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Illicit Financial Flows to and from the Philippines: A Study in Dynamic Simulation, 1960-2011

Dev Kar and Brian LeBlanc

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Global Financial Integrity Wishes to Thank
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We are pleased to present here our report, **Illicit Financial Flows to and from the Philippines: A Study in Dynamic Simulation, 1960-2011.**

We find that over the 52 years covered by this analysis, the Philippines experienced some $410 billion in illicit flows, made up of $133 billion out of the country and $277 billion into the country. Mispricing of trade accounts for the bulk of these flows. In most countries this is accomplished by overpricing imports and underpricing exports. In the case of the Philippines we also see substantial underpricing of imports for the purpose of saving on customs duties and VAT taxes. When such underpricing of imports occurs, there is almost always a comparable means of completing payment for the underpriced imports, usually by overpricing some other imports, underpricing exports, or via alternative money laundering schemes.

This analysis of illicit financial flows affecting the Philippines is the most methodologically rigorous that Global Financial Integrity has produced. We have developed a structural equations model to capture the main interactions between the official and the underground economies. And we have also developed a vector error correction model to ensure the robustness of the correlations shown by the structural equations. These calculations rather clearly demonstrate the following:

- Illicit inflows significantly reduce the collection of total taxes and bolster the underground economy.
- Illicit outflows reduce domestic savings.
- Increases in import duties and VAT taxes lead to a nearly proportionate increase in import tax evasion.

Global Financial Integrity particularly thanks Dev Kar and Brian LeBlanc for the creative and thoughtful work reflected in this study.

We trust that this analysis may spur the Government of the Philippines to consider effective steps to curb illicit financial flows and maximize domestic resources for development. This is the goal of Global Financial Integrity, working in conjunction with government officials.

Raymond W. Baker
President
February, 2014

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Abstract

This study presents a model of the drivers and dynamics of illicit financial flows to and from the Philippines over the period 1960-2011. Illicit flows through unrecorded balance of payments leakages and trade misinvoicing differ from broad capital flight which also includes flows of "normal" or legitimate capital. The larger implication is that models of capital flight that net out a mix of licit and illicit capital are fundamentally flawed. While legitimate capital flows that are recorded can be netted out, flows that are illicit in both directions cannot as the net result would be conceptually equivalent to net crime, an absurd concept. Hence, we argue that traditional models of capital flight understate the problem facing developing countries and they fail to acknowledge the adverse impact that flows in both directions have on them. In contrast, the narrower focus on illicit flows permits an analysis of inflows and outflows, which are treated as separate but interacting transactions that impact both the official and underground economies. Thereby the study affords a fuller understanding of how illicit flows impact a developing country. Starting with a structural equations model the estimation strategy culminates in a vector error correction procedure that yields four salient findings. First, there exists a clear link between illicit inflows and outflows with the latter possibly financing the former. Second, illicit financial inflows drive the underground economy and hamper tax collection. Third, illicit outflows of about US$4.5 billion per annum on average deplete the country's domestic savings, which could hamper sustainable economic growth in the long run. Finally, illicit flows have on average cost the government US$1.5 billion per year in lost tax revenues over the period of 2001-2011. The loss in revenues, representing about 37 percent of the social benefits budget of the consolidated state and local governments in 2011, is significant.

Executive Summary

The following report estimates and examines the illicit flow of money into and out of the Philippines over the 52-year period from 1960 through 2011, the most recent year for which comprehensive data are available.

The study finds **that between 1960 and 2011, illicit financial outflows from the Philippines totaled $132.9 billion,** while **illicit inflows amounted to $277.6 billion.** Thus, over the 52-year time-span, cumulative illicit financial flows into and out of the Philippines totaled $410.5 billion.

The vast majority of money flowing illicitly into and out of the Philippines is accomplished through the misinvoicing of trade, rather than through hot money flows such as unrecorded wire transfers. Of the $132.9 billion that flowed illicitly out of the nation, $95.2 billion (or roughly 72 percent) was via trade misinvoicing.

The dominance of trade misinvoicing as a conduit for illicit flows is even more apparent when examining illicit inflows. Of the $277.6 billion in illicit financial inflows over the years, $267.8 billion (or roughly 96 percent) is attributable to trade misinvoicing.

Moreover, the report conclusively finds that both illicit inflows and illicit outflows are harmful to the Philippines. Illicit outflows drain money from the domestic Philippine economy, they facilitate income tax and customs duty evasion, and they are found to deplete domestic savings. As such, it is concluded that illicit outflows hamper sustainable economic growth over the long-run.

Interestingly, illicit financial inflows are perhaps an even bigger drain on the Philippine economy. Most of the $267.8 billion in illicit inflows due to trade misinvoicing is the result of under-invoicing imports. It is so widespread in the Philippines that **over the past decade, 25 percent of the value of all goods imported into the Philippines– or 1 out of every 4 dollars– goes unreported to customs officials.**

Import under-invoicing is generally driven by a desire to reduce or eliminate the costs of customs duties and tariffs. As taxes on international trade constitute 22 percent of total taxes in the Philippines, such widespread under-invoicing has a severely damaging effect on government revenues.

The report finds that **the Philippine government has lost at least $19.3 billion since 1990 in tax revenue due to customs duties evasion through import under-invoicing alone.** Combined with an additional $3.7 billion in tax revenue lost through export under-invoicing, **the Philippine government has lost at least $23 billion in customs revenue due to trade misinvoicing since 1990.**

Since 2000, illicit financial flows have cheated the government of an average of $1.46 billion in tax revenue each year. To put this in perspective, the $3.85 billion in lost tax revenue in 2011 was more than twice the size of the fiscal deficit and equal to 95 percent of the total government expenditures on social benefits that same year.

While illicit inflows through trade misinvoicing cheat the government of customs duties, the proceeds of those inflows are not found to benefit the official economy. Rather, they are found to drive the underground economy, leading to a further deterioration in governance.

The study estimates the size of the underground economy at roughly 35 percent of GDP and finds that total illicit financial flows correlate nearly perfectly with the World Bank's "Control of Corruption" Governance indicator.

Over the period of 1960-2011, trade misinvoicing relative to total trade increased by 3 percent per annum on average in the case of Philippines and declined by 4 percent per annum in the case of South Korea. This difference in experience highlights the role of governance, which deteriorated significantly in the Philippines and strengthened markedly in South Korea.

The study is the most methodologically rigorous analysis conducted by GFI to date on the role of illicit financial flows into or out of any country.

I. Introduction

Illicit financial flows have increasingly attracted the attention of policymakers and international organizations in recent years. While illegal capital flight comes closest to the term illicit financial flows, the difference extends well beyond terminology. In essence, the former sees "push" factors in developing countries to be solely responsible for capital flight. In contrast, the latter implicitly recognizes that both the "push" factors in developing counties and the "pull" factors inherent in the global shadow financial system are responsible for the generation, transmission, and absorption of illicit flows.

Broadly defined, illicit outflows involve capital that is illegally earned, transferred, or utilized and cover all unrecorded private financial outflows that drive the accumulation of foreign assets by residents in contravention of applicable capital controls and regulatory frameworks. For example, capital may be earned through legitimate means such as the profits of a legitimate business. However, its transfer abroad in violation of applicable laws such as exchange control regulations or corporate tax laws renders the capital illicit, generating an illicit flow.

A 2012 study by Global Financial Integrity (GFI) analyzing illicit financial outflows from all developing countries found that the Philippines was the sixth largest exporter of illicit capital from the developing world over the period 2001-2010, moving up from the 13th position in a precursor study which included both licit and illicit outflows as part of broad capital flight (henceforth capital flight).[2] The current study focusing on the Philippines sheds light on the factors that drive illicit flows to and from the country and how they impact its underground economy. We also present estimates of capital flight to facilitate comparison of the magnitude of gross outflows.

This is perhaps the first case study of the drivers and dynamics of illicit flows to and from a country. The study is important because while there is abundant academic literature on what drives capital flight, systemic studies on purely illicit flows are rare. A study of illicit flows will throw light on the components and the various factors that drive them.

The study is organized as follows: Section II presents a brief discussion of the methodology of estimating illicit flows. We also highlight the reasons why the treatment of inflows and outflows differs from that adopted by past researchers. Section III discusses the pattern of and trends in capital flight and illicit flows to and from the Philippines. We point out possible drivers of capital flight and illicit flows and the fact that the latter may be driven largely by weak governance. In Section IV we present a model that shows how illicit inflows and outflows adversely impact both the underground as well as the official economy. Section V summarizes the key findings of the study.

[2] See, *Illicit Financial Flows From Developing Countries: 2001-2010, Dev Kar and Sarah Freitas, December 2012 and Illicit Financial Flows from Developing Countries Over the Decade Ending 2009* by the same authors.

II. Methodology

The notion that capital flight from developing countries often takes on an illicit form dates back to Bhagwati, Kreuger, and Wilbuswadi's (1974) seminal piece on the determinates of capital flight. Bhagwati and others have argued that extensive capital controls in developing countries not only separate capital markets, they reduce the attractiveness of domestic relative to foreign assets creating incentives for circumventing the controls and accumulating assets abroad.

There are two broad channels through which capital flight to and from a country can be measured—leakages of capital from the balance of payments and the deliberate misinvoicing of external trade in goods. Errors in the compilation of balance of payments as well as, more specifically, recording of merchandise trade both by the reporting country and its trading partners, introduce "white noise" in estimates of capital flight and illicit flows.

Leakages of capital from the balance of payments have typically been estimated through the World Bank Residual (WBR) method and the Hot Money Narrow (HMN) method. The WBR method, which can be thought of as a broad indicator of capital flight, was first developed at the World Bank in 1985. The method involves comparing a country's source of funds (new loans plus net foreign direct investment) against its use of funds (current account balance plus change in reserves). The HMN method is simply based on the net errors and omissions (NEOs) in the balance of payments, with negative figures denoting outward capital flows while positive figures represent inward capital transfers. Typically, WBR estimates are larger than HMN estimates because the former also includes the transfer of some recorded or licit capital, as shown by Claessens and Naude (1992). The HMN method, on the other hand, is the only measure of balance of payments leakages that is thought to capture strictly illicit flows. For this reason, as far as balance of payments leakages are concerned, we favor the HMN to the WBR as we are solely interested in the illicit portion of capital flight from the Philippines.

As is common with numerous other studies on capital flight, we supplement the illicit flows captured by the HMN with estimates of illicit flows that occur through the deliberate manipulation of export and import invoices in the Philippines. It has been shown by Bhagwati (1964), Bhagwati et al (1974), Gulati (1987), Claessens and Naude (1992), Boyce and Ndikumana (2001), and many others that trade misinvoicing is one of the key conduits through which economic agents move money out of and into developing countries illegally. As is commonly understood, traders can move money out of a country illicitly through the under-reporting of exports or the over-reporting of imports. Likewise, capital can be moved into a country illicitly through the over-reporting or exports or the under-reporting of imports.[3]

[3] Trade misinvoicing figures are estimated using advanced economies as a trading partner which are then proportionately scaled up to cover the Philippines total trade with all countries. The reasoning behind this is widely cited in existing academic literature. Please see Bhagwati et al (1974) for an in-depth discussion.

Estimating trade misinvoicing using bilateral trade data in goods has been in vogue in academic literature for close to 50 years. However, since the advent of entrepot economies like Hong Kong, and to a lesser extent Singapore and Dubai, researchers have had to deal with the resulting trade distortions that are created through the re-exportation of goods in order to avoid overestimating capital flight. Whereas most studies have focused on China's trade discrepancies resulting from the re-exports of Chinese goods through Hong Kong, the same methodology has not been applied in the case of other countries such as India and the Philippines, which also re-export many goods through Hong Kong. The method used to estimate trade misinvoicing in this study takes account of all re-export transactions involving the Philippines and Hong Kong. This is the first paper on illicit flows that uses actual data provided by the Hong Kong Census and Statistics Department to correct for the Philippines' re-exports to and from countries involving the use of Hong Kong as an entrepot.

There is another important aspect of the methodology used in this study to estimate capital flight and illicit flows. Traditionally, economists have netted out inward from outward capital flight in the same manner that recorded capital flows in the balance of payments (such as foreign direct investment or portfolio investment) are treated. We argue that while it is useful to net out legitimate or recorded capital flows, the same logic does not hold when the flows are illicit in nature. This study will show that both illicit outflows and illicit inflows have harmful effects on the economy through different channels. Hence, the model treats illicit inflows and outflows separately, thereby allowing us to better analyze the adverse implications such flows have on the country. The traditional method of netting out illicit inflows from outflows as if the inflows are a benefit that offset the cost of outflows would not permit such an analysis. Hence, in our model, export under-invoicing and import over-invoicing transactions are supplemented by negative HMN estimates to derive illicit outflows, while illicit inflows are derived by supplementing export over-invoicing and import under-invoicing by positive HMN estimates.

What of the factors responsible for driving capital flight and illicit flows? Intuitively, one would think that while licit capital flows would tend to be driven by macroeconomic conditions such as high and highly variable inflation, large fiscal deficits, interest differentials, etc., illicit flows should be mainly driven by governance-related factors. However, in several case studies to date, we failed to find such a clear demarcation between the drivers of capital flight and illicit flows. For example, in the case of Mexico and Russia, we found that macroeconomic instability was severe enough to drive not only capital flight but also illicit outflows.[4] By the same token, to the extent that weak governance adversely impacts the business climate, such conditions can also drive out licit capital. A further difficulty in clearly delineating the drivers of capital flight and illicit flows arises from the fact that the former represents a *mix* of both licit and illicit capital with the proportions varying from one country to another (Section III).

[4] Reference, *Russia: Illicit Financial Flows and the Role of the Underground Economy,* Dev Kar and Sarah Freitas, Global Financial Integrity, February 2013 and *Mexico: Illicit Financial Flows, Macroeconomic Imbalances, and the Underground Economy,* Dev Kar, Global Financial Integrity, January 2012.

While macroeconomic conditions are reflected in a variety of related indicators, capturing the state of overall governance through a single indicator is problematic. For instance, World Bank Governance Indicators or those developed by Transparency International have inherent limitations that are recognized by the compilers themselves such as their subjective nature based on opinions gathered through surveys and the limited time span for which these indicators are available. Given the difficulties of empirically measuring the state of overall governance, we proxy it by independently estimating the underground economy. The state of overall governance is intimately linked to the size of a country's underground economy–countries that are poorly governed tend to have a large underground economy while those that are strongly governed have a small underground economy relative to official GDP.[5]

The estimates for the underground economy were derived using Tanzi's (1983) commonly used Currency Demand (CD) approach. The main assumptions behind the CD approach are that transactions in the underground economy are mostly conducted in cash in order to maintain activities away from any formal record and the tax rate is the key incentive to make hidden transactions (Macias 2009). An increase in the tax rate would increase the demand for currency because economic agents would then have greater incentives to participate in the underground economy where transactions are typically settled in cash. The CD approach was preferred over the multiple indicators multiple causes (MIMIC) approach due to difficulties in compiling indicators needed back to 1960. We found that our estimates of the underground economy using the CD approach are quite close to those obtained by the MIMIC method by Schneider et al (2010). Over the period of 1999-2007, which is the period covered in the latter study, our CD-based estimates show that the underground economy of the Philippines was around 39 percent of official GDP which is slightly lower than the 42 percent of GDP found by Schneider et al. A more in-depth discussion of how the underground economy estimates were derived in this study is presented in Appendix 4.

[5] For additional studies on the link between governance and the underground economy, please see Schneider, Buehn, and Montenegro (2010), Torgler and Schneider (2007), Kaufmann (2005), and Drehar and Schneider (2010).

III. Broad Capital Flight and Illicit Flows in the Philippines

a. Capital Flight and Illicit Outflows

As noted at the outset, this study is mainly focused on the factors driving illicit flows. Estimates of broad capital flight over the period 1960 to 2011 are provided in Table 1 to simply facilitate comparison against a popular measure. Capital flight is estimated based on the World Bank Residual (WBR) method adjusted for trade misinvoicing whereas illicit flows are estimated by adjusting the net errors and omissions of the balance of payments (Hot Money Narrow, HMN) for trade misinvoicing. Hence, the adjustment for trade misinvoicing is common to both methods. A few caveats to the estimates shown in Table 1 are in order.

Leakages of capital from the balance of payments captured by the WBR method capture *both* licit and illicit capital (Claessens and Naude, 1993). However, the difference between the WBR and HMN estimates does not necessarily equal licit flows due to two reasons. First, because balance of payments components are compiled on a net basis, a net of gross positions would not equal a net of these components. Second, the HMN measure includes errors in recording that could well be in excess of the gap between the source and use of funds underlying the WBR measure. These errors introduce some noise in the estimation of illicit flows which cannot be filtered out.

Table 1. Philippines: Illicit Financial Flows, 1960-2011
(in millions of constant US dollars, base 2005 or in percent)

	Inflows			Outflows							
Year	WBR (a)	HMN (b)	Trade Misinvoicing (c)	WBR (d)	HMN (e)	Trade Misinvoicing (f)	Total Illicit Inflows (b+c)	Total Illicit Outflows (e+f)	Net Illicit Flows (e+f)-(b+c)	IFF Outflows/ GDP (e+f)/GDP	Outward Capital Flight/GDP (d+f)/GDP
1960-1969	1,046	123	8,324	724	4,918	5,645	8,447	10,563	2,116	3%	2%
1970-1979	1,446	1,682	12,751	12,356	3,428	5,932	14,433	9,360	-5,073	2%	3%
1980-1989	8,096	3,029	20,318	18,176	2,441	13,767	23,347	16,208	-7,139	2%	5%
1990-1999	10,136	3,869	55,990	14,035	14,598	13,504	59,859	28,102	-31,757	3%	3%
2000-2009	2,219	1,101	98,757	23,491	9,388	47,100	99,858	56,488	-43,370	5%	6%
2000	78	0	16,623	0	1,839	5,199	16,623	7,038	-9,585	8%	6%
2001	2,141	700	10,131	0	0	5,668	10,831	5,668	-5,163	7%	7%
2002	0	39	5,875	3,380	0	4,589	5,914	4,589	-1,325	5%	9%
2003	0	0	8,682	3,744	953	6,917	8,682	7,870	-812	9%	12%
2004	0	0	7,274	1,816	283	6,922	7,274	7,205	-69	8%	9%
2005	0	0	5,023	2,700	1,798	8,054	5,023	9,852	4,829	10%	10%
2006	0	0	7,104	3,853	1,539	3,758	7,104	5,297	-1,807	4%	6%
2007	0	0	9,159	3,371	1,961	3,019	9,159	4,980	-4,179	4%	5%
2008	0	0	15,050	1,366	1,015	2,973	15,050	3,988	-11,062	3%	3%
2009	0	362	13,838	3,261	0	0	14,200	0	-14,200	0%	2%
2010	0	0	22,900	4,122	1,780	1,584	22,900	3,364	-19,536	2%	3%
2011	0	0	25,815	335	1,135	7,644	25,815	8,779	-17,036	4%	4%
Cumulative	**22,943**	**9,805**	**267,797**	**81,406**	**37,688**	**95,175**	**277,602**	**132,863**	**-144,739**		
Average	**441**	**189**	**5,150**	**1,565**	**725**	**3,396**	**5,443**	**2,605**	**-2,838**	**3%**	**4%**

As noted before, netting out illicit flows is logically flawed for several reasons. If flows are illicit in both directions, netting them out is conceptually equivalent to net crime which is absurd. By the same token, netting out a mix of licit and illicit capital such as those underlying the WBR estimates is also conceptually problematic. Hence, Table 1 presents constant dollar estimates of illicit inflows and illicit outflows separately as well as on a net basis to highlight the issue. While it appears that the Philippines should be gaining capital on a net-basis through illicit inflows, these flows are merely driving the underground economy and depriving the Philippine government of needed revenue. Section IV shows that both illicit inflows and outflows adversely impact the Philippine economy.

Over the 52 year period of our study, the country lost US$176.6 billion through capital flight (WBR of US$81.4 billion plus trade misinvoicing outflows of US$95.2 billion). This averages to US$3.5 billion per annum over the period 1960-2011. In comparison, the country lost about US$132.9 billion in illicit capital (balance of payments HMN leakages of US$37.7 billion plus trade misinvoicing outflows of US$95.2 billion), or about US$2.6 billion per annum.

On average, broad capital flight exceeded illicit outflows by about 1 percent of GDP per annum. Moreover, capital flight grew at a slightly faster rate per annum than illicit outflows. The difference in trend growth rates suggests that licit outflows grew faster than did illicit outflows perhaps as a result of capital account liberalization and financial globalization. Trade misinvoicing represented nearly 54 percent of capital flight and 71.6 percent of total illicit flows from the country over this period.

Both capital flight and illicit flows were much larger relative to GDP in the decade ending 2009- 6.3 percent and 5 percent respectively- than in any of the four preceding decades when they hovered in the 1.7-3.6 percent range. Government revenues (not shown in the table) also failed to keep pace with capital flight and illicit flows. In the first decade (1960-1969), capital flight accounted for slightly more than a third of revenues collected while illicit flows were equivalent to almost a quarter of total revenues. In the intervening three decades (1970-1999), both types of capital outflows declined relative to revenues only to rise significantly in the last decade ending 2009. Thus by all accounts, capital flight and the more narrowly defined illicit flows became more serious in the last decade ending 2009.

There is also evidence that the deliberate misinvoicing of trade has become more important as a conduit for illicit outflows. Over the first decade (1960-69), trade misinvoicing accounted for 53.4 percent of total illicit outflows which increased to 66.7 percent of flight capital and 83.4 percent of total illicit outflows in the last decade.

The next section explores trends in illicit financial *inflows* into the Philippines and discusses why such flows through trade misinvoicing grew much faster in the decade ending 2009 than in the previous periods.

b. Illicit Inflows and Technical Smuggling

The problem of smuggling has been a long standing issue in the Philippines. The country's multiple points of entry and over 7,000 islands pose a logistical nightmare for customs administration, which is also riddled with corruption. President Benigno Aquino III, who came to power largely on an anti-corruption platform, made the following statement in his July 2013 State of the Union Address:

> *"Instead of collecting the proper taxes and preventing contraband from entering the country, [customs officials] are heedlessly permitting the smuggling of goods, and even drugs, arms and other items of a similar nature into our territory. Where do these people get the gall?"*

There are essentially two kinds of smuggling—"pure" and "technical". Pure smuggling involves the classic and popular method through which goods are brought into or out of a country in a completely unrecorded manner by bypassing all legal channels. Economic models and methods cannot capture the nature and extent of pure smuggling. Technical smuggling, on the other hand, involves utilizing legal channels to bring in smuggled goods by manipulating customs documentation to misrepresent the value, quantity, or quality of goods being imported. Although this can happen in many ways, our estimates are only able to detect technical smuggling through the under-invoicing of imports through which more goods are brought into a country than are officially declared at the Customs. This study focuses exclusively on technical smuggling and references to smuggling relate only to the portion that can be attributed to related trade misinvoicing. Estimates of the amount of technical smuggling in this study (as in other studies) are likely to be understated due to a number of reasons.

First, the method we use, namely a comparison of bilateral trade data on goods, cannot capture "same-invoice faking" whereby traders collude through word-of-mouth to misinvoice a transaction on the same invoice. Second, the method used cannot capture misinvoicing through which a good in a high-tariff band is deliberately misclassified into a lower tariff band. Finally, as Yang (2008) notes, many imports into the Philippines are smuggled by routing them through one of many no-tax Export Processing Zones (EPZs) before they are illegally diverted back for domestic consumption. In this form of smuggling, the importer has no incentive to alter the value of the invoice because imports into EPZs are tariff-free as they are supposed to be used for export production.

Over the period of 1960-2011, 95 percent of the $277.6 billion dollars of goods and capital that have been smuggled arise out of import under-invoicing. Many researchers such as Bhagwati (1964, 1974), de Boyrie et al (2007), Ndikumana and Boyce (2001), have shown that there is a link between import tariffs and import underinvoicing. As effective duty rates increase so does import under-invoicing. Mishra et al (2007) found that in the case of India, a one percent increase in tariffs increase duty evasion by about 0.1 percent. Fisman and Wei (2004) found that in trade between China and Hong Kong, a one percent increase in tax (sum of tariff and VAT on imports), leads to a 2-3 percent increase in evasion.

Although trade liberalization programs in the Philippines enacted in the early 1990s have substantially reduced protectionism, taxes on international trade still make up approximately 22 percent of total taxes, compared to just 0.3 percent in the case of OECD countries. In fact, the massive scale of import under-invoicing in the Philippines is seriously hampering the collection of government revenues.

Import under-invoicing steadily increased in real terms since 1960. During the weakly-governed Marcos regime (1965-1986) approximately 13 percent of all imports on average were under-invoiced. However, over the decade ending 2011, approximately 25 percent of imports or *one out of every four dollars of imported goods into the Philippines were not properly invoiced.* Much of the increase in import under-invoicing is thought to be due to developments in the shipping industry, specifically the increased use of container vans for seaborne cargo. Alano (1984) notes that the huge twenty- to fourty- foot containers in which goods are shipped are very difficult to inspect and have created logistical problems for Philippines customs. Pre-shipment inspections (PSI), which were initiated by the World Bank in the 1980s as a means to limit the smuggling of goods in containers, have not reined in smuggling in the Philippines.

We find no rational reason why economists should continue to net out import under-invoicing due to technical smuggling from outward capital flight. The fact that academic literature on capital flight is based on such a methodology helps no one, least of all policymakers in developing countries. In the case of the Philippines, the loss of tax revenue from import under-invoicing is staggering. Assuming that the un-reported imports would have been taxed at the effective rate of taxation (total import taxes collected as percent of total imports) on international trade, the country has lost $19.3 billion dollars since 1990 through import under-invoicing alone. Combined with an additional $3.7 billion lost since 1990 due to export under-invoicing, the total estimated loss in tax revenues through trade misinvoicing amounts to at least $23 billion.

c. Illicit Financial Flows and Governance

The World Bank compiles a set of indicators covering six aspects of governance—voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption. There are some inherent limitations of the World Bank Governance Indicators. The most important limitation is the relatively short time span for which country data are available. The limited availability of data does not permit their use in most time series analyses. Second, the indicators are based on questionnaire-based surveys of public and private enterprises, which are necessarily subjective. The World Bank warns that these indicators cannot be relied upon to gauge year-to-year changes in governance in any country. Rather, the indicators capture the overall and specific aspects of governance in a country in the long run (in our case over 16 years, 1996-2011). Finally, governance is a complex state involving six different aspects wherein some indicators can show an improvement while others register a significant deterioration. There is no single index that captures the overall state of governance in a country.

Table 2. Philippines and Korea: Trade Misinvoicing and Control of Corruption, 1960-2011

Year	Average Percent of Total Trade Misinvoiced (percent) 1/		Control of Corruption Index (percentile rank) 2/ 3/	
	Philippines	Republic of Korea	Philippines	Republic of Korea
1960-1969	14%	27%	…	…
1970-1979	10%	7%	…	…
1980-1989	15%	8%	…	…
1990-1999	13%	6%	…	…
2000-2011	20%	6%	32	69
Trend Rate of Growth	**3%**	**-4%**	**-53%**	**8%**

1/ Calculated as export and import misinvoicing over total trade
2/ Data only available beginning in 2000. A higher percentile rank indicates stronger control of corruption
3/ Trend rate of growth calculated as percent change between 2000 and 2011 for Control of Corruption Index

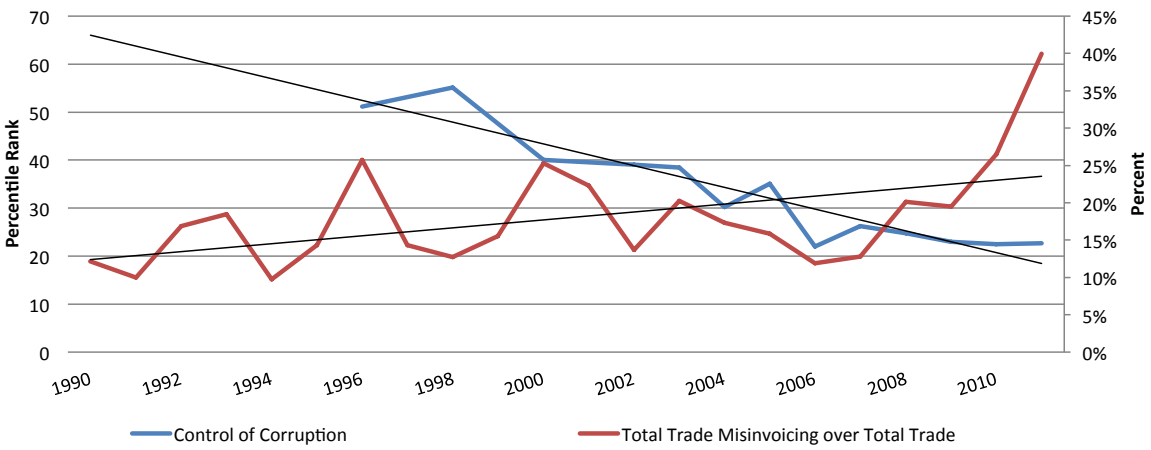
We can illustrate the link between trade misinvoicing and the control of corruption in light of the experience of the Philippines and Korea (Table 2). We chose Korea for comparison because it (i) is one among few Asian countries that became a developed country during the period of our study (ii) adopted an export-led growth strategy with increasing trade openness and (iii) managed to strengthen governance through relatively better control of corruption.

Table 2 presents estimates of trade misinvoicing as percent of total trade of the Philippines and Korea over the four decades, 1960-1999 and the 12-year period 2000-2011. We also present the control of corruption index compiled by the World Bank for the last period for which the data are available. The data show that total trade misinvoicing in the Philippines increased from an average of 14 percent of total trade during 1960-1969 to an average of 20 percent of total trade in the last period with small fluctuations in the intervening period. For the period as a whole, trade misinvoicing in the Philippines grew at a trend rate of 3 percent per annum. In comparison, trade misinvoicing in Korea declined sharply as a proportion of total trade from 27 percent in 1960-1969 to just 6 percent of total trade since the 1990s which reflect a negative trend rate of growth of 4 percent per annum.

Almost concomitant with the increase in trade misinvoicing, the control of corruption in the Philippines worsened as it slipped to the 32nd percentile over the 12-year period 2000-2011, meaning fully 68 percent of all countries in the world managed better control of corruption. In contrast, Korea managed to strengthen the control of corruption on an average of 8 percent per annum over the same period moving up to the 69th percentile rank.

Chart 1 plots the percentile rank of the Philippines among all countries of the world related to the control of corruption and total illicit flows (inflows plus outflows) through trade misinvoicing as a share of the country's total trade. The chart shows the steady decline in the control of corruption in the Philippines since 1995, the earliest year for which data are available. Over a period when governance is slipping by most measures, inflows and outflows of illicit capital through trade misinvoicing as a share of total trade has also been increasing, a remarkable development captured by the two intersecting trend lines.

Chart 1. Illicit Financial Flows vs. Control of Corruption in the Philippines
(percentile rank or in percent)



Given these limitations, we use independent estimates of the size of a country's underground economy in order to capture the overall state of governance. The underground economy serves as a good proxy for overall governance. In countries where overall governance is weak, the underground economy is large and growing, whereas in strongly governed countries the underground economy is small and possibly shrinking further. In the next section, we will examine the drivers and dynamics of illicit financial flows from the Philippines and the various channels through which the underground economy comes to play a prominent role.

Box 1. Tax Evasion through Trade Misinvoicing

A firm can lower its taxable income by deliberately altering export or import invoices in order to take advantage of various tax incentives and benefits. These incentives can be hard to pinpoint, however, due to complexities in tax codes and differences in applicable tax and tariff rates. Over the 52 year period of this study, however, our estimates show that firms in the Philippines have been consistently, and increasingly, under-reporting the value of *both* their imports and exports, suggesting efforts to evade taxes.

Import tariffs have been the cornerstone of many developing countries' budgets due to narrow income tax bases and low per capita incomes. When an importer of goods under-reports the value of a dutiable good, they pay less in tariffs than they would have had they reported the full amount. Thus, an importer can smuggle goods into a country, duty free, through import under-invoicing. It could be argued that firms that under-report imports may

actually face higher taxable income due to lower reported costs (since imports show up as a cost of doing business on a firm's balance sheet). We make no adjustment for this, however, because it's more accurate to assume that undeclared, smuggled goods are probably sold in undeclared, unreported ways. The model presented in this study gives posits that illicit inflows through import under-invoicing drive the underground economy in the Philippines.

Likewise with exports, a firm can transfer abroad a portion of their taxable profits by under-reporting their exports. For example, a firm in the Philippines selling $10,000 worth of rice to a buyer in Japan may, by one means or another, only declare the transaction to be worth $8,000 on their invoice to Philippines customs officials. The exporter will then instruct the Japanese purchaser to forward $8,000 to his bank account in Manila and then the remaining $2,000 to his offshore account in Hong Kong. Since the rice exporter's reported revenue is now $8,000 as opposed to $10,000, he is liable for significantly lower tax payment on that earned income. Meanwhile, $2,000 worth of valuable foreign exchange is held abroad in his bank account in Hong Kong, untaxed and unavailable for capital formation.

In order to put a figure on the amount of tax revenue forgone through trade misinvoicing in the Philippines, we multiply the amount of import under-invoicing by the *effective* tariff rate on imports and the amount of export under-invoicing by the effective tax rate on incomes, profits, and capital gains. Due to the complex nature of the Philippines tax code, this is as close as we can come to estimating tax evasion through trade misinvoicing in the Philippines

That being said, we believe these estimates of tax evasion to be significantly conservative for the following two reasons:

1. Importers are more likely to smuggle goods with higher duties than the average effective tariff rate we use. It is relatively safe to assume that the risk of smuggling increases as the tariff rate of a product increases relative to that of other goods.
2. Our import under-invoicing figures only catch a fraction of the ways in which goods can be smuggled into the Philippines.

Despite these limitations, our estimates show that over $12 billion in tax revenue has been forgone due to trade misinvoicing in the Philippines since 1990, or $1.46 billion per year on average since 2000. To put this into perspective, the $3.85 billion in lost tax revenues in 2011 was over twice the size of the fiscal deficit and also constitutes 95 percent of the Philippines total government expenditures on social benefits during the same year.

Table 3: Philippines Loss of Tax Revenue from Trade Misinvoicing, 1990-2011

(in millions of US dollars)

Year	Imports				Exports				Total Loss of Revenue
	Under-invoicing	Over-invoicing	Effective Rate of Taxes on International Trade 1/	Tax Loss	Under-invoicing	Over-invoicing	Effective Rate on Incomes, Profits and Capital Gains 2/	Tax Loss	
1990	1,260	0	15%	192	728	0	5%	33	225
1991	910	0	19%	171	847	0	5%	41	212
1992	2,422	0	20%	491	888	0	5%	46	537
1993	3,108	0	18%	554	1,026	0	5%	52	606
1994	1,775	0	14%	253	833	0	5%	45	298
1995	3,996	0	15%	592	993	0	6%	58	649
1996	7,670	0	14%	1,055	2,873	0	6%	180	1,236
1997	5,455	0	9%	495	1,731	0	7%	117	612
1998	7,066	0	7%	490	437	0	6%	27	517
1999	10,720	0	8%	849	0	468	6%	-27	823
2000	14,657	0	7%	1,008	4,585	0	6%	259	1,268
2001	9,185	0	6%	579	5,139	0	6%	295	874
2002	5,411	0	6%	315	4,227	0	5%	228	543
2003	8,178	0	6%	473	6,515	0	5%	351	824
2004	7,035	0	5%	386	6,695	0	5%	364	749
2005	5,023	0	6%	302	8,054	0	6%	459	761
2006	7,333	0	8%	604	3,879	0	6%	233	838
2007	9,724	0	9%	874	3,205	0	6%	199	1,073
2008	16,592	0	11%	1,773	3,278	0	6%	205	1,978
2009	14,243	0	11%	1,580	0	958	5%	-52	1,528
2010	25,569	0	12%	2,954	1,768	0	5%	96	3,050
2011	29,734	0	11%	3,328	8,805	0	6%	517	3,846
Cumulative	197,067	0		19,320	66,507	1,426		3,728	23,048
Average	8,958	0		878	3,023	65		169	1,048

Source: GFI estimates of trade misinvoicing, World Bank data on different components of tax revenue

1/ Effective rate of taxes on international trade defined as total taxes on international trade over imports.

2/ Effective rate on incomes, profits, and capital gains defined as taxes on incomes, profits, and capital gains over GDP.

IV. A Model of Illicit Financial Flows to and from the Philippines

a. Estimation Strategy

We develop a structural equations model (SEM) to capture some of the main interactions between the official and underground economies. The basic objective of the SEM is to examine the drivers and dynamics of illicit financial flows to and from the Philippines. In doing that, the model allows us to revisit a fundamental assumption underlying much of the academic literature on capital flight. The existing literature is replete with studies that net out inward capital flight from outward transfers as if the former is a genuine return of capital that offsets the loss of capital either in the current or an earlier period through one channel or another. Hence, traditional academic literature treats capital flight in much the same way as recorded financial flows through the balance of payments in that net flows represent a net gain or loss benefit or cost to an economy.

The model consists of nine stochastic equations six of which relate to the official economy (prices, central government revenues, central government expenditures, money supply, total taxes, and domestic savings) and three to the underground economy (illicit inflows, illicit outflows, and the underground economy). While the underground economy is larger than illicit flows through trade misinvoicing, such flows represent the only systemic measures of illicit transactions that can be estimated in a time series context. In addition, the SEM includes an equation for generating inflationary expectations using the adaptive approach whereby current inflationary expectations are modeled as a weighted average of current inflation and inflationary expectations in the previous period along the lines developed by Cagan (1956).

For a number of reasons, we chose the two-stage least squares (2SLS) technique to estimate the SEM. First, it has long been proven that ordinary least squares (OLS) estimates produce inconsistent estimates in SEMs due to the “simultaneity bias” arising from the use of endogenous variables. Thus, we use instrumental variables constituting of exogenous variables elsewhere in the system and the 2SLS technique to correct for this inconsistency. Second, given our limited sample size, the three-stage least squares (3SLS) method offers no gain in asymptotic efficiency over the 2SLS.

All time series variables used in the SEM are shown to be non-stationary in levels and integrated of order I(1), which invalidates many standard inference procedures. The standard recommendation for correcting first-order non-stationarity when using 2SLS is to model the equation in first difference. The drawback of this approach is that it results in loss of information when studying long-run relationships. However, as Hsiao (1997) has shown, 2SLS in levels still produces consistent estimates in the presence of non-stationarity and cointegration in SEMs. While the speed of convergence of the SEM can vary, Hsiao’s main point was that empirical researchers need not

worry about nonstationarity and cointegration, but rather the typical problems of identification and simultaneity bias. In short, 2SLS is still a robust method of estimating a SEM.

We also model four key equations in our SEM with a vector error correction model (VECM) to ensure robustness and confidence in the SEM estimates. VECM has been increasingly used by researchers to model the relationships between cointegrated variables of the same order. An advantage of the VECM approach is that it requires the researcher to make few *a priori* assumptions about the economy, which is a limitation of the SEM, and it also produces both long-run and short-run estimates. We then compare the VECM and SEM estimates and point out the implications for significant differences.

We now consider the various components of the SEM.

b. Official Economy

The equation for the price level is derived from a standard formulation of the demand for real money balances (Aghevli and Khan, 1978). Regarding fiscal policy the hypothesis is that government expenditures tend to respond faster to inflation than revenues due to inflation clauses built into government contracts.

Moreover, in order to reduce the real burden of taxes, taxpayers tend to delay paying taxes in an inflationary environment. The asymmetrical response of government expenditures and revenues to inflation tends to expand the fiscal deficit which can further drive inflation if the government is forced to rely on inflationary finance because the pool of domestic savings is low or if the market for government bonds is underdeveloped.

Furthermore, in the official economy, monetary and fiscal policies have an impact on the money supply. According to the Brunner-Meltzer (1963) model, nominal money supply is a function of the monetary base, the ratio of currency to demand deposits, the fiscal balance ratio (defined as the ratio of government expenditures to government revenues), and the rate of interest.[6] Next, total direct and indirect tax collections depend not only on nominal income and taxes collected in the previous period but also negatively on the extent of tax evasion through trade misinvoicing (e.g., import under-invoicing and smuggling).

Illicit inflows and outflows can have varying impact on tax collections. While outflows may not significantly reduce tax collections because the capital being transferred abroad is illicit (due to corruption and other illegal activities) and therefore not taxable, inflows are clearly driven by import tax evasion with clear implications for taxes collected.

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[6] We reject the Aghevli-Khan (1978) version because it is an identity except for the errors due to linearization; reference, Dev Kar, *Government Deficits and Inflation in Brazil: The Experience During 1948-1964,* IMF Working Paper, DM/81/76, International Monetary Fund, October 19, 1981.

c. Underground Economy

The SEM also postulates that illicit inflows and outflows drive each other. There is some evidence from the literature on trade-based money laundering that in countries with weak governance, significant capital outflows through trade misinvoicing may be linked to massive illicit inflows to finance transactions in the black market for foreign exchange or "hawala" transactions. The Philippines is one of the top recipients of worker's remittances which could drive the demand for informal "hawala" markets and the black market for foreign exchange. Trade-based money laundering may appear particularly attractive to those engaged in hawala transactions which require a large pool of both domestic and foreign currencies.[7]

The under-invoicing of imports requires substantial foreign currency held abroad in order to finance the unreported and underreported imports. Strict capital controls in the Philippines make it risky and difficult for smugglers to convert local to foreign currency to pay for the smuggled goods. They find it much easier to pay for the unreported goods using funds held in their offshore accounts. While Boyce and Zarsky (1988) put forward this thesis, this is the first study to test it empirically. This is one way through which illicit inflows and outflows would be linked. Furthermore, if pre-shipment inspections (PSI) since 1987 have led to lower import under-invoicing, then illicit inflows should be negatively related to the dummy variable PSI (set equal to 1 in the post-1987 period and zero for the period before).

Illicit outflows on the other hand can be expected to be negatively related to growth in per capita incomes—higher economic growth can boost confidence in the domestic economy which may reduce capital flight through trade misinvoicing. Also, larger trading volumes relative to GDP (or greater trade openness) may well encourage more outflows if no measures are taken to strengthen governance, particularly regarding Customs administration.

The underground economy is formulated as a function of inflows of illicit capital, the real level of tax collection, the rate of interest, the urban population, exchange rate, and real GDP. Most of these factors have been modeled by past researchers. For instance, Bajada (1999) pointed out that economic agents participate in the underground economy to either avoid paying taxes or take advantage of some government policies. They could make fraudulent claims on government programs (such as taking advantage of favorable exchange rates for certain imports or subsidies for exports) or seek to circumvent foreign exchange regulations (such as export proceeds surrender requirements). So we introduce a proxy for the effective rate of taxation (defined as total taxes as a share of GDP). We would expect the effective rate of taxation to be directly related to the underground economy—as the rate increases, the underground economy should expand as a result of more tax evasion. Inflows of illicit capital are likely to be positively related to the underground economy rather than drive the official economy.

[7] For a discussion of the link between "hawala" and trade misinvoicing see, for example, *Hawala*, Mohammed El-Qorchi, Finance and Development, December 2002, Volume 39, Number 4, International Monetary Fund, Washington DC. See also, *Trade Based Money-Laundering,* Financial Action Task Force, June 23, 2006.

Dell'Anno (2003) showed that the Italian underground economy was negatively related to the growth of real GDP. Gutmann (1977), Feige (1979), and Tanzi (1983), and Cosimo et. al (2011) showed that a variety of social and institutional variables can induce people to use currency transactions to avoid paying taxes—one of these variables is the degree of urbanization as measured by the urban population. In addition, given the lack of a consistent time series on black market exchange rates, the official exchange rate may be positively related to the underground economy to the extent that increases in the rate (depreciation) provide a further incentive to exchange foreign for domestic currency. Given the complexity of modeling the underground economy, this equation has two endogenous and four exogenous variables.

The 10-equation system is represented as follows: [8]

$$log\ P_t = \gamma a_0 - \gamma a_1\ logY_t + \gamma a_2\ \Pi_t - \gamma a_3\ log\ (M/P)_{t-1} + log\ M_t \quad (1)$$

$$log\ R_t = -\alpha b_0 + \alpha b_1\ (log\ Y_t + log\ P_t) + \alpha b_2\ log\ R_{t-1} \quad (2)$$

$$log\ G_t = \beta c_0 - \beta c_1\ log\ Y_t + \beta c_2\ log\ (G/P)_{t-1} + \beta c_3\ log\ P_t \quad (3)$$

$$log\ M_t = -pd_0 + pd_1\ log\ MB_t + pd_2\ log\ IR_t - pd_3 logCR_t + pd_4(log\ G_t - logR_t) \quad (4)$$

$$log\ TTax_t = -\delta e_0 + \delta e_1\ log\ GDP_t + \delta e_2 TTax_{t-1} - \delta e_3 IInf_t \quad (5)$$

$$log\ S_t = \lambda f_0 - \lambda f_1\ log\ P_t + \lambda f_2\ log\ IR_t + \lambda f_3\ log\ GDPcap_t - \lambda f_4\ log\ IOutf_t \quad (6)$$

$$log\ IInf_t = \xi\ g_0 + \xi g_1 Outf_t + \xi\ g_2 log\ (ImpTax/Imports)_t - \xi g_3 Ycap + \xi g_4 PSI_t \quad (7)$$

$$log\ IOutf_t = \mu h_0 + \mu h_1\ log\ linfl_t + \mu h_2 log\ (TTax/GDP)_t + \mu h_3\ log\ TrdOpn_t + \mu h_4\ log\ ExtDebt_t - log\ Ycap_t \quad (8)$$

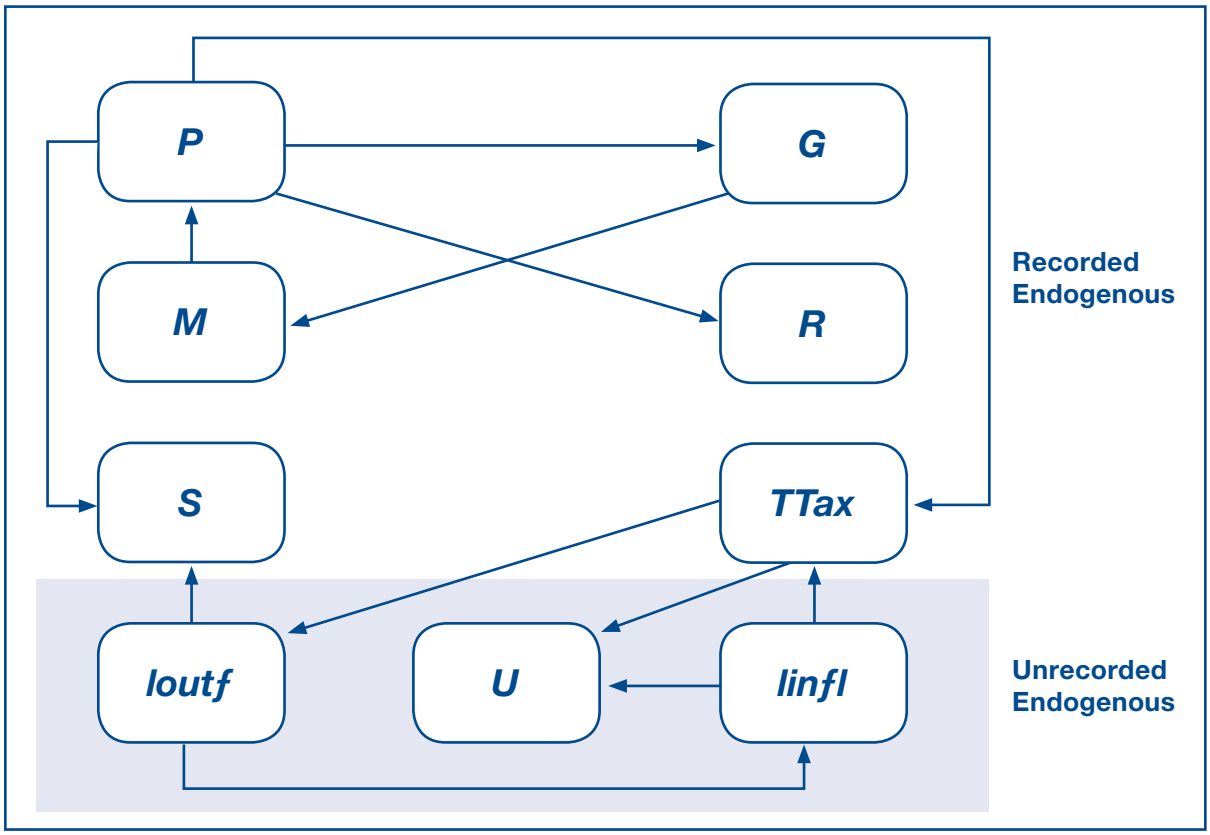
$$log\ U_t = \psi j_0 + \psi j_1 log\ IInf_t + \psi j_3\ log(TTax/GDP)_t - \psi j_6 log\ IR_t + \psi j_4 log\ UPop_t + \psi j_5\ log\ ER_t - \psi j6 logY_t \quad (9)$$

$$\Pi_t = \sigma \Delta logP_t + (1-\sigma)\Pi_{t-1} \quad (10)$$

The variables are: P, the price level (consumer price index); Y, real GDP; Π_t, the expected rate of inflation; M, broad money supply defined as money plus quasi-money; R, central government revenues; G, central government expenditures; IR, the rate of interest on saving and time deposits; CR, the currency to demand deposit ratio; TTax, total direct and indirect taxes collected; IOutf, illicit financial outflows; S, total domestic savings; IInf, illicit financial inflows; PSI is a dummy variable set equal to 1 when pre-shipment inspections were introduced in 1987 and zero for the earlier period without such inspections; Ycap, real income per capital; GDPcap, nominal income per capita; U, the domestic underground economy; TrdOpen, trade openness defined as exports plus imports as a ratio of GDP; UPop, the urban population; ER, and the nominal exchange rate to the US dollar.

[8] Note that the final equation based on the Cagan (1956) model, is definitional. It specifies how inflationary expectations are generated through an error-learning mechanism based on economic agents' current and past experience with inflation.

Chart 2. The Philippines: Schematic Representation of Endogenous Variables in the SEM



d. Dynamic Simulation of the SEM

Diagnostics

We apply the rank and order condition on each structural equation of the SEM to confirm that all equations are identified. Each equation is uniquely derived and cannot be formulated as a linear combination of other equations of the SEM. The order condition for each equation is satisfied in that the number of excluded variables is equal or higher than the number of included endogenous variables minus one.

In general, the Durbin-Watson (DW) test for serial correlation is not applicable in SEMs. Specifically, the DW test is invalid for equations where the dependent variable appears as a lagged regressor (as in the price level, government revenue, government expenditure, and total tax equations). We therefore use the Breusch-Godfrey (B-G) test for serial correlation in individual equations of the SEM. As the ρ-value of the B-G test (based on the Lagrange Multiplier method, LM) shown in Table 4 is greater than 0.10, this confirms the absence of serial correlation in each equation of the SEM.

Given that the errors in the equations are not serially correlated, the next concern is whether the presence of heteroskedasticity invalidates the diagnostics such as the standard errors, t statistics, and F statistics. We test for autoregressive conditional heteroskedasticity (ARCH), which is a leading form of dynamic heteroskedasticity (i.e., the error terms have time-varying variances). If ARCH is present, then volatility in the dependent variable is a function of the errors in explaining it and the (conditional) variance of the errors varies over time. The critical values presented in Table 4 rule out ARCH effects for all equations besides government expenditures which is remodeled to show robust standard errors.

Findings

Dynamic simulation of the SEM underscores four salient findings. We discuss these first rather than present the results of the estimated equations in the order they are listed (Appendix Table 3).

First, illicit inflows significantly reduce the collection of total taxes. This tax evasive nature of illicit inflows also drives the underground economy. Hence, far from being a benefit, illicit inflows adversely impact the economy by reducing tax collections and boosting the underground economy.

Second, illicit outflows also adversely impact the economy in two ways—they reduce domestic savings (as residents prefer foreign over domestic assets) and significantly drive illicit inflows. Boyce and Zarsky (1988) speculated that "funds which appear to have fled the country (Philippines) are in fact used to finance unrecorded imports". The simulation results support the contentions of Boyce and Zarsky and other researchers.

Third, an increase in the effective import tax (defined as total import duties plus VAT taxes on imports as a share of total imports) leads to an almost proportionate increase in import tax evasion. This perhaps points to the need for strengthening customs administration through a comprehensive reform program should the government wish to implement an effective tariff policy.

Fourth, while money supply had a significant impact on the price level, the SEM finds no evidence that over the time period 1960-2011, the fiscal balance played any significant role in driving the money supply. This is because during the latter part of the period, deficits were financed not only by monetary expansion, but also through sales of government bonds and through foreign borrowing. Under the circumstances, there can be no clear link between money supply and fiscal deficits.

All the estimated coefficients had the correct signs and significance with minor exceptions. In the order that equations appear in Table 4, the expected rate of inflation, lagged real money balances, and money supply were all significant at the 99 percent confidence interval in explaining the

price level, while the real income was only mildly significant at the 90 percent level. Revenues are significantly determined by those collected in the previous period as well as nominal income in the current period. Government expenditures on the other hand are driven by real expenditures in the previous period and prices. In other words, the government tries to maintain the real value of expenditures. The monetary base was found to be the most significant determinant of the money supply whereas the interest rate on bank deposits and the currency ratio (defined as currency in circulation as a share of demand deposits) are both significant only at the 90 percent level. We found no evidence that the fiscal balance was a significant factor in driving the money supply.

Like revenues, total taxes collected in the previous period are the most significant (99 percent confidence interval) determinant of taxes collected in the current period. Nominal income was also found to be positively significant at the 99 percent confidence level while we can say with 95 percent confidence that illicit financial inflows (due to import tax evasion) reduce tax collections in the current period. However, we only found a weak link between illicit outflows through trade misinvoicing and reduction in the collection of total taxes. This is a reasonable finding given that illicit outflows are mainly generated through the under-invoicing of exports which hardly attract any taxes. As noted before, we found that illicit inflows and outflows seem to drive each other. That being said, there is no evidence that illicit outflows through trade misinvoicing are linked to external debt through a revolving door mechanism.

Inflation reduces domestic savings significantly while an increase in real per capita income increases it. Again, illicit outflows tend to reduce domestic savings to the extent that foreign assets are acquired in lieu of domestic instruments. Total taxes collected has the expected negative sign in explaining illicit outflows (i.e., the higher the taxes collected, the less the evasion) but they are only significant at the 90 percent level. Taxes to GDP can increase mainly due to a widening of the tax base or an increase in effective rates. In the short run, it is extremely difficult to widen the tax base due to deficiencies in the tax collection mechanism (such as lack of tax payer IDs) and in structural rigidities (such as a large informal economy). If taxes increase mainly as a result of an increase in effective rates then higher rates would be positively related to the underground economy—the higher the rate, the larger the underground economy due to evasion as confirmed by the SEM. Interest rates have a negative impact on the underground economy because higher deposit rates channel more funds into the official economy rather than into illicit assets. The urban population has a positive impact on the underground economy as more people who are unable to find jobs in the official economy turn to the informal sector to sustain themselves. The nominal exchange rate seems to have no impact on the underground economy while the level of real income is negatively related to it.

Table 4. Structural Equation Estimates

Two Stage Least Squares

$$log\ P_t = 0.554 - 0.149\ log\ Y_t + 0.952\Pi_t - 0.780\ log\ (M/P)_{t-1} + 0.958\ log\ M_t$$
[0.56] [-1.84]* [6.76]*** [-14.01]*** [31.92]***

R^2 = 0.9984 **SE** = 0.0629 **B-G** = 0.1821 **ARCH** = 0.8827

$$log\ R_t = -1.197 + 0.196\ (log\ Y_1 + log\ P_t) + 0.810\ log\ R_{t-1}$$
[-2.04]** [2.51]*** [11.42]***

R^2 = 0.9989 **SE** = 0.0779 **B-G** = 0.4681 **ARCH** = 0.7566

$$log\ G_t = 2.430 - 0.076\ logY_t + 0.803\ log\ (G/P)_{t-1} + 1.124\ log\ P_t$$
[1.16] [-0.43] [8.67]*** [19.22]***

R^2 = 0.9973 **SE** = 0.1239 **B-G** = 0.3787 **ARCH** = 0.0121

$$log\ M_t = - 0.327 + 1.028\ log\ MB_t + 0.514\ log\ IR_t - 0.713\ logCR_t + 6.503\ (log\ G_t - log\ R_t)$$
[-0.55] [19.64]*** [1.74]* [-1.90]* [1.36]

R^2 = 0.9602 **SE** = 0.5093 **B-G** = 0.1238 **ARCH** = 0.6270

$$log\ TTax_t = -2.44 + 0.568\ log\ GDP_t + 0.776\ log\ TTax_{t-1} - 0.250\ log\ IInfl_t$$
[-2.46]** [2.70]*** [6.17]*** [-2.30]**

R^2 = 0.9970 **SE** = 0.1326 **B-G** = 0.4724 **ARCH** = 0.2785

$$log\ S_t = 7.907 - 0.194\ logIOutf_t - 1.08\ log\ P_t + 2.417\ log\ GDPcap_t + 0.141\ logIR_t$$
[3.02]*** [-1.79]* [-2.19]** [6.14]*** [1.73]*

R^2 = 0.9959 **SE** = 0.1302 **B-G** = 0.6984 **ARCH** = 0.5398

$$logIInfl_t = 10.069 + 1.327\ log\ IOutf_t + 1.049\ log\ (ImpTax/Imports)_t - 0.990\ log\ Ycap_t - 0.132\ PSI$$
[0.52] [4.72]*** [2.02]** [-0.50] [-0.22]

R^2 = 0.9068 **SE** = 0.8626 **B-G** = 0.1594 **ARCH** = 0.9263

$$logIOutf_t = 1.943 + 0.803\ log\ IInfl_t + 1.195\ log\ TrdOpen - 1.56\ log(TTax/GDP)_t + 0.204\ log\ ExtDebt_t - 0.648\ log\ Ycap_t$$
[0.16] [3.58]*** [1.18] [-1.73]* [0.97] [-0.54]

R^2 = 0.9296 **SE** = 0.6922 **B-G** = 0.1101 **ARCH** = 0.8916

$$logU_t = 30.34 + 0.578\ log\ IInfl_t - 0.720\ log\ IR_t + 4.94\ logUpop_t + 1.484\ log(TTax/GDP)_t + 0.027\ logER_t - 1.037\ log\ Y_t$$
[4.99]*** [2.94]*** [-4.87]*** [2.79]*** [2.36]** [0.08] [-2.08]**

R^2 = 0.9832 **SE** = 0.3107 **B-G** = 0.5023 **ARCH** = 0.5132

$$\Pi_t = 0.9\Delta logP_t + 0.1\Pi_{t-1}$$

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t-statistics are reported in brackets

*,**,*** indicates significance at the 10%, 5%, and 1% level respectively

B-G indicates the *p*-value of the Breusch-Godfrey Serial Correlation LM Test where a value greater than 0.10 represents the absence of serial correlation.

ARCH indicates the *p*-value of the ARCH test for heteroskedasticity where a value greater than 0.10 represents the absence of serial heteroskedasticity

Chart 3. The Philippines: Results of Dynamic Simulation with SEM, 1960-2011

e. Results of the Vector Error Correction Model (VECM)

In order to ensure confidence in the results of our SEM, we re-modeled four key equations of the SEM (illicit outflows, illicit inflows, domestic savings, and the underground economy) using a vector error correction method to address potential non-stationarity and cointegration of variables. All variables in the model are shown to be of order I(1) and Johansen cointegration tests show the existence of one cointegrating vector for all four equations. Tests for unit-roots were conducted using the ADF, Phillips-Perron, and KPSS tests while the cointegration tests were conducting using both the Johansen and Engle-Granger tests for cointegration. All four equations were free of serial correlation as shown by the VAR residual LM test results. Finally, stability of the VECMs was confirmed given that all inverse roots of the autoregressive characteristic polynomial lie inside the unit-root circle.[9] The short-run results of the VECM are then normalized around the dependent variables in order to obtain long-run estimates for each equation. The estimated long-run estimates of illicit inflows, outflows, domestic savings, and the underground economy are shown in Table 4.

Table 5. Normalized Cointegrating Coefficients from Selected VECM Specifications

$logIOutf_t$ = 49.60 + 1.03 $log\ IInfl_t$ + 0.55 $log\ TrdOpen$ – 4.49 $log(TTax/GDP)_t$ + 0.015 $log\ ExtDebt_t$ + 3.364 $log\ Ycap_t$
(0.244)*** (0.991) (0.605)*** (0.255) (1.448)***
Log likelihood = 224.08 ξ = -0.505***

$logIInfl_t$ = 13.14 + 0.89 $log\ IOutf_t$ + 0.76 $log\ (ImpTax/Imports)_t$ + 1.50 $log\ Ycap_t$
(0.102)*** (0.227)*** (0.801)***
Log likelihood = 68.36 ξ = -0.788***

$log\ S_t$ = 9.72 – 0.133 $logIOutf_t$ – 0.83 $log\ P_t$ + 2.09 $log\ GDPcap_t$ – 0.06 $logIR_t$
(0.022)*** (0.125)*** (0.121)*** (0.049)
Log likelihood = 214.00 ξ = -0.655***

$logU_t$ = 22.56 + 0.39 $log\ IInfl_t$ – 0.70 $log\ IR_t$ + 3.75 $logUpop_t$ + 1.40 $log(TTax/GDP)_t$ + 0.43 $logER_t$ – 0.54 $log\ Y_t$
(0.061)*** (0.086)*** (0.560)*** (0.277)*** (0.121)*** (0.186)***
Log likelihood = 519.00 ξ = -0.757***

Standard errors are reported in parentheses
*,**,*** indicates significance at the 10%, 5%, and 1% level respectively.
ξ: error correction term indicating percent correction in the model per period

The first VECM equation shows that *illicit inflows seem to have a strong impact on illicit outflows in the long run.* Furthermore, better tax performance (as measured by the share of total taxes collected to GDP) seems to imply a reduction in illicit outflows. Thus, the long run results augur well for an aggressive tax policy that relies on broadening the tax base rather than simply increasing effective rates which could trigger more evasion. Another interesting finding is that cetirus paribus

[9] Please see Appendix 2 for detailed test results.

(e.g., no improvements in governance), *higher real per capita income would simply drive more illicit outflows in the long run*; in contrast, the SEM result is insignificant. Trade openness was not found to be a significant driver of illicit outflows either in the SEM or VECM formulations. Also, we did not find a long run "revolving door" effect between illicit outflows and external debt. This is not surprising given that external debt has actually been coming down in recent years, particularly in relation to GDP.

The second VECM suggests that in the long run, a 1 percent increase in illicit outflows will increase illicit inflows by 0.89 percent—a smaller impact than found by the SEM wherein inflows would increase by 1.3 percent. Moreover, a 1 percent increase in the effective import tax rate would increase illicit inflows through duty evasion by 0.76 percent. Similarly, a 1 percent increase in real per capita incomes would increase illicit inflows by 1.5 percent if all other variables were to be held constant.

The negative relation between illicit outflows and domestic savings is more significant (at the 1 percent level) in the VECM compared to the SEM where it is weaker. A one percent increase in outflows can be expected to reduce domestic savings by 0.13 percent in the long run. The VECM did not find any strong relationship between bank deposit rates and domestic savings in the long run.

The final VECM finds that all variables such as illicit inflows, bank deposit rates, urban population, tax performance, exchange rate, and real income are significant at the 1 percent level in driving the underground economy in the long run. While all signs are consistent with the SEM formulation, their significance and impact vary. For example, while a one percent increase in inflows will increase the underground economy by 0.39 percent, a similar increase in the urban population would expand the latter by 3.75 percent. *An increase in the effective tax rate would also increase the underground economy significantly presumably by increasing the incentive to evade them*—a 1 percent increase in the rate would increase the underground economy by 1.4 percent in the long run.

V. Conclusion

This paper analyzes illicit financial flows to and from the Philippines. Such unrecorded capital flows are generated through the deliberate misinvoicing of external trade and through balance of payments leakages. The estimates of illicit flows presented in this study support the findings of past researchers such as Boyce and Zarsky (1988), Beja (2005), and others that undervaluation and smuggling of imports is a widespread practice in the Philippines. In comparison, illicit outflows through export under-invoicing, rather than import over-invoicing, is the predominant method of transferring illicit capital from the country.

Simulations using a structural equations model (SEM) show how illicit flows and the underground economy interact with the official economy. Specifically, we find statistically significant interaction between illicit inflows and outflows with the former reducing the collection of total taxes through import undervaluation and smuggling. The vector error correction model (VECM) shows that in the long run, illicit outflows reduce domestic savings as residents prefer foreign over domestic financial instruments. The VECM and to some extent the SEM results show that higher import or overall tax rates would lead to greater import duty evasion or growth in the underground economy. Hence, the government should broaden the tax base in the long run rather than raise effective rates in the short run in order to implement an effective tax reform. The SEM and VECM results show that illicit flows adversely impact both the official economy by lowering the savings rate and the collection of taxes (thereby widening the fiscal deficit at a given level of expenditures) but also by driving the underground economy directly and indirectly. Robust VECM results are consistent with those obtained through dynamic simulations of a SEM which was estimated by the two-stage least squares method.

Appendix 1: Illicit Financial Outflows and Inflows Tables

Table 1A. Philippines: Illicit Financial Inflows, 1960-2011

(in millions of constant US dollars, base year 2005)

Year	HMN	Export Over-invoicing	Import Under-invoicing	HMN + Trade Misinvoicing
1960	0	0	1,067	1,067
1961	0	0	684	684
1962	123	0	535	657
1963	0	0	1,131	1,131
1964	0	0	784	784
1965	0	0	907	907
1966	0	0	770	770
1967	0	0	1,034	1,034
1968	0	0	1,104	1,104
1969	0	0	1,355	1,355
1970	0	0	1,256	1,256
1971	0	0	937	937
1972	0	0	723	723
1973	0	10	1,443	1,453
1974	0	92	1,183	1,275
1975	0	0	1,219	1,219
1976	0	0	1,136	1,136
1977	676	0	1,446	2,122
1978	336	0	2,345	2,682
1979	670	0	2,407	3,076
1980	294	0	2,084	2,378
1981	0	0	2,221	2,221
1982	0	0	1,494	1,494
1983	0	0	4,519	4,519
1984	122	0	3,683	3,805
1985	988	0	1,674	2,662
1986	60	0	1,747	1,807
1987	117	0	2,576	2,692
1988	815	0	3,676	4,491
1989	633	0	4,739	5,372
1990	886	0	1,883	2,769
1991	0	0	2,042	2,042
1992	0	0	5,866	5,866
1993	115	0	4,202	4,317
1994	207	0	2,338	2,545
1995	0	0	8,521	8,521
1996	0	0	12,081	12,081
1997	0	0	6,637	6,637
1998	0	0	8,465	8,465
1999	2,661	548	13,543	16,752
2000	0	0	16,701	16,701
2001	700	0	12,271	12,971
2002	39	0	5,875	5,914
2003	0	0	8,682	8,682
2004	0	0	7,274	7,274
2005	0	0	5,023	5,023
2006	0	0	7,104	7,104
2007	0	0	9,159	9,159
2008	0	0	15,050	15,050
2009	362	872	12,966	14,200
2010	0	0	22,900	22,900
2011	0	0	25,815	25,815
Cumulative	**9,805**	**1,523**	**266,273**	**277,602**
Average	**189**	**29**	**5,121**	**5,443**

Table 1B. Philippines: Illicit Financial Outflows, 1960-2011

(in millions of constant US dollars, base year 2005)

Year	HMN	Export Under-invoicing	Import Over-invoicing	HMN + Trade Misinvoicing
1960	211	550	0	761
1961	248	708	0	956
1962	0	478	0	478
1963	944	36	0	980
1964	321	254	0	575
1965	452	146	0	599
1966	487	447	0	934
1967	421	666	0	1,087
1968	1,157	883	0	2,039
1969	676	1,476	0	2,153
1970	744	630	0	1,375
1971	685	639	0	1,324
1972	495	732	0	1,227
1973	84	0	0	84
1974	269	0	0	269
1975	660	1,301	0	1,961
1976	491	258	0	749
1977	0	547	0	547
1978	0	812	0	812
1979	0	1,012	0	1,012
1980	0	1,426	0	1,426
1981	1,045	1,383	0	2,429
1982	736	1,533	0	2,270
1983	659	1,035	0	1,694
1984	0	1,562	0	1,562
1985	0	2,005	0	2,005
1986	0	1,458	0	1,458
1987	0	1,170	0	1,170
1988	0	1,314	0	1,314
1989	0	880	0	880
1990	0	1,088	0	1,088
1991	198	1,215	0	1,413
1992	724	1,235	0	1,960
1993	0	1,387	0	1,387
1994	0	1,098	0	1,098
1995	2,683	1,273	0	3,956
1996	3,718	3,577	0	7,295
1997	6,377	2,106	0	8,483
1998	898	523	0	1,422
1999	0	0	0	0
2000	1,839	5,199	0	7,038
2001	0	5,668	0	5,668
2002	0	4,589	0	4,589
2003	953	6,917	0	7,870
2004	283	6,922	0	7,205
2005	1,798	8,054	0	9,853
2006	1,539	3,758	0	5,297
2007	1,961	3,019	0	4,979
2008	1,015	2,973	0	3,988
2009	0	0	0	0
2010	1,780	1,584	0	3,364
2011	1,135	7,644	0	8,780
Cumulative	**37,688**	**95,175**	**0**	**132,863**
Average	**725**	**1,830**	**0**	**2,555**

Appendix 2: Diagnostic Tests for the VECM

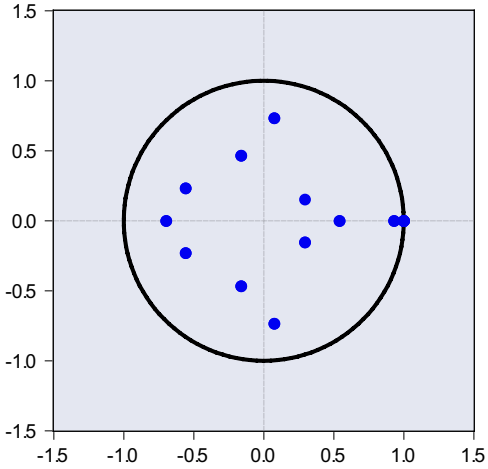
Table 2A. Unit-Root Tests

Variable	Model	Levels			First Difference		
		ADF	PP	KPSS	ADF	PP	KPSS
log TTax	Constant	-1.84	-1.73	0.85###	-5.66***	-5.65***	0.38#
	Constant & Trend	-0.07	-0.07	0.21##	-5.92***	-5.92***	0.15##
log TrdOpen	Constant	-2.23	-2.16	0.86###	-6.12***	-6.12***	0.31
	Constant & Trend	-5.34***	-1.32	0.07	-6.41***	-6.42***	0.11
log IInf	Constant	-0.71	-1.04	0.98###	12.11***	-12.85***	0.22
	Constant & Trend	-4.87***	-4.91***	0.09	11.99***	-12.77***	0.16##
log GDP	Constant	-1.47	-1.28	0.86###	-5.43***	-5.40***	0.35#
	Constant & Trend	0.15	-0.21	0.21##	-4.72***	-5.68***	0.19##
log M	Constant	-1.33	-1.06	0.86###	-4.70***	-4.71***	0.29
	Constant & Trend	0.14	-0.40	0.14#	-4.87***	-4.87***	0.22###
P	Constant	-2.33	-3.76***	0.26	-8.87***	-15.95***	0.50##
	Constant & Trend	-4.38***	-3.79**	0.22###	-8.87***	-20.06***	0.37###
log R	Constant	-2.32	-2.27	0.86###	-6.17***	-6.16***	0.50##
	Constant & Trend	0.15	0.05	0.21##	-6.72***	-6.72***	0.12#
MULT_LN	Constant	-2.30	-2.35	0.68##	-6.47***	-6.53***	0.23
	Constant & Trend	-1.53	-2.02	0.06	-6.65***	-6.69***	0.08
E_LN	Constant	0.07	0.20	0.86###	-7.85***	-7.89***	0.09
	Constant & Trend	-2.69	-2.70	0.10	-7.78***	-7.82***	0.08
log Ycap	Constant	-0.9	-0.88	0.85###	-4.41***	-4.43***	0.10
	Constant & Trend	-2.21	-1.88	0.13#	-4.36***	-4.39***	0.10
log U	Constant	-1.89	-2.03	0.96###	-7.67***	-7.66***	0.49##
	Constant & Trend	-0.46	-0.25	0.24###	-7.06***	-8.27***	0.07
log Y	Constant	-1.18	-1.02	0.97###	-4.53***	-4.56***	0.15
	Constant & Trend	-2.33	-1.78	0.18##	-4.58***	-4.62***	0.09
log P	Constant	-1.09	-0.95	0.85###	-4.78***	-4.78***	0.31
	Constant & Trend	-0.07	-0.54	0.18##	-4.74***	-4.91***	0.22###
log IOutf	Constant	-1.34	-1.15	0.95###	-6.92***	-10.77***	0.32
	Constant & Trend	-4.50***	-5.25***	0.08	-6.88***	-13.55***	0.42###
log Exports	Constant	-1.62	-1.67	0.85###	-6.44***	-6.41***	0.31
	Constant & Trend	-0.43	-0.36	0.12##	-6.69***	-6.67***	0.13#
log Imports	Constant	-1.40	-2.23	0.86###	-5.97***	-5.97***	0.49##
	Constant & Trend	0.05	0.05	0.18##	-6.45***	-6.46***	0.11
log ExtDebt	Constant	0.84	0.41	0.74##	-5.91***	-6.10***	0.27
	Constant & Trend	1.57	-1.73	0.21##	-4.79***	-6.30***	0.07
log IR	Constant	-1.77	-1.63	0.25	-8.08***	-8.40***	0.36#
	Constant & Trend	-1.87	-1.47	0.24###	-8.54***	-16.48***	0.37###
*log*CR	Constant	-2.30	-1.39	0.18	-8.59***	-8.49***	0.15
	Constant & Trend	-1.52	-1.49	0.15##	-8.60***	-8.52***	0.10
log ER	Constant	-1.85	-1.87	0.95###	-7.07***	-7.07***	0.22
	Constant & Trend	-1.99	-2.10	0.14#	-7.36***	-7.35***	0.05
log ImpTax	Constant	-1.52	-1.42	0.94###	-5.84***	-5.86***	0.26
	Constant & Trend	-0.87	-1.00	0.21##	-4.42***	-6.03***	0.07
*log*MB	Constant	0.35	0.34	0.86###	-7.47***	-7.46***	0.17
	Constant & Trend	-2.07	-2.18	0.123#	-7.39***	-7.38***	0.16##
log G	Constant	-2.00	-2.22	0.86###	-8.15***	-8.09***	0.52##
	Constant & Trend	-0.18	0.21	0.19##	-8.83***	-8.82***	0.14#
	none						

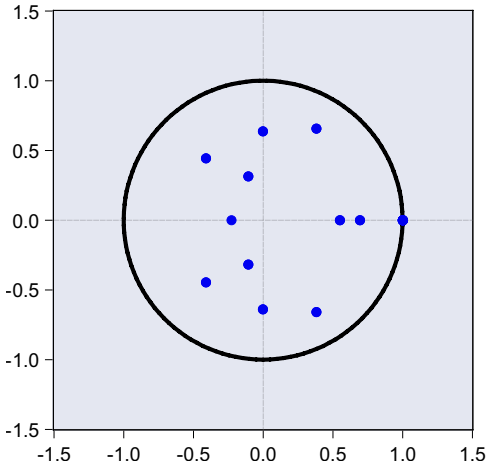
*,**,*** represent the presence of non-stationarity for the ADF and PP tests at the 1%, 5%, and 10% level respectively
#,##,### represemt the presence of stationarity for the KPSS test at the 1%, 5%, and 10% level respectively

Table 2B. Stability Tests for Vector Error Correction Models

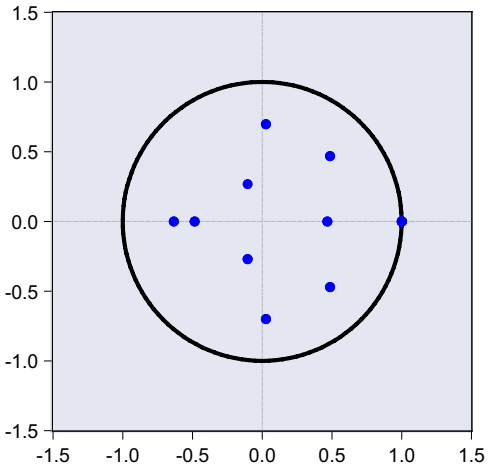
Illicit Financial Outflows:
Inverse Roots of AR Characteristic Polynomial



Domestic Savings:
Inverse Roots of AR Characteristic Polynomial



Illicit Financial Inflows:
Inverse Roots of AR Characteristic Polynomial



Underground Economy:
Inverse Roots of AR Characteristic Polynomial

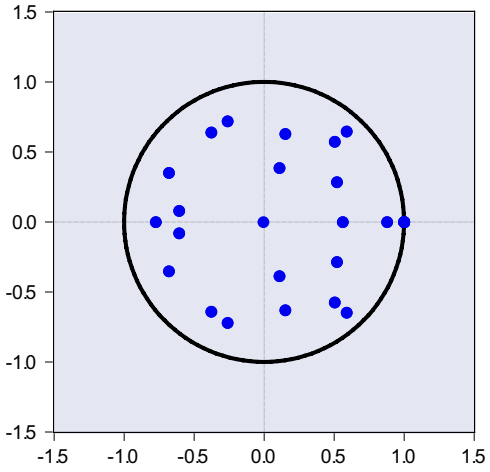


Table 2C. Johansen Cointegration Tests

Illicit Financial Inflows

Null hypothesis	Alternative hypothesis		5% Critical value	1% Critical value
$\lambda_{trace}\ tests$		$\lambda_{trace}\ value$		
r = 0	r > 0	62.14	47.86*	54.68*
r ≤ 1	r > 1	23.24	29.8	35.46
r ≤ 2	r > 2	9.3	15.49	19.94
r ≤ 3	r > 3	0.99	3.84	6.63
$\lambda_{max}\ tests$		$\lambda_{max}\ value$		
r = 0	r > 0	38.89	27.58*	32.72*
r ≤ 1	r > 1	13.94	21.13	25.86
r ≤ 2	r > 2	8.31	14.26	18.52
r ≤ 3	r > 3	0.99	3.84	6.63

* denotes the number of cointegrating vectors

Domestic Savings

Null hypothesis	Alternative hypothesis		5% Critical value	1% Critical value
$\lambda_{trace}\ tests$		$\lambda_{trace}\ value$		
r = 0	r > 0	83.94	69.82	77.82*
r ≤ 1	r > 1	49.6	47.86*	54.68*
r ≤ 2	r > 2	24.94	29.8	35.46
r ≤ 3	r > 3	6.67	15.49	19.94
r ≤ 4	r > 4	1.52	3.84	6.63
$\lambda_{max}\ tests$		$\lambda_{max}\ value$		
r = 0	r > 0	34.24	33.88*	39.37
r ≤ 1	r > 1	24.66	27.58	32.72
r ≤ 2	r > 2	18.27	21.13	25.86
r ≤ 3	r > 3	5.14	14.26	18.52
r ≤ 4	r > 4	1.53	3.84	6.63

* denotes the number of cointegrating vectors

Table 2C. Johansen Cointegration Tests (cont)

Underground Economy

Null hypothesis	Alternative hypothesis		5% Critical value	1% Critical value
λ_{trace} tests		λ_{trace} value		
r = 0	r > 0	168.33	125.62	135.97
r ≤ 1	r > 1	108.33	95.75	104.96*
r ≤ 2	r > 2	73.13	69.82*	77.82
r ≤ 3	r > 3	42.28	47.86	54.68
r ≤ 4	r > 4	19.94	29.8	35.46
r ≤ 5	r > 5	8.01	15.49	19.64
r ≤ 6	r > 6	2.07	3.84	6.63
λ_{max} tests		λ_{max} value		
r = 0	r > 0	60.00	46.23*	52.31*
r ≤ 1	r > 1	35.20	40.08	45.87
r ≤ 2	r > 2	30.85	33.88	39.37
r ≤ 3	r > 3	22.34	27.58	32.72
r ≤ 4	r > 4	11.93	21.13	25.86
r ≤ 5	r > 5	5.94	14.26	18.52
r ≤ 6	r > 6	2.07	3.84	6.63

* denotes the number of cointegrating vectors

Illicit Financial Outflows

Null hypothesis	Alternative hypothesis		5% Critical value	1% Critical value
λ_{trace} tests		λ_{trace} value		
r = 0	r > 0	119.27	95.75	104.96*
r ≤ 1	r > 1	73.88	69.82*	77.82
r ≤ 2	r > 2	45.42	47.86	54.68
r ≤ 3	r > 3	24.13	29.8	35.46
r ≤ 4	r > 4	11.03	15.49	19.94
r ≤ 5	r > 5	5.22	3.84	6.63
λ_{max} tests		λ_{max} value		
r = 0	r > 0	45.39	40.08*	45.87
r ≤ 1	r > 1	28.46	33.88	39.37
r ≤ 2	r > 2	21.3	27.58	32.72
r ≤ 3	r > 3	13.09	21.13	25.86
r ≤ 4	r > 4	5.82	14.26	18.52
r ≤ 5	r > 5	5.22	3.84	6.63

* denotes the number of cointegrating vectors

Table 2D. Engle-Granger Cointegration Tests

Equation	ADF		Phillips-Perron		KPSS 1/	
	Constant	*Constant & Trend*	Constant	Constant & Trend	Constant	Constant & Trend
Illicit Financial Inflows	-6.01***	-4.32***	-5.42***	-5.41***	0.08	0.08
Illicit Financial Outflows	-5.74***	-5.76***	-5.84***	-5.81***	0.04	0.04
Underground Economy	-6.01***	-4.32***	-6.01***	-5.95***	0.04	0.04
Domestic Savings	-4.42***	-4.25***	-5.04***	-4.89***	0.05	0.05

*** indicates the presence of stationary residuals for the ADF and Phillips-Perron unit root tests
1/ The absence of a "#" in the KPSS unit root test indicates the presence of stationary residuals

Appendix 3: Advanced Economy Country List for Trade Misinvoicing Calculation

Table 3. Advanced Country List for Trade Misinvoicing Estimates

Country Name
Australia
Austria
Belgium
Canada
Cyprus
Czech Republic
Denmark
Finland
France
Germany
Greece
Hong Kong
Iceland
Ireland
Israel
Italy
Japan
Korea
Luxembourg
Malta
Netherlands
New Zealand
Norway
Portugal
Singapore
Slovak Republic
Slovenia
Spain
Sweden
Switzerland
Taiwan, Province of China
United Kingdom
United States

Source: IMF Direction of Trade Statistics

Appendix 4: Estimation of the Underground Economy

Measuring the informal, or underground, sector of an economy has been of interest to many researchers concerned with development. There are primarily methods of estimating the underground economy:

1. Direct methods: methods which involve taking public surveys and conducting interviews with actual informal workers;
2. Indirect methods: methods in which discrepancies in official records are used as proxies to obtain the size of the informal sector;
3. Multiple Indicators Multiple Causes (MIMIC) approach: as made popular by Schneider (2002), MIMIC models aim to link unobserved variables to observed ones to derive the size of the underground economy.

Due to data constraints, we model our estimates of the underground economy in the Philippines using Tanzi's Currency Demand approach, which falls under the "indirect method" category of techniques. This has been the approach of many studies on informality, and was pioneered by Tanzi (1983). We model our estimates very similar to Tanzi's, but along the lines of Macias (2009) due to data limitations and the issues related to using the ratio of currency demand to holdings of money. Our final model was as follows

$$C_t = \beta_0 + \beta_1 Y_t + \beta_2 (1+EffTax)_t - \beta_t IR_t$$

Where C is the currency held outside banks deflated by the price level, Y is real income, EffTax represents the total effective tax rates represented by total taxes collected over total income, and IR is the nominal effective interest rates.

Due to the presence of non-stationarity and cointegration in all the variables involved, we use a VECM to model the above equation. The coefficients are then normalized around C to obtain the long-run equation. The crux of the currency demand approach lies in comparing what currency holdings outside depository institutions would be if the tax rate were to fall to zero, assuming that taxes are one of the chief causes of individuals remaining in the informal sector. The difference between the above model estimated with taxes and without taxes gives us an estimate of the extra currency in the economy. This figure is then multiplied by the velocity of money, similarly to Tanzi (1983) and numerous other studies, to get our final estimate.

Chart 4B and Table 4C shows the relationship between the underground economy and the formal economy in the Philippines over the period of 1960-2011. We believe these estimates to be rather robust considering our closeness to Schneider's (2002) estimates. Schneider's underground economy estimates for the Philippines for the period of 1999-2007 averaged 41.9 percent of GDP while ours averaged a similar, yet slightly lower, figure of 39 percent of GDP.

Chart 4B. Philippines Underground Economy vs. Official Economy, 1961-2011
(in millions of pesos)

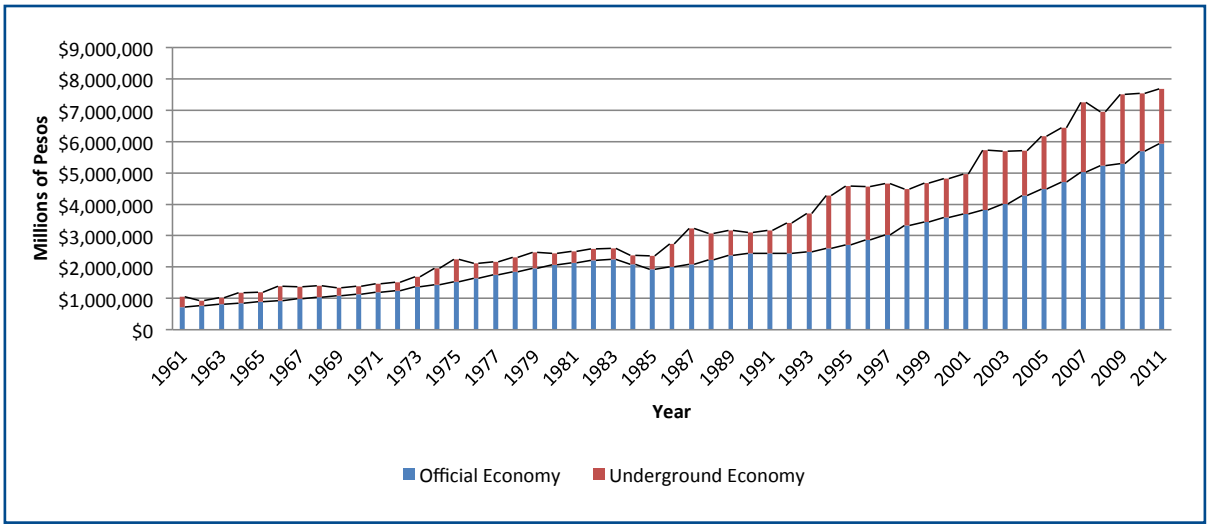


Table 4C. Philippines Underground Economy to GDP, 1960-2011
(in percent)

Year	Underground Economy to Real GDP
1960-1969	35.2%
1970-1979	27.8%
1980-1989	26.7%
1990-1999	46.5%
2000-2009	38.8%
2000	34.8%
2001	34.8%
2002	50.0%
2003	42.0%
2004	33.4%
2005	37.7%
2006	36.6%
2007	44.1%
2008	32.6%
2009	41.7%
2010	32.3%
2011	29.7%
1960-2011	34.8%

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Notes

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