs (millions of US$)	GDP PPP (millions of US$)	CPI Index	Government Effectiveness	Political Stability	Regulatory Quality	Rule of Law	Voice and Accountability
Algeria	Northern Africa	8483.9	453100.0	31.3	2.5	1.8	2.0	2.3	2.1
Armenia	Asia	1004.7	19824.3	30.3	2.9	3.0	3.3	2.6	2.3
Azerbaijan	Asia	10649.0	127056.7	24.1	2.3	2.4	2.6	2.2	1.7

Bangladesh	Asia	7514.9	362800.0	23.1	2.2	1.5	2.1	2.2	2.6
Belarus	Europe	8985.9	143648.6	25.2	2.0	3.2	1.7	2.0	1.4
Botswana	Sub-Saharan Africa	1369.0	26975.3	59.4	3.5	4.0	3.5	3.6	3.5
Brazil	Latin America and the Caribbean	21523.1	2717000.0	38.0	2.9	2.9	3.1	2.8	3.5
Bulgaria	Europe	2480.8	106649.9	38.9	3.1	3.3	3.6	2.9	3.5
Burkina Faso	Sub-Saharan Africa	785.9	21372.0	34.2	2.4	2.8	2.8	2.6	2.7
Chile	Latin America and the Caribbean	6017.1	312500.0	71.2	4.2	3.5	4.5	4.3	4.1
Colombia	Latin America and the Caribbean	5004.2	493300.0	37.1	2.9	1.4	3.3	2.6	2.8
Costa Rica	Latin America and the Caribbean	12419.2	57388.4	49.9	3.3	3.6	3.5	3.5	4.0
Côte d'Ivoire	Sub-Saharan Africa	2193.1	54300.5	23.4	1.9	1.5	2.2	1.8	1.9
Croatia	Europe	3561.8	84957.6	41.7	3.6	3.6	3.5	3.2	3.5
Dominican Republic	Latin America and the Caribbean	1683.1	104760.8	29.7	2.4	3.0	2.8	2.4	3.1
Georgia	Asia	1526.7	26313.4	39.7	3.3	2.3	3.4	2.8	2.9
Guatemala	Latin America and the Caribbean	2166.9	96108.1	29.7	2.3	2.2	2.8	1.9	2.7
Guyana	Latin America and the Caribbean	322.8	4273.8	26.5	2.8	2.5	2.4	2.4	3.0
Haiti	Latin America and the Caribbean	180.5	15423.1	18.1	1.5	1.9	2.0	1.6	2.2
Honduras	Latin America and the Caribbean	4765.9	31946.0	26.0	2.3	2.5	2.7	2.0	2.6
India	Asia	18365.5	5147000.0	33.9	2.9	1.8	2.6	3.0	3.4
Indonesia	Asia	17377.4	1987000.0	27.9	2.8	2.1	2.7	2.4	3.0
Jamaica	Latin America and the Caribbean	643.7	22629.9	34.7	3.2	2.8	3.3	2.6	3.5
Jordan	Asia	1630.3	64065.9	49.2	3.1	2.6	3.2	3.4	2.3
Lesotho	Sub-Saharan Africa	190.9	4696.5	37.7	2.6	3.1	2.4	2.7	3.0
Malaysia	Asia	41797.0	585000.0	48.6	4.1	3.1	3.6	3.5	2.6
Mali	Sub-Saharan Africa	538.8	26531.2	29.2	2.2	2.5	2.6	2.6	3.0
Mauritius	Sub-Saharan Africa	616.7	19092.8	51.7	3.8	3.8	3.8	3.9	3.9
Mexico	Latin America and the Caribbean	57030.5	1742000.0	33.6	3.2	2.3	3.4	2.5	3.1
Namibia	Sub-Saharan Africa	1130.9	18115.8	45.2	3.1	3.9	3.1	3.2	3.4
Nicaragua	Latin America and the Caribbean	2989.4	23428.3	26.3	2.1	2.7	2.6	2.3	2.6
Nigeria	Sub-Saharan Africa	18396.1	771800.0	24.3	2.0	1.0	2.2	1.8	2.2
Paraguay	Latin America and the Caribbean	3699.7	43422.0	23.3	2.1	2.3	2.5	2.1	2.8

Peru	Latin America and the Caribbean	4267.6	281600.0	35.9	2.7	2.1	3.4	2.3	3.1
Philippines	Asia	8873.2	512200.0	28.0	3.0	1.6	2.9	2.5	3.0
Republic of Moldova	Europe	919.5	13814.4	31.5	2.4	2.8	2.8	2.6	2.8
Romania	Europe	2772.9	330200.0	37.7	2.8	3.2	3.5	3.0	3.4
Rwanda	Sub-Saharan Africa	259.2	13412.5	39.2	2.8	2.6	2.7	2.6	1.8
Senegal	Sub-Saharan Africa	856.4	27166.7	34.3	2.6	2.8	2.8	2.7	2.9
South Africa	Sub-Saharan Africa	15255.9	597900.0	45.3	3.5	3.0	3.5	3.1	3.6
Sri Lanka	Asia	1660.6	169200.0	33.8	2.9	1.9	2.8	3.0	2.5
Thailand	Asia	14496.0	872500.0	35.5	3.3	1.8	3.2	2.9	2.5
The former Yugoslav Republic of Macedonia	Europe	480.3	22332.2	37.3	2.9	2.5	3.2	2.7	3.1
Ukraine	Europe	11542.5	361600.0	25.2	2.4	2.7	2.5	2.2	2.9
Uruguay	Latin America and the Caribbean	1219.4	54617.4	68.3	3.5	3.8	3.4	3.6	4.1
Viet Nam	Asia	8891.7	376600.0	28.1	2.8	3.2	2.4	2.6	1.6
Zambia	Sub-Saharan Africa	863.6	42615.0	31.1	2.3	3.4	2.5	2.5	2.8

Appendix B: Descriptive statistics and correlations

Table B.1
Descriptive statistics of macroeconomic variables

	No. of Obs.	Mean	St. Dev.	Minimum	Maximum
Illicit Financial Flows (log)	470	7.852	1.598	0.828	11.278
$R_t - R_f$	470	102.605	8.272	53.960	145.536
GDP (log)	470	25.323	1.702	21.866	29.626
Interest rate (variance)	470	32.651	151.257	0.000	2,180.000
Exchange rate (variance)	470	0.006	0.019	0.000	0.205
Inflation (variance)	470	14.748	81.957	0.000	1,117.258
FDI/GDP	470	0.02	0.017	0.0002	0.143

Table B.2
Descriptive statistics of institutional quality variables

	No. of Obs.	Mean	St. Dev.	Minimum	Maximum
Corruption	470	35.623	11.860	14.000	73.000
Government Effectiveness	470	2.796	0.591	0.969	4.286
Political Stability	470	2.645	0.756	0.702	4.183
Regulatory Quality	470	2.924	0.562	1.360	4.547

Rule of Law	470	2.676	0.575	1.316	4.419
Accountability	470	2.864	0.640	1.230	4.244

Table B.3
Correlation among main macroeconomic variables

	$R_t - R_f$	GDP (log)	Interest rate (variance)	Exchange rate (variance)	Inflation (variance)	FDI/GDP
$R_t - R_f$	1.00000	0.01778	-0.14378	-0.03288	-0.08039	-0.00214
GDP (log)	0.01778	1.00000	0.03839	0.03589	-0.00769	-0.20399
Interest rate (variance)	-0.14378	0.03839	1.00000	0.21656	0.25170	-0.02773
Exchange rate (variance)	-0.03288	0.03589	0.21656	1.00000	0.76000	-0.04424
Inflation (variance)	-0.08039	-0.00769	0.25170	0.76000	1.00000	-0.01668
FDI/GDP	-0.00214	-0.20399	-0.02773	-0.04424	-0.01668	1.00000

Table B.4
Correlation among institutional quality variables

	Corruption	Gov. Effectiveness	Political Stability	Regulatory Quality	Rule of Law	Accountability
Corruption	1.000000	0.799161	0.583054	0.765443	0.880725	0.610195
Gov. Effectiveness	0.799161	1.000000	0.475131	0.837702	0.874571	0.590829
Political Stability	0.583054	0.475131	1.000000	0.467728	0.620620	0.454734
Regulatory Quality	0.765443	0.837702	0.467728	1.000000	0.785170	0.682964
Rule of Law	0.880725	0.874571	0.620620	0.785170	1.000000	0.642663
Accountability	0.610195	0.590829	0.454734	0.682964	0.642663	1.000000

Appendix C: Regression results. Table C.1: Panel regression analysis of macroeconomic and non-macroeconomic variables and illicit financial flows from 2005 to 2014 for 47 countries

	Dependent variable: Illicit Financial Flows (log)										
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)
Corruption	-0.015*					-0.014*	-0.011	-0.017**	-0.015**	-0.014*	-0.014*
	(0.008)					(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.007)
Reg. Quality	-0.291					-0.340	-0.295				
	(0.234)					(0.233)	(0.208)				
Gov. Effectiveness	0.268					0.320		0.173			
	(0.242)					(0.241)		(0.214)			
Accountability	0.293					0.300			0.114		
	(0.242)					(0.242)			(0.222)		
Rule of Law	0.202					0.142				-0.059	
	(0.287)					(0.286)				(0.233)	
Political Stability	-0.406***					-0.363***					-0.322***
	(0.101)					(0.100)					(0.092)
(Rt-Rf)	0.004	0.003	0.002	0.003	0.002						
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)						
Inflation (var)	0.001	0.0005	-0.0002								
	(0.0005)	(0.0005)	(0.0003)								
Interest rate (var)	0.00002	-0.00001			-0.0001						
	(0.0002)	(0.0002)			(0.0002)						
Exchange rate (var)	-4.748**	-3.715*		-2.112							
	(2.152)	(2.160)		(1.388)							
FDI/GDP	12.426***	12.051***	12.241***	12.165***	12.147***	12.307***	12.381***	12.112***	11.934***	12.064***	12.182***
	(2.334)	(2.355)	(2.343)	(2.337)	(2.354)	(2.279)	(2.288)	(2.282)	(2.296)	(2.282)	(2.250)
GDP (log)	1.398***	1.125***	1.127***	1.123***	1.131***	1.418***	1.375***	1.314***	1.325***	1.324***	1.361***
	(0.162)	(0.131)	(0.131)	(0.131)	(0.131)	(0.161)	(0.163)	(0.159)	(0.159)	(0.159)	(0.157)
Observations	470	470	470	470	470	470	470	470	470	470	470
R^2	0.249	0.205	0.199	0.203	0.199	0.238	0.209	0.206	0.206	0.205	0.228
Adjusted R^2	0.143	0.106	0.103	0.108	0.103	0.139	0.114	0.112	0.111	0.110	0.136
F Statistic	11.374*** (df = 12; 411)	17.892*** (df = 6; 417)	26.027*** (df = 4; 419)	26.662*** (df = 4; 419)	25.974*** (df = 4; 419)	16.234*** (df = 8; 415)	27.650*** (df = 4; 419)	27.224*** (df = 4; 419)	27.100*** (df = 4; 419)	27.037*** (df = 4; 419)	30.905*** (df = 4; 419)
Note:	*p<0.1; **p<0.05; ***p<0.01										

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