GLOBAL FINANCIAL INTEGRITY

Brazil: Capital Flight, Illicit Flows, and Macroeconomic Crises, 1960-2012

Dev Kar
September 2014

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We are pleased to present here our report, *Brazil: Capital Flight, Illicit Flows, and Macroeconomic Crises, 1960-2012*.

Illicit financial outflows averaged US$14.7 billion per year for the period from 2000 to 2009. For the period from 2010 to 2012, illicit financial outflows increased to an average of US$33.7 billion per year. These outflows constitute about 1.5 percent of Brazil's growing GDP for both of these periods. In terms of total magnitude, the country is seventh among developing countries, all of which suffer from this phenomenon.

GFI's analysis is based on data filed by Brazil with the International Monetary Fund and the World Bank, enabling a breakdown of unrecorded outflows into balance of payments leakages and trade misinvoicing. Balance of payments leakages have across the decades generally been on the order of 10 to 20 percent of the total, meaning that trade misinvoicing generally accounts for 80 to 90 percent of the drainage of capital from the country.

For many years we have observed a hesitancy in Brazil to address problems of capital flight and illicit outflows, as many scholars and officials believed that the nation's strong sense of patriotism and burgeoning economy worked to dampen this possibility. It is, however, real and merits serious attention by policymakers.

GFI has produced earlier in-depth studies of illicit financial outflows affecting India, Russia, Mexico, and the Philippines and more limited analyses of similar issues affecting China, Ghana, Kenya, Tanzania, Uganda, and Mozambique. With this study of Brazil, we utilize for the first time a comprehensive structural equations model (SEM) to examine factors that influence licit and illicit flows from the country. We find that the illicit outflows—comprising some 68 percent of the total—make up the largest component of the outflows of capital. Furthermore, we find that the dominant factor correlating to both of these components of outflows is the impact of the underground economy, which both drives and is driven by illicit outflows, confirming the importance of dealing with this aspect of the economy and its roots in governance concerns.

These observations lead to the conclusion that more citizens operating in the underground economy need to be brought into the framework of the legal economy, and that central to accomplishing this goal is the curtailment of trade misinvoicing. Brazil has a distinctive approach to the issue of misinvoicing, particularly that part of the problem encountered with multinational

corporations—abusive transfer pricing. In particular, subjecting transactions with tax havens to special scrutiny has restrained exaggerated charges for intangibles and services. The government should do much more to curtail both the under-pricing of exports and the over-pricing of imports through additional proactive deterrence measures, rather than retroactive punishment.

GFI thanks Dev Kar, chief economist, Brian LeBlanc, associate economist, and Joshua Simmons, policy counsel, for their outstanding work on this analysis. GFI also thanks the Ford Foundation and its former program officer, Leonardo Burlamaqui, Brazilian himself, for years of generous contributions both to this work and to earlier studies.

Raymond W. Baker
President

September 2014

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Abstract

This study examines capital flight and illicit financial flows from Brazil against a backdrop of macroeconomic crises. Over the 53 year period covered in this study, the Brazilian economy experienced high inflation, hyperinflation, large fiscal deficits, and crushing external debt, which led to debt reschedulings and prolonged recessions. The paper sheds light on the behavior of capital flight in response to such shocks and how illicit flows from the country move in tandem with its underground economy. Given the existing gap in academic literature, we use a full-scale structural equations model to analyze the link between broad capital flight and illicit flows on the one hand and macroeconomic and governance-related drivers on the other. Specifically, we model fiscal operations, monetary policy, price developments, GDP, and capital formation along with the behavior of the underground economy and capital flight in order to study their interactions. A salient model result is that, while illicit flows both drive and are driven by the underground economy, broad capital flight is driven by macroeconomic drivers such as monetary policy and investment conditions as well as illicit flows. Informed by the results of the model, we conclude with policy recommendations to curtail the cross-border transfer of such capital.

Executive Summary

This is a study of illicit financial flows and capital flight (consisting of both licit as well as illicit capital) from Brazil, which we have undertaken for three main reasons. First, existing studies on capital flight from Brazil are dated. Second, there are no studies that focus on outflows of illicit capital from Brazil, let alone over a long time span. Finally, Brazil is a large exporter of illicit capital. Global Financial Integrity's latest annual report, *Illicit Financial Flows from Developing Countries: 2002-2011*, published in December 2013, found that the country illegally transferred abroad on average US$19.3 billion per annum over the decade ending 2011, the seventh highest of such outflows from the developing world.

Outflows of illicit capital totaled US$401.6 billion from 1960 through 2012. Illicit outflows increased from an annual average of 1.49 percent of GDP in the 1960s to 1.71 percent of GDP in the 1980s before receding to 1.54 percent of GDP in the last decade ending 2009. Outflows have continued at roughly 1.47 percent of GDP in the most recent three-year period, 2010-2012, for which data are available. Most illicit outflows occur through trade misinvoicing rather than via balance of payments leakages. The deliberate under-invoicing of exports rather than the over-invoicing of imports is the preferred method to transfer illicit funds from Brazil.

In terms of magnitude, Brazil lost a total of US$590.2 billion during the period (or about 2.2 percent of GDP on average) through broad capital flight, which consists of illicit as well as licit funds. Capital flight increased sharply from the 1960s through the 1990s, although the pace of outflows declined somewhat over the last decade ending 2009. There is no doubt that serious macroeconomic shocks related to hyperinflation and near-debt defaults triggered the continued increase in capital flight in the 1990s. Starting at about 2.6 percent of GDP on average during the 1960s, capital flight fell to 1.9 percent of GDP in the last decade ending 2009 before increasing to 2.1 percent of GDP in the last three years, 2010-2012.

We developed models to estimate the size of the underground economy and to explore the factors driving both capital flight and illicit flows from Brazil over the period 1965-2011. One of the most interesting findings is that illicit financial flows both drive and are driven by Brazil's underground economy. Moreover, the models confirm that the underground economy had a significant negative impact on investment, implying that, as the underground economy grew, it tended to divert resources away from the official economy. Likewise, we found that even broad capital flight, consisting of a mix of licit and illicit flows, is driven mainly by governance-related factors such as illicit flows. This is not surprising given that, on average, illicit flows comprise some 68 percent of capital flight.

We found that broad capital flight behaved in a more predictable manner than illicit outflows in response to macroeconomic crises. This is to be expected because the licit component of broad capital flight tends to be more sensitive to macroeconomic shocks than the illicit component, where

the primary motivation is sheltering illicit assets from regulatory scrutiny and confiscation even in the best of times. In general, capital flight seems to increase in the immediate aftermath of a crisis, perhaps in proportion to the severity of the crisis.

Econometric model tests provided several insights into how macroeconomic conditions and the overall state of governance impact both capital flight and illicit flows, as well as how they impact the "above-ground," or official, economy. The salient findings can be summarized as follows.

Capital flight and illicit financial flows tend to drive each other. This is the first study where a definite link between the two has been established through the use of a structural equations model. We found that a 1.0 percent increase in illicit financial flows is correlated to a 0.83 percent increase in broad capital flight.

We also examined the link between economic growth, income inequality, and capital flight. While the lack of an unbroken series on the Gini coefficient prevented its inclusion in our model, regression analysis with a shorter time period (1970-2011) showed that worsening income inequality also seems to drive capital flight, although the relationship is only significant at the 90 percent level. A possible explanation is that rising income inequality implies a larger number of high net worth individuals (HNWIs). It is the HNWIs rather than the common man that can finance capital flight and take advantage of the world's shadow financial system to shelter wealth.

Drawing upon the results of the model, we examine the legal and policy environment in Brazil, and conclude with suggested policy measures to curtail capital flight and illicit flows from Brazil. Our finding that illicit flows through trade misinvoicing comprise the largest proportion of capital flight from Brazil suggests that curbing capital flight will require strong customs and tax enforcement and oversight. Brazil has also long struggled with corruption, and our finding of the persistent size of Brazil's underground economy—38.9 percent of the official economy per year on average over the period of the study—suggests that the country faces much broader governance issues. Finally, while Brazil has made great strides in recent years towards bringing its anti-money laundering regime in line with international standards, these legal changes have not necessarily been accompanied by effective enforcement.

No set of policy changes is capable of completely eliminating illicit financial flows or capital flight, but we recommend several measures designed to substantially curtail such flows, guided by two main principles: greater transparency in domestic and international financial transactions, and greater cooperation between governments to shut down the channels through which illicit money flows. These include taking stronger legal measures against trade misinvoicing, instituting transparency of company ownership, and building the technical and human capacity needed to effectively utilize the data that will be shared under emerging tax information exchange arrangements.

Overall, Brazil has an established financial infrastructure, a strong commitment to democratic governance, and many of the laws and procedures needed to curb illicit financial flows and rein in the underground economy already in place. However, these advantages must be coupled with the capacity and political will to fully implement and enforce such measures. Curtailing illicit financial flows must become a priority throughout the Brazilian government.

I. Introduction

There are a number of reasons why a study of capital flight and illicit flows from Brazil is important. Global Financial Integrity's December 2013 report, *Illicit Financial Flows from Developing Countries: 2002-2011*, found that Brazil was the world's seventh largest exporter of illicit capital, with outflows averaging US$19.3 billion per annum over the decade ending 2011.[2] The country also has a checkered economic history, ranging from fast economic growth to stagnation and even contraction. Recessionary episodes were typically accompanied by severe macroeconomic crises such as hyperinflation, external debt default, currency and exchange crisis, or stagflation wherein tepid growth co-existed with high inflation. There are hardly any studies that examine how capital flight and illicit flows from Brazil behaved in response to various macroeconomic crises over time. Finally, the study is notable given the paucity of academic literature on the interaction between capital flight and illicit flows, as well as on how such outflows impact the official economy.

We develop a full-scale structural equations model (SEM) in order to study the behavior of broad capital flight and illicit flows in the context of Brazil's macroeconomic history. The SEM seeks to capture the interactions of the official economy and broad capital flight as well as illicit flows. There are two reasons why we need to use both measures of capital outflows in the case of Brazil. For one, there has been a massive structural transformation of the Brazilian economy over more than five decades as extensive controls were dismantled in fits and starts towards greater economic liberalization. As a result, outflows that were once considered illegal due to exchange controls became legitimate due to capital account liberalization over time. For another, as an International Monetary Fund (IMF) study noted, capital flight itself is "a somewhat elusive concept" requiring us to distinguish between illegal outflows and those that are "normal," in that they take place due to considerations related to portfolio diversification and return maximization.[3] A singular focus on capital flows that are strictly illicit would not only ignore structural changes in the economy, but it would miss significant outflows due to normal investors' concerns.

One of the hypotheses we will test is whether outflows of legitimate capital tend to be more strongly linked to macroeconomic drivers compared to outflows of purely illicit capital. We say "tend" because the macroeconomic conditions that drive capital flight typically vary from one country to another. For example, it is hard to find a clear link between fiscal deficits and capital flight because the threshold deficits that could trigger outflows of capital (due to a fear of future tax increases arising from increased deficits) may vary depending on the sources of deficit financing and what economic agents consider to be excessive. Moreover, capital outflows due to covered interest differentials may be larger in countries with more integrated capital markets than in countries whose

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[2]. Dev Kar and Brian LeBlanc. *Illicit Financial Flows from Developing Countries: 2002-2011* (Washington, DC: Global Financial Integrity, 2013), 24.

[3]. Michael Deppler and Martin Williamson, "Capital Flight: Concepts, Measurement, and Issues," in *Staff Studies for the World Economic Outlook* SM/87/24 (Washington, DC: International Monetary Fund, 23 January 1987), 39.

capital markets are less integrated due to tighter controls on capital flows.[4] We intend to shed light on the particular drivers of capital flight and illicit flows in the Brazilian context.

The paper is organized as follows. Section II presents a brief methodological overview of how broad capital flight and illicit financial flows are estimated, followed by a short discussion of Brazil's economic history. In this context, we will explore the behavior of capital flight and illicit flows in the context of Brazil's macroeconomic crises. We will then develop an SEM in Section III laying out the theoretical basis for each structural equation and discuss the main findings arising from model simulations. In Section IV, we present a discussion of the policy measures needed to curtail such capital outflows. The main conclusions of this study are summarized in Section V.

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4. A covered interest differential is defined as the difference in interest rates between two countries after taking account of the cost of using a forward contract to cover or eliminate the investor's exposure to exchange rate risks over the time period during which the foreign investment matures.

II. Capital Flight and Illicit Flows in the Context of Macroeconomic Crises

i. Estimating Capital Flight and Illicit Financial Flows

Economists have long recognized that capital flight is a difficult concept to measure. The early works of Cuddington,[5] Cumby and Levich,[6] Dooley,[7] and other researchers point out such difficulties and suggest alternative ways of capturing what are predominantly unrecorded capital flows in both directions. The focus here is not to provide an overview of the academic literature on various measures (as other researchers have already done so) but to draw a clear methodological distinction between capital flight and illicit flows.

Estimates of broad capital flight presented in this study are based on the World Bank Residual (WBR) method adjusted for trade misinvoicing. The WBR method was developed at the World Bank in 1985 and has been used extensively as a measure of broad capital flight that includes both licit and illicit capital. Essentially, the WBR measure estimates the gap between a country's recorded source of funds and recorded use of funds. Source of funds consists of new external loans (estimated by adding together the change in the stock of public and publicly guaranteed debt as well as private non-guaranteed debt) plus net foreign direct investment (FDI). Typically, for a developing country like Brazil, which receives more FDI than it invests abroad, net FDI inflows would supplement the country's source of funds. Use of funds comprises financing of current account deficits as well as the additions to reserve holdings. Should the country have a current account surplus or should it draw down reserves rather than add to such holdings, such transactions would entail a negative use (i.e., add to source of funds).

The relationship between capital flight and illicit flows can be derived from the balance of payments identity as enumerated by Claessens and Naudé.[8] Using their nomenclature, let A be the current account balance, B represent net equity flows (including net foreign direct investment and portfolio investment), C the other short-term capital of other sectors, D the portfolio investments involving other bonds, E the change in deposit money banks' foreign assets, F the change in reserves of the central bank, G the net errors and omissions (NEO), and H the change in external debt. Then, the balance of payments identity is:

$$A + B + C + D + E + F + G + H = 0$$
$$\text{Or,} \quad C + D + E + G = -(A + B + F + H)$$

which implies that recorded, and therefore legal, private capital flows (C + D + E) plus net errors and omissions (G) must equal the negative of the sum of the current account balance (A), net equity

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5. John T. Cuddington, "Capital Flight: Estimates, Issues, and Explanations," in *Princeton Studies in International Finance* (Princeton, NJ: International Finance Section, Dept. of Economics, Princeton University, 1986).

6. Robert Cumby and Richard Levich, "On the Definition and Magnitude of Recent Capital Flight," in *Capital Flight and Third World Debt*, eds. D. Lessard and J. Williamson (Washington, DC: Institute for International Economics, 1987).

7. Michael P. Dooley, *Capital Flight: A Response to Differences in Financial Risks*, IMF Staff Papers 35 (Washington, DC: International Monetary Fund, 1988).

8. Stijn Claessens and David Naudé, *Recent Estimates of Capital Flight*, Policy Research Working Paper Series 1186 (Washington, DC: Debt and International Finance Division, International Economics Department, The World Bank, 1993), 3-5.

flows (B), change in reserves (F), and the change in external debt (H). The right hand side of the above equation is the WBR equation.

Economic sources and methods cannot capture illicit financial flows in a comprehensive manner. The difficulty arises from the fact that we are in part trying to capture financial flows generated from purely illegal activities such as drug trafficking, bribery and kickbacks related to corruption, and arms or human smuggling, which are typically designed to evade detection by regulatory authorities and law enforcement. Such activities are often settled in cash, so that the parties to the illegal transaction cannot be traced. Hence, gap analysis of officially recorded data has inherent limitations in capturing illegal transactions. Nevertheless, in accordance with the methodology adopted by other researchers, we replace the WBR estimates by the net errors and omissions (NEOs) of the balance of payments.

As past researchers such as Cumby and Levich have noted, the NEO is the main part of the Hot Money Narrow (HMN) method, which also includes recorded short-term capital flows of the private sector.[9] An IMF study points out that "…errors and omissions [in the balance of payments accounts] are implicitly attributed in their entirety to capital transactions whose net value can be attributed to capital flight."[10] Because NEOs reflect unrecorded transactions, we attribute them to illicit flows. The HMN estimates are also adjusted for trade misinvoicing to derive total illicit financial flows. *Hence, the trade misinvoicing component is common to both broad capital flight as well as illicit financial flows.*

The NEO (G) can be derived from the balance of payments identity quite simply as follows:

$$G = -(A + B + F + H) - C - D - E$$
$$\text{Or,} \quad G = -(A + B + F + H) - (C + D + E)$$

In other words, the NEO represents the difference between broad capital flight (as measured by the WBR method) and licit private capital flows that are recorded by balance of payments compilers. What we are doing is taking out licit capital flows from a mix of licit and illicit capital flows captured by the WBR method, leaving us with illicit capital flows (or net errors and omissions). Both WBR and NEO (G) are supplemented by estimates of trade misinvoicing to yield broad capital flight and illicit financial flows used in this study.

We shall see in the following section that while illicit flows are in general smaller than broad capital flight (as intuitively they should be), the net entries in each component of the balance of payments identity imply that they need not always be.

ii. Capital Flight and Illicit Flows in the Historical Context

a. Overall Volume and Pattern

Over the 53-year period 1960-2012, Brazil lost a total of US$590.2 billion through broad capital flight, of which about US$401.6 billion was through illicit outflows (Table 1). These outflows represent around 2.2

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9. Cumby and Levich, "Definition and Magnitude," 12.
10. Deppler and Williamson, "Concepts, Measurement, and Issues," 42.

percent and 1.5 percent of GDP on average, respectively. The implication is that, on average, illicit outflows comprise around 68 percent of total broad capital flight, which includes licit capital outflows as part of "normal" portfolio diversification. Again, this observation is subject to the caveat that licit and illicit financial outflows need not necessarily add to broad capital flight.

The reason they may not is related directly to the balance of payments accounting framework, where each entry is a net of inflows minus outflows. For instance, an entry related to inflows of foreign direct investment may well be a net of loans minus repayments from the local subsidiary to its parent company abroad. Hence, even a credit item is a net of financial flows in both directions. In such a system, when we do not have the data on gross flows in both directions, it is possible that the sum of the net items may not be equal to the gross result obtained by summing up the components. In general, however, it is reasonable to say that illicit outflows comprise the major share (68 percent) of total capital flight from Brazil. Given the significant difference between broad capital flight and illicit flows, we model both of them in order to determine whether one drives the other.

The volume of broad capital flight increased from the 1960s through the 1990s at a blistering pace as a result of macroeconomic instability such as high and highly variable inflation and hyperinflation (Chart 1). Outflows continued to increase during the 2000s but at a slower pace, although, during the last three years, 2010-2012, they again picked up pace.

Chart 1. Brazil: Broad Capital Flight and Illicit Outflows, 1960-2009
(millions of nominal U.S. dollars)
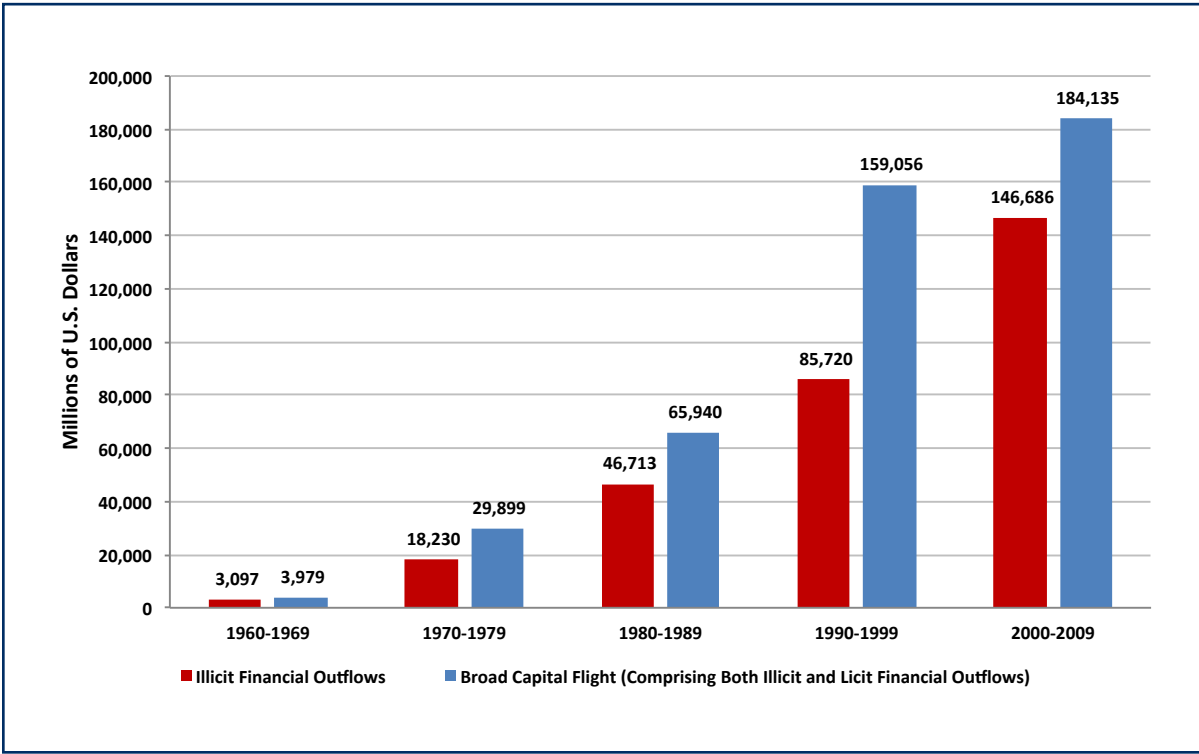
The latest surge in broad capital flight (not shown in the chart) is likely to be a result of large outflows of licit capital due to the liberalization of the Brazilian capital account as well as due to ongoing financial globalization, which tends to integrate capital markets.

The pattern of illicit outflows has also increased at a rapid pace in line with broad capital flight. There was a six-fold increase in such outflows from the 1960s to the 1970s, although the rate of increase declined steadily over the decades; from the 1970s to the 1980s, cumulative outflows grew by about two and a half times; from the 1980s to the 1990s, the increase was just 1.8 times; the increase in the last decade from the 1990s to the 2000s decelerated to 1.7 times. These broad patterns in the financial outflows under capital flight and IFFs are captured in Chart 1.

Chart 2.   Brazil: Broad Capital Flight and Illicit Outflows, 1960-2009
(percent of GDP)
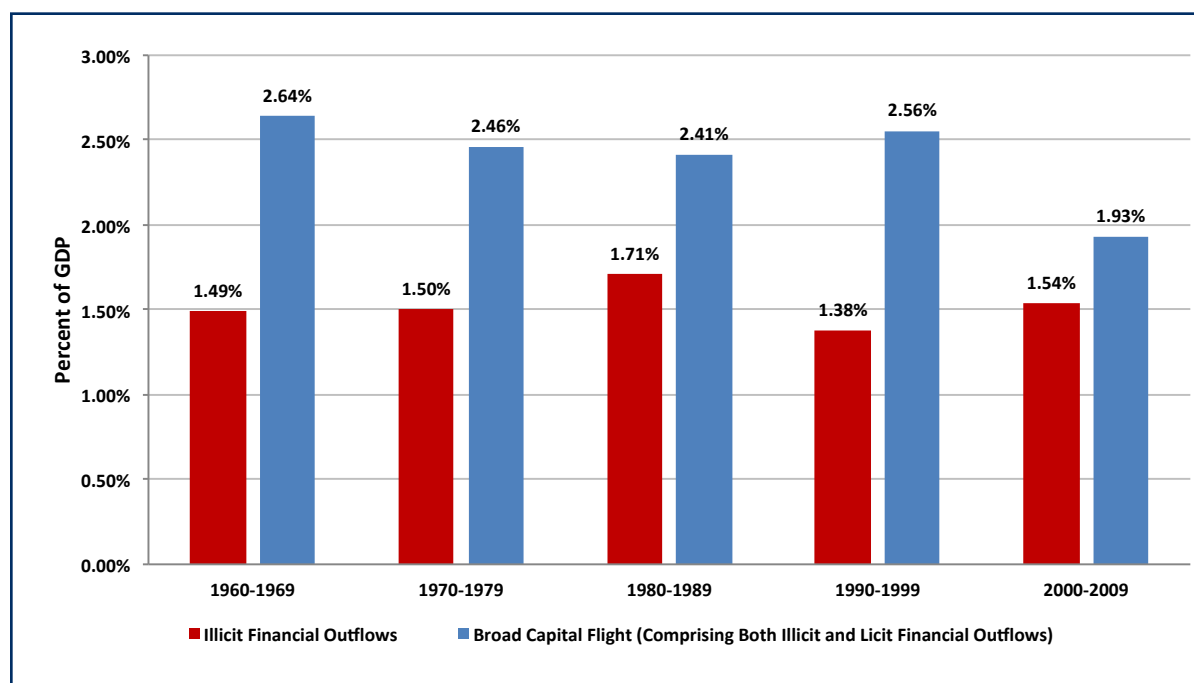
In terms of GDP, broad capital flight declined somewhat from the 1960s through the 1980s, increased marginally in the 1990s, but fell significantly in the last decade ending 2009 (Chart 2). In other words, while capital flight in relation to GDP fell significantly from the 1990s to the 2000s, illicit outflows in relation to GDP *increased* in the last decade over the 1990s, although the increase was not sufficient to reach the peak from the 1980s (see Chart 2).

b. Overview of Economic History

During the 1960s and 1970s, Brazil had one of the world's fastest growing economies. Growth was led by expansion of exports. But the root cause of Brazil's economic difficulties in the 1960s

was inflation, measured by the general price index, which is a weighted average of the cost of living, wholesale prices, and the cost of construction in Rio de Janeiro. In fact, chronic inflation accompanied impressive economic growth during this decade. The rate of inflation peaked at slightly over 90 percent in 1964 before decelerating towards the end of the decade. Monetary and credit expansion was significantly driven in large part by large cash deficits of the central government. The fiscal imbalance did not arise due to shortfalls in revenue collections but by the growing operational deficits of state-owned enterprises and autonomous agencies and the extension of various subsidies. Wage increases in key sectors of the economy helped to accelerate inflation in the mid-1960s as the wage-price spiral became more entrenched in the economy.

Table 1. Brazil: Decennial Developments in Capital Flight and Illicit Financial Flows from Brazil
(in millions of nominal U.S. dollars, in percent, or Gini Coefficient)

Period	Nature of Crisis or Economic Condition	Rate of Growth of GDP (in percent)	Average Inflation (in percent)	Central Govt. Fiscal Balance (in percent)	Current Acc. Balance (percent of GDP)	Income Inequality (Gini Coefficient)	External Debt (percent of GDP)	Broad Capital Flight		Illicit Financial Flows	
								Gross Outflows	As a percent of GDP	Gross Outflows	As a percent of GDP
1960-1969		5.90%	44.16%	-3.60%	-0.92%	48.76	7.28%	3,979	2.64%	3,097	1.49%
1970-1979	Oil shocks/ high inflation & growth	7.90%	30.45%	1.96%	-4.10%	59.08	23.31%	29,899	2.46%	18,230	1.50%
1980-1989	Hyperinflation/ debt default	3.00%	327.36%	3.21%	-1.81%	51.71	37.27%	65,940	2.41%	46,713	1.71%
1990-1999	Hyperinflation	1.70%	843.25%	1.10%	-2.11%	52.10	27.28%	159,056	2.56%	85,720	1.38%
2000-2009		3.32%	6.89%	-3.28%	-0.66%	49.49	24.41%	184,135	1.93%	146,686	1.54%
2010-2012	Stagnation	1.88%	5.69%	-2.53%	-2.24%	46.51	17.41%	147,223	2.14%	101,162	1.47%
1960-2012		**4.52%**	**252.58%**	**-0.03%**	**-1.68%**	**52.21**	**24.39%**	**590,232**	**2.20%**	**401,608**	**1.50%**

Brazil achieved an average rate of growth of 6.0 percent per annum during the 1960s. Economic growth was mostly driven by the industrial and service sectors rather than by agriculture. In fact, industrial growth accounted for more than a third of GDP growth during this period, as a significant portion of industrial output drove exports. But prices rose at an average rate of nearly 30 percent per annum, although there was a deceleration towards the end of the 1960s.

The government resorted to price controls in the 1960s to rein in inflation. Controls on a wide range of industrial goods were implemented through a price council at the Ministry of Finance, while the Special Secretariat of Supplies and Prices (SEAP) at the Ministry of Planning exercised a general control over prices. However, price controls also led to increased efforts to circumvent them and to a proliferation of black markets, as traders tried to make profits by selling only a fraction of their goods at controlled prices and diverting the bulk through the black market to meet the excess demand. Widespread price controls and the resulting proliferation of black markets were probably responsible for the fact that roughly 68 percent of broad capital flight was due to illicit financial flows (Table 1).

The factors driving inflation in the 1970s were myriad—lax demand management policies, increases in production costs due to oil price increases, excessive wage increases, and poor agricultural

production. At the beginning of this decade, during 1970-71, inflation slowed to an average rate of around 19.5 percent per annum, decelerating to 15.7 percent in 1972 and to 15.5 percent in 1973; the first oil price shock hit Brazil in late 1973. In general, the central government budget was not a factor driving monetary expansion for much of the 1970s. The favorable scenario had mostly to do with better revenue performance. Gradually, in the 1970s, open market operations became the main tool for influencing aggregate demand management including large open market sales to rein in liquidity. To the extent that the private sector absorbed the government bonds, this helped policy makers to curtail the monetization of fiscal deficits. Non-inflationary sources of financing the budget deficits would, of course, break the link between deficits, the money supply, and prices.

Successive oil price shocks in the 1970s worsened Brazil's terms of trade and reduced economic growth. Brazil's total import bill also increased sharply. For a while, the country managed to ride out the shock by borrowing cheap petro dollars. But when interest rates rose sharply in the early 1980s and international commercial lenders curtailed their lending to Latin America, the earlier reliance on foreign borrowing came back to haunt Brazil. Debt service payments as a share of export earnings began to rise sharply to a point where it became increasingly difficult to repay external creditors. Growth slowed to a crawl, and, in 1987, the government could not make interest payments on its external debt, which necessitated a rescheduling of public and publicly guaranteed debt.

There was an acceleration of inflation during the run up to the debt crisis. More flexible exchange rate policies coupled with a relaxation of price controls raised the annual rate of inflation to 100 percent per year during 1981-82. Widespread wage-price indexation—supported by an accommodative monetary policy and the adjustment of key prices—served to fuel inflation to 211 percent in 1983, which increased further to 224 percent in 1984. A comprehensive system of price controls was re-introduced in April 1985 in an effort to dampen inflationary expectations. Inflation continued to be high during the period 1986-89 and economic growth was moderate. There were repeated attempts to limit inflation through a combination of price controls, wage freezes, and modifications to the system of price indexation. The objective was to loosen the inertial component of inflation. Because these programs were not supported by appropriate monetary, fiscal, and wage policies, the reduction in inflation was short-lived. Once the controls were eased or the indexation re-established, inflation resumed with greater intensity. The rate of inflation reached 1,000 percent in 1988.

A combination of frequent devaluations, extensive wage-price and other indexation, and monetary financing of large deficits generated out of control price increases. Hyperinflation peaked at nearly 3,000 percent in 1990. The 1990s started off with declining economic activity accompanied by high inflation—a period that can be characterized as stagflation. Economic growth fell by 1.5 percent a year on average during 1990-92 while inflation averaged 1,040 percent per annum. It was clear by the early 1990s that achieving stabilization in Brazil required far-reaching economic reform, perhaps even amendments to the 1988 constitution which had generated a number of fiscal problems.

An IMF study recognized that the root cause of Brazilian inflation had been the monetization of the public sector fiscal deficit, and went on to show that the impact of deficit financing through money creation can become entrenched if economic agents form expectations based on their past experiences with inflation.[11] Moreover, widespread indexation of wages and other contracts not only created policy inertia but fed inflationary expectations themselves.

The Collor I plan, introduced by a new Administration that took office in March 1990, included a package of stabilization measures and structural reforms to arrest inflation quickly. A significant policy action entailed the "blocking," or not allowing the monetization, of about two thirds of the financial assets in the economy (M-4) for a period of 18 months. While the measure violated the terms of many financial contracts, it achieved a sharp reduction in liquidity which was complemented by a strengthening of public finances. The overall thrust of these policies was to dampen economic activity. Real GDP growth fell by 1.5 percent per year on average, while annual inflation still surged by some 1,040 percent. But the government made important progress in normalizing relations with external creditors and in implementing trade liberalization and privatization of many loss-making public enterprises.

A stabilization program designed by Henrique Cardoso called the Plano Real was launched in 1994. Cardoso would later become the country's President. Plano Real involved a two-step process. First, the old currency was replaced by a unit of real value (URV). Then, the Central Bank created a new currency called the Real which was initially set equal to one U.S. dollar. The URV did away with the need for indexation because the URV itself was a price index. All existing contracts then had to be converted based on the URV. It was only then, with a 30-day advance notice by the Bank of Brazil, that the new currency was introduced. The Real debuted on July 1, 1994, with no surprises and no price or wage freezes attempted.

Real interest rates rose sharply due to the contractionary impact of the Plan on liquidity. While high interest rates did rein in inflation and attract foreign capital, they led to the deterioration of fiscal accounts due to the asymmetric indexation of expenditures and revenue, which increased nominal expenditures faster than that of revenue. Moreover, higher real interest rates also led to higher cost of financing the public debt.

The combination of lax fiscal policy and tight monetary policy led to an overvaluation of the currency, which drove capital flight (see the spike in broad capital flight in Chart 3). The exchange rate peg collapsed in late 1998 after the central bank lost US$14 billion in reserves in two days. Brazil moved to a de facto floating exchange rate system on January 15, 2000, and the government introduced the Fiscal Responsibility Law in 2000 in order to control runaway public spending. Riding on a wave of popular socialist rhetoric, Lula da Silva was elected President in 2002, leading to investor fears that Brazil may default on its external debt. After all, his Workers Party was quite radical, and he himself had severely criticized the Plano Real before coming to power. While, on

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[11.] Dev K. Kar, *Government Deficits and Inflation in Brazil: The Experience During 1948-64*, IMF Working Paper DM/81/76 (Washington, DC: International Monetary Fund, October 1981). This working paper explores the impact of monetary and fiscal policies on the price level.

balance, Lula maintained macroeconomic stability, there was an increase in gross capital flight in 2004 as a result of sagging investor confidence.

On the whole, this last period covered by our study has been underpinned by much greater macroeconomic stability, moderately good growth rates, and rising living standards. When the global economic crisis hit in late 2008, Brazil was better placed to handle the aftermath, but not without a spike in capital outflows—whether measured as broad capital flight or illicit financial flows.

1. Broad Capital Flight and Macroeconomic Crises

We found that, for Brazil, estimates of broad capital flight based on gross outflows were better able to track macroeconomic crises than net capital flight, gross illicit outflows, or net illicit flows. In general, outflows through capital flight seem to occur in the aftermath of a crisis (see Chart 3). Thus, the first oil shock in late 1973 was followed by a year of significant capital flight, which peaked at the end of 1974. Similarly, the second oil shock in 1979 was also followed by more capital flight, which reached a peak in 1980. In late 1981, there was a spike in interest rates, which resulted in large capital outflows over the following year, as Brazilian investors began to acquire foreign assets due to large interest rate differentials in their favor. This was followed by hyperinflation and debt rescheduling in 1986, which triggered capital flight that spiked in 1987. Hyperinflation continued in the early 1990s, as a result of which capital flight shot up again in 1993. When the Plano Real was introduced in 1994, it sparked hope that the stabilization program would stimulate confidence in the economy.

Chart 3.   Brazil: Capital Flight and Macroeconomic Crises, 1965-2012
(in millions of nominal U.S. dollars)
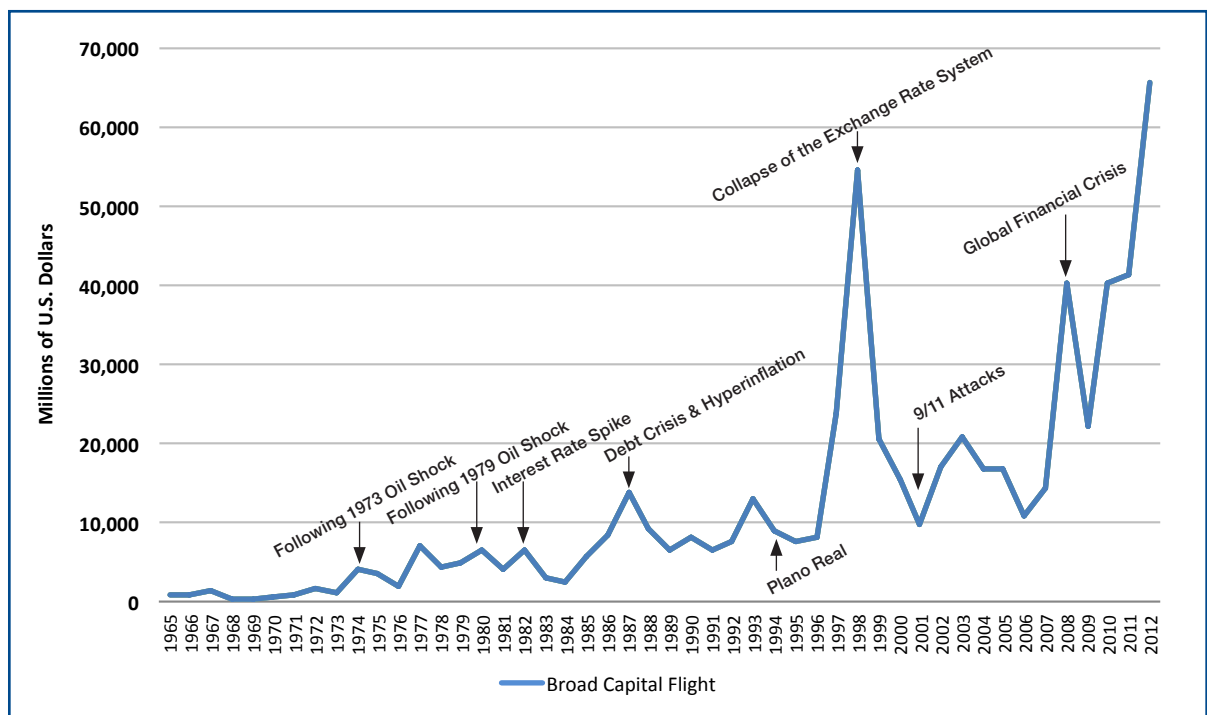
But the beneficial effect was short-lived and the crawling peg had to be abandoned. The collapse of the exchange rate system led to massive capital flight in 1998. However, as the program took hold, the flight of capital was arrested for a few years (1999-2001) when it reached a nadir. The September 11, 2001, terrorist attacks in the United States led to investor fears and a loss of confidence in Brazil's ability to limit the fallout. Capital flight surged in the aftermath of the attacks and continued through 2003. Over the next three years, 2004-2007, outflows of capital remained below the peak set in 2003. After that, capital flight spiked up sharply in the run up to the great recession that began in late 2008.

The sharp jump in capital flight from Brazil in 2012 supports the view that Brazilian investors decided to pull money out as a result of the European sovereign-debt crisis. Brazil's Executive Director to the IMF warned in late 2011 that a worsening of debt problems in the Eurozone countries could shake investor confidence in Brazil's financial markets, prompting capital flight.[12] Furthermore, an article published in CNBC in June 2013 expressed the view that Brazil could be most at risk from capital flight as the country was "…highly vulnerable to currency depreciation and capital outflows."[13] According to that article, Morgan Stanley rated Brazil as one of the five countries most vulnerable to sudden capital outflows. These views appear to be confirmed by the spike in our estimates of broad capital flight in 2012.

2. The Nature and Scale of Illicit Financial Flows from Brazil

As noted before, total illicit financial flows from Brazil consist of balance of payments leakages (captured by the HMN measure) and trade misinvoicing (captured by the Gross Excluding Reversals or GER measure). The GER method estimates outflows of illicit capital through export under-invoicing and import over-invoicing without netting inflows of illicit capital through export over-invoicing and import under-invoicing. The main reason why we only consider gross outflows of illicit capital through trade misinvoicing is because the so-called illicit inflows represent no benefit to a country. For instance, import under-invoicing directly results in lower customs duties leading to a loss of government revenues. A loss in government revenues is not a benefit that should be netted out from gross outflows of illicit capital.

Outflows due to trade misinvoicing over the 53-year period 1960 to 2012 totaled US$372.3 billion, while those through balance of payments leakages totaled US$29.4 billion. Barring a slight dip in the 1990s, total illicit outflows continued to increase significantly throughout the decades from an annual average of US$309.7 million in the 1960s, to US$1.8 billion in the 1970s, which jumped to $4.7 billion in the 1980s. Illicit outflows increased sharply to an average of US$8.6 billion per year in the 1990s before ascending to US$14.7 billion in the 2000s. Most of the increase was driven by trade misinvoicing.

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12. Arnaldo Galvao, "Brazil May Face Capital Flight on European Debt, IMF Director Says," *Bloomberg*, 17 October 2011, accessed 16 May 2014, http://www.bloomberg.com/news/2011-10-17/brazil-may-face-capital-flight-on-european-debt-crisis-imf-director-says.html.
13. Katy Barnato, "This Nation Could Be the Most at Risk From Capital Flight," *CNBC*, 14 June 2013, accessed 13 May 2014, http://www.cnbc.com/id/100815904.

On average, balance of payments leakages account for just 21.2 percent of total illicit outflows, while the bulk of illicit outflows, 78.8 percent, are related to trade misinvoicing. Broadly speaking, there seems to be no stability in the way these channels are used to transfer illicit capital. While the preferred channel has always been through the misinvoicing of trade, its share was nearly 80 percent in the 1960s, growing to 93.5 percent in the 1990s, after which they dropped to 80 percent in the 1980s and plummeted to just 57 percent in the 1990s. But in the last decade ending 2009, the share of trade misinvoicing in total illicit outflows increased to 87.4 percent of total outflows.

The sharp increase in the current account deficit in the 1970s relative to the 1960s (see Table 1) reduced the leakages of both licit and illicit capital from the balance of payments (through greater use of funds compared to source of funds), triggering an offsetting increase in outflows through trade misinvoicing. The current account deficit narrowed again over the 1980s, leading to an increase in the relative importance of balance of payments leakages and a corresponding fall in trade misinvoicing. However, the current account deficit is not the only factor driving changes in the relative importance of these two channels for transferring illicit capital. This is because, even as the current account deficit increased somewhat in the 1990s, HMN-related outflows increased in the 1990s to 57.3 percent of total illicit outflows. For one, there was a sustained decline in regulatory quality according to the World Bank governance indicators, which could include weaknesses in customs administration. For another, inflation ran at an average annual rate of 843 percent during the 1990s, which boosted underground economic activities. This in turn seems to have boosted illicit outflows through trade misinvoicing rather than balance of payments leakages. In our previous case studies we found a strong link between illicit outflows generated through trade misinvoicing and the size of the underground economy. In the last decade, the current account deficit narrowed sharply to just 0.66 percent of GDP, which reduced outflows through the balance of payments and increased the use of trade misinvoicing to 87.4 percent of total outflows.

Export under-invoicing is the primary mechanism by which Brazilian traders misinvoice trade to shift capital abroad illicitly. Over the period 1960-2012, some 73.7 percent of trade-related illicit outflows occurred through export under-invoicing. Import over-invoicing accounted for just 26.3 percent of total trade misinvoicing. The imposition of state and other taxes, such as social taxes, on imports, on top of the tax that goes to the central government, may raise the total import taxes to such a level that it is no longer advantageous for Brazilian companies and traders to over-invoice imports—particularly in relation to the effective corporate tax rate, which has hovered around 24 percent in recent years according to the accounting firm PricewaterhouseCoopers.[14] Companies typically do not gain by paying a higher import cost through over-invoicing when they cannot offset it by paying lower corporate taxes. In short, as long as the marginal import duty is higher than marginal corporate tax rate, there is no gain in shifting the higher import costs on to corporate taxes. Hence

14. PwC, "Brazil," in *Worldwide Tax Summaries: Corporate Taxes 2013/14* (New York: PwC, 2013), 265-6, accessed 14 July 2014, http://www.pwc.com/gx/en/tax/corporate-tax/worldwide-tax-summaries/assets/pwc-worldwide-tax-summaries-corporate-2013-14.pdf.

the preferred method has been to under-invoice exports. While export under-invoicing was the predominant form of trade misinvoicing in the 1960s, 1980s, 1990s, and the 2000s, import over-invoicing dominated most of the 1970s. More research into why the pattern of trade misinvoicing flipped in the 1970s might be carried out, but this is a matter that is outside the scope of the present study.

Chart 4.   Brazil: Illicit Financial Outflows and the Underground Economy, 1960-2009[15]
(percent of GDP)
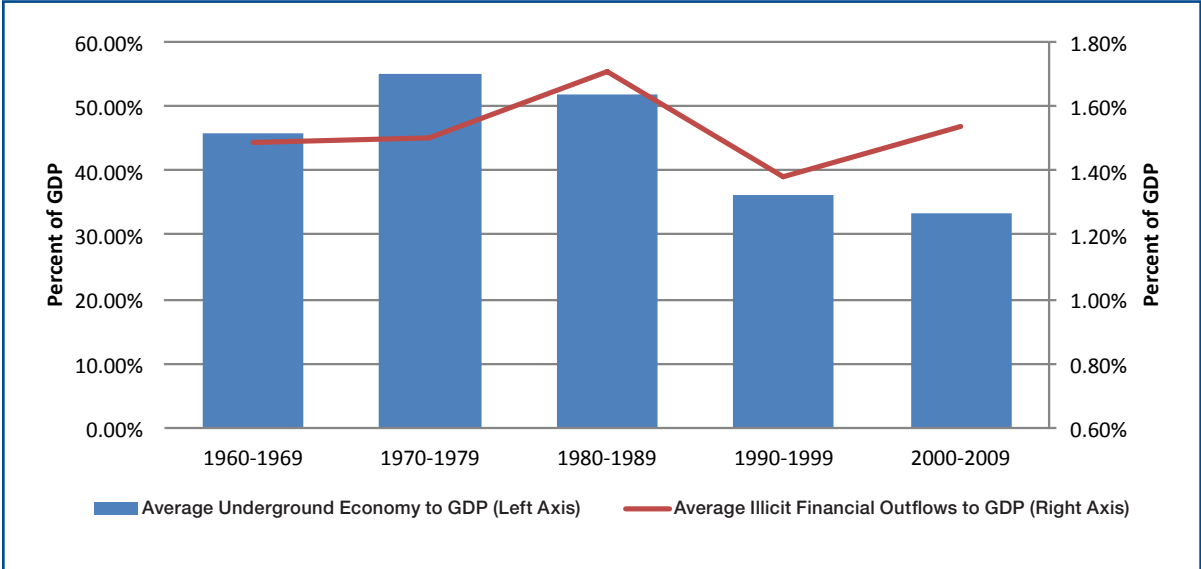
Chart 4 shows that illicit outflows have tended to follow rather closely the share of the underground economy to GDP ratio.[16] The increase in outflows to GDP in the most recent decade ending 2009 is an exception to this pattern. Because the underground economy (as a share of official GDP) is a proxy for the overall state of governance, it is not surprising to find close association between the cross-border transfer of illicit capital and the underground economy as depicted in Chart 4.

[15.] Estimates of the underground economy were obtained through the monetary approach (see Appendix II for details on methodology).
[16.] See Appendix II

III. A Model of Capital Flight and Illicit Financial Flows from Brazil

We develop a structural equations model (SEM) to examine the drivers and dynamics of both illicit financial flows and capital flight from Brazil. In other words, we model gross outflows of licit and illicit capital as well as outflows that are purely illicit. Inward capital transfers are not netted out from such outflows.

This is a larger model than the one we developed in the case of our earlier studies of illicit flows out of India, Mexico, the Philippines, or Russia. It is larger because (i) unlike in other case studies, the present SEM seeks to explain nominal income (GDP) endogenously; (ii) capital formation, which is a key factor driving official GDP, is also endogenous; and, (iii) illicit flows and capital flight are shown to be driving each other either directly or indirectly via their impact on the underground economy.

There are nine structural equations and one behavioral equation specifying how inflationary expectations are formed. Six of the nine structural equations relate to the official economy, i.e., government expenditures, government revenues, broad money supply, formation of prices as a result of the interaction between monetary and fiscal policies, gross fixed capital formation (relating to both the official and private sector), and nominal income. Three other equations capture how broad capital flight, illicit flows, and the underground economy interact with the official economy.

Before estimating the model, we address the issue of identification of the structural equations. If any equation is under-identified, then the parameters of the equation cannot be estimated, so that the entire model cannot be simulated. It must be possible for numerical estimates of the structural equation to be obtained from the estimated reduced-form coefficients, so we need to impose the order condition for identification for each equation. The order condition, which is a necessary condition for identification, states that the number of predetermined variables *excluded from the equation* must not be less than the number of endogenous variables included in that equation less one. We can see that, in fact, each structural equation is over-identified.

Researchers have widely used two methods for estimating an interdependent system of structural equations—the three-stage and two-stage least squares methods (3SLS and 2SLS, respectively). While both 3SLS and 2SLS provide consistent estimates, we use the 2SLS technique mainly because there is no gain in asymptotic efficiency in small samples. The benefits of applying the 3SLS cannot be realized in a sample size of some 60 observations.

The next several pages will explain how the various sectors of the model are derived.

i. Government Sector

Apart from the fact that the government plays an important part in all developing countries, the exact specification of how central government revenues and expenditures behave is necessary to capture their interactions with the monetary sector and the resulting formation of price developments and expectations. Note that we focus only on the central government rather than the general government accounts, which consolidate the central government with state and local governments. The main reason for the narrower focus on the central government is due to the fact that data on consolidated general government are not available for the period 1965-2011.

The model makes the assumption that the government's desired amount of real expenditures depends on the prevailing level of real income—that is, the government strives to at least maintain the real value of its expenditure outlays because failing to do so would lead to economic contraction. While the Brazilian government has cut back on expenditures, such cuts have seldom been in real terms. In general, this is a reasonable assumption. Hence, in logarithms (ln), the relationship is:

$$\ln (G/P)^D = a_0 + a_1 \ln Y_t, \ a_1 > 0$$

where G is nominal government expenditures, P the price level (measured by the consumer price index), and Y is real income (GDP). Actual current real expenditures are assumed to adjust current desired expenditures and actual real expenditures in the previous period, that is:

$$\ln (G/P)_t = \alpha \ [\ln (G/P)^D - \ln (G/P)_{t-1}\ ], \ 1 > \alpha > 0,$$ where α is the adjustment coefficient. We eliminate desired real expenditures through substitution which yields:

$$\ln (G/P)t = \alpha a_0 + \alpha a_1 \ln Y_t + (1 - \alpha) \ln (G/P)_{t-1}$$
or, $$\ln G_t = \alpha a_0 + \alpha a_1 \ln Y_t + (1 - \alpha) \ln (G/P)_{t-1} + \ln P_t, \ 1 > \alpha > 0$$

The reduced form equation for government revenue is formulated similarly. Thus:

$$\ln R_t = \beta b_0 + \beta b_1 (\ln Y_t + \ln P_t) + (1 - \beta) \ln R_{t-1}, \ 1 > \beta > 0$$

ii. Money Supply Process

We specify the money supply process according to the Brunner-Meltzer (BM) formulation, in that the nominal money supply is a function of the monetary base, the ratio of currency to demand deposits, and the discount rate. The money supply is postulated to vary positively with the monetary base, which is the amount of money issued by the central bank, negatively with the amount of currency relative to demand deposits, and positively with the discount rate. The drawback of the Brunner-

Meltzer formulation is that government revenues and government expenditures do not enter the equation endogenously. The quantity theory of money, on the other hand, explicitly incorporates the impact of fiscal policy on the money supply process, but the equation is an identity. The Brunner Meltzer formulation is:

$$\ln M_t = c_0 + c_1 \ln (MB_t) + c_2 \ln IR_t + c_3 \ln CR_t$$

iii. Formation of Prices

The equation for the price level (P) is derived from a standard function for real money demand. We assume that in a developing country like Brazil, the expected rate of inflation, rather than the rates of return on financial assets, is more likely to reflect the true opportunity cost of holding real money balances. We also assume that the actual stock of real money adjusts by a constant proportion to the difference between the real money demand and the stock of money in the previous period:

$$\Delta\ln (M/P)_{t-1} = \gamma [\ln (M/P)^D - \ln (M/P)_{t-1}], \qquad 1 > \gamma > 0,$$

where γ is the adjustment coefficient. The demand for real money balances in developing countries is therefore formulated as:

$$\ln (M/P)^D_t = d_0 + d_1 \ln Y_t - d_2 \Pi_t \qquad d_1, d_2 > 0$$

where Π_t, the expected rate of inflation, serves as a proxy for the opportunity cost for holding money in an economy with administered interest rates at least over a significant period of time. The demand for real money balances is eliminated through substitution yielding:

$$\ln (M/P)_t = \gamma d_0 + \gamma d_1 \ln Y_t - \gamma d_2\Pi_t + (1 - \gamma) \ln (M/P)_{t-1}$$

or, $\ln P_t = - \gamma d_0 - \gamma d_1 \ln Y_t + \gamma d_2\Pi_t - (1 - \gamma) \ln (M/P)_{t-1} + \ln M_t, 1 > \gamma > 0$

iv. Real Sector

The real sector in this model consists of two structural equations explaining nominal GDP and gross fixed capital formation. Nominal GDP is specified as a standard Cobb-Douglas production function, which links inputs and outputs. These links have been tested for many countries over several decades. The formula is:

$$GDP = P f(K, L)$$

which specifies that the total goods and services produced in an economy (GDP) depends on productivity (P), which is popularly known as technology and is also a function of capital

investments and labor input. Because the share of capital and labor, θ, will vary by country, the testable production function is:

$$GDP = PK^{\theta}L^{1-\theta}$$
$$\ln GDP_t = e_0 + e_1\,\theta \ln K + e_2\,(1-\theta) \ln L$$

where ln P is the constant in the regression. The coefficients of capital and labor sum to one or come very close to it.

The second equation for gross fixed capital formation serves to link the impact of the underground economy (or the overall state of governance) on the official economy. Hence, the impact of governance issues on the economy had to be modeled indirectly because the Cobb-Douglas production function does not allow the inclusion of other factors that could impact production. The investment function is also specified as a function of normal factors like interest rate, nominal income (GDP), investment in the previous period, external debt, and the underground economy. The interest rate is proxied by the expected rate of inflation because, in an economy where rates have been administratively fixed for some time or where rates do not fully reflect the supply and demand for loan-able funds, the expected rate of inflation serves as the opportunity cost of holding money. Nominal income is a standard explanatory variable in investment functions, while investment in the current period has often been found to be significantly linked to investment in the previous period in other countries. Investment may also be driven by contracting external debt, so we test whether this is true for the period as a whole. The underground economy may adversely impact growth of the official economy if the overall productivity of capital invested there is lower than their rate of return in the official economy. This would be true if, for example, capital is invested in carrying out black market transactions, to finance contraband, or to invest in speculative real estate. The gains from such investments accrue to the corrupt, with the benefits accruing to the larger economy.

$$\ln K_t = \delta f_0 + \delta f_1 \ln K_{t-1} + \delta f_2 \ln UE_t + \delta f_3 \ln GDP_t + \delta f_4 \ln ExtDebt_t + \Pi_t$$

The final equation of the official economy that closes the loop is expected inflation, Π_t. Inflationary expectations are formulated along similar lines as Cagan, where such expectations are formed according to an adaptive process. This means that an increase in actual inflation translates into an increase in inflationary expectations. The equation is as follows:

$$\Pi_t = \xi\Delta\ln P_t + (1 - \xi)\,\Pi_{t-1},\quad 1 > \xi > 0$$

where ξ denotes the coefficient of expectations and $\ln P_t$ is the current rate of inflation. If all economic agents were somehow able to formulate the inflationary expectations[17] with perfect foresight, past experiences with inflation would play no role and the adjustment parameter would

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[17.] Dev Kar, "The Brazilian Financial Sector: An Empirical Study in Evolution" (PhD Dissertation, George Washington University, 1982).

be equal to one. In the absence of perfect information regarding future outcomes of inflation, however, the Cagan specification allows inflation in prior periods to play a role in current inflationary expectations. The adjustment coefficient will vary depending upon the expectations of economic agents in an inflationary environment. If, for example, as in Brazil, a country experiences high and highly variable inflation or hyperinflation, the expectations of economic agents will be skewed towards assigning more weight to inflation in the current period. In other words, the inflationary expectations of economic agents would be driven mainly by their experience with inflation in the current period (i.e., the adjustment coefficient will be relatively high, say 0.9 or higher) rather than their past experience of inflation. We use different adjustment coefficients to maximize the significance of inflationary expectations wherever the variable is used in the model.

v. Underground Economy, Illicit Flows, and Capital Flight

The underground economy is independently estimated using the monetary approach prior to its inclusion in the model (see Appendix II for methodology). Within the model, the underground economy is cast as a function of just three variables—inflation, illicit outflows, and growth of the official economy.

$$\ln UE_t = \psi g_0 + \psi g_1 \ln P_t + \psi g_2 \ln IFF_t + \psi g_3 \dot{Y}_t$$

where $\dot{Y}_t$ represents economic growth. Inflation, and particularly hyperinflation, severely impacts those on fixed income and forces them to find alternative sources of income in the informal and underground economies. The informal economy is not necessarily illegal (such as retail trade). But the informal economy is linked to the underground economy by the fact that workers in both generally do not pay taxes. Illicit outflows lead holders of such assets to not report income derived from the return on those assets which in turn adds to the underground economy. We would expect growth in the official economy to be negatively related to the underground economy because higher growth rates would tend to divert resources to the official economy, as more labor and capital seek legitimate opportunities rather than undertake the risks associated with illegal activities.

We introduce equations for both broad capital flight and illicit flows. In this way, we can study the different factors that drive them. The hypothesis is that broad capital flight, as estimated by the World Bank Residual approach adjusted for trade misinvoicing, is driven by both macroeconomic and governance-related factors. Income inequality, which could be a structural factor driving capital flight, could not be included because of the paucity of data on the Gini.

Given data limitations, we model capital flight as follows:

$$\ln CapFlight_t = \lambda h_0 + \lambda h_1 \ln IFF_t + \lambda h_2 \ln P_t - \lambda h_3 \ln GDP_t - \lambda h_4 \dot{Y}_t$$

The above formulation uses illicit flows as a proxy for the state of overall governance, rather than the underground economy, because we want to capture interactions between the two. Given that both capital flight and illicit flows are adjusted by trade misinvoicing, we are basically assessing the significance of illicit flows (as captured by the net errors and omissions or HMN) in explaining the gap between the source and use of funds underlying the World Bank Residual approach. We would expect illicit flows to be positively related to broad capital flight. Price developments are also likely to drive capital flight to the extent that rising prices erode the real value of domestic assets, driving investors out in search of more stability, while rising nominal income and real growth are expected to stem capital flight as investors gain more confidence in the domestic economy and the attractiveness of domestic over foreign assets increases. We found that macroeconomic factors, such as prices, nominal income, and economic growth, were not significant in explaining illicit flows. Therefore, illicit flows are formulated simply as a function of the underground economy, that is:

$$\ln IFF = \mu_0 i_0 + \mu i_1 \ln UE_t$$

vi. The Complete Model

The complete ten-equation SEM that is simulated is as follows:

$$\ln G_t = \alpha a_0 + \alpha a_1 \ln Y_t + (1 - \alpha) \ln (G/P)_{t-1} + \alpha \ln P_t$$
$$\ln R_t = \beta b_0 + \beta b_1 \ln GDP_t + (1 - \beta) \ln R_{t-1}$$
$$\ln M_t = c_0 + c_1 \ln MB_t + c_2 \ln IR_t + c_3 \ln CR_t$$
$$\ln P_t = - \gamma d_0 - \gamma d_1 \ln Y_t + \gamma d_2 \Pi_t - (1 - \gamma) \ln (M/P)_{t-1} + \ln M_t$$
$$\ln GDP_t = e_0 + e_1 \theta \ln K + e_2 (1 - \theta) \ln L$$
$$\ln K_t = \delta f_0 - \delta f_1 \ln UE_t + \delta f_2 \ln CapForm_{t-1} + \delta f_3 \ln GDP_t + \delta f_4 \ln ExtDebt_t - \delta f_5 \Pi_t$$
$$\Pi_t = \xi \Delta \ln P + (1 - \xi) \Pi_{t-1}$$
$$\ln UE_t = \psi g_0 + \psi g_1 \ln P_t + \psi g_2 \ln IFF_t - \psi g_3 \dot{Y}_t$$
$$\ln CapFlight_t = \lambda h_0 + \lambda h_1 \ln IFF_t + \lambda h_2 \ln P_t - \lambda h_3 \ln GDP_t - \lambda h_4 \dot{Y}_t$$
$$\ln IFF = \mu_0 i_0 + \mu i_1 \ln UE_t$$

To sum up, the endogenous variables determined within the SEM comprise the following: G and R are the nominal expenditures and revenues of the central government respectively, M the supply of broad money, P the price level as captured by the consumer price index, GDP the nominal income, K the gross fixed capital formation consisting of both public and private investment, Π the expected rate of inflation, UE the underground economy, CapFlight is broad capital flight as estimated by the World Bank Residual model adjusted for trade misinvoicing, and IFF represents illicit financial flows as estimated by the Hot Money Narrow (HMN) method based on net errors and omission of the balance of payments adjusted for trade misinvoicing. Both CapFlight and IFF estimates are based on outflows only; inflows are not netted out from outflows. The rationale for focusing only on outflows is that, because flows are illicit in both directions (as a significant portion of broad capital flight is also illicit), it makes little sense to net out such flows, which would be akin to the concept of net crime.

The exogenous variables in the above SEM are real income Y, monetary base created by the government MB, discount rate of interest IR, the currency to demand deposit ratio CR, labor supply L, level of outstanding external debt ExtDebt, real economic growth $\dot{Y}_t$ plus all lagged variables.

vii. Results of Dynamic Simulation of the SEM

The main findings of the SEM on Brazil are as follows:

1. The model results show that the underground economy is the main link through which illicit flows impact the Brazilian economy at large and are in turn impacted by developments in the broader economy. The two-way interactions of illicit flows and the broader economy are not direct but indirect. For example, illicit flows were found to be a significant driver of Brazil's underground economy, which in turn negatively impacted capital formation. In other words, as the underground economy grew, it diverted resources away from the official economy, leading to lower capital formation.

2. Capital formation, in turn, is positively and significantly related to economic growth. Hence, to the extent that the underground economy acts as a drag on investment in the official economy, illicit outflows lower the potential rate of growth (defined as the rate of growth without illicit outflows). Hence, illicit outflows represent a significant loss to the Brazilian economy.

3. Model results also show that the underground economy itself drives illicit outflows—the larger the underground economy, the greater the capacity to generate illicit outflows. However, apart from illicit outflows, we did not find inflation or real economic growth to be significant drivers of the underground economy.

4. Illicit flows are significantly related to capital flight. A 1.0 percent increase in illicit outflows leads to a 0.83 percent increase in capital flight.

5. Government revenues are mainly driven by nominal income (GDP). In contrast, lagged revenues were not significant in explaining the current period's revenue collections. In contrast, the previous period's real expenditures were significant in determining current expenditures. In spite of high and highly variable inflation as well as hyperinflation, we find that, in general, the Government did not allow expenditures to decline in inflation-adjusted terms. That is not to say that real expenditures were not cut as part of fiscal adjustment over a specific period, but—for the period as a whole—that has certainly not been the case.

6. Prices are mainly driven by increases in broad money. Real GDP had the expected negative sign—in other words real economic growth is negatively related to growth, although the significance is only at the 90 percent confidence level. It was surprising to find that inflationary expectations did not feed back into prices in a significant manner, although there is a positive association. Perhaps the adaptive error learning process does not adequately capture the formation of expectations when inflation is highly variable and there are episodes of hyperinflation. As expected, the real money stock in the previous period was statistically significant and negatively related to prices in the current period. Except as noted, the signs of the variables and their statistical significance are consistent with those predicted by monetary theory.

7. Broad money supply was formulated according to the Brunner-Meltzer theory. The monetary base and the currency to demand deposit ratio were strongly significant and were found to drive the money supply. The discount rate was significant only at the 90 percent confidence interval, and the coefficient was much smaller than either base money or the currency ratio. We found no evidence that over the period 1965-2011, Brazil's fiscal policy played any role in driving inflation. There are two main reasons behind this finding. First, the central government fiscal balance remained in surplus (i.e., revenues exceeded expenditures) for two continuous extended periods, 1970-1985 and 1987-1995. Hence, during these extended periods, monetary policy variables are not impacted by fiscal issues but by money market equilibrium. The periods 1970-1985 and 1987-1995 can be called "monetary dominant". In contrast, monetary dominance was interspersed by two continuous periods of significant fiscal deficits, 1960-1969 and 1996-2012. These periods are said to be fiscally dominant in that monetary policy is typically subordinated either through direct financing in the form of central bank credits and money creation or through domestic bond financing. The latter tends to crowd out private investment as interest rates rise. Regardless of the fact that financing can also take place through some combination of monetary expansion, domestic bond sales, and foreign financing, the fact remains that large deficits tend to impose a fiscally dominant regime.

Structural and Behavioral Equation Estimates

$\ln G_t = -11.894 + 0.292 \ln Y_t + 1.265 \ln (G/P)_{t-1} + 0.955 \ln P_t$
$\quad\quad [-1.28] \quad [0.71] \quad\quad [3.26]^{***} \quad\quad\quad [29.43]^{***} \quad\quad R^2 = 0.999 \; SE = 0.401$

$\ln R_t = 13.417 + 0.939 \ln GDP_t + 0.103 \ln R_{t-1}$
$\quad\quad [13.97]^{***} \; [13.15]^{***} \quad\quad [1.52] \quad\quad\quad\quad R^2 = 0.999 \; SE = 0.483$

$\ln M_t = 1.271 + 0.996 \ln MB_t + 0.075 \ln IR_t + 1.197 \ln CR_t$
$\quad\quad [4.08]^{***} \; [85.14]^{***} \quad\quad [1.792]^{*} \quad\quad [6.70]^{***} \quad\quad R^2 = 0.999 \; SE = 0.321$

$\ln P_t = -4.057 - 0.385 \ln Y_t + 0.015 \, \Pi_t - 0.670 \ln (M/P)_{t-1} + 0.982 \ln M_t$
$\quad\quad [-1.33] \quad [-1.82]^{*} \quad\quad [1.57] \quad [-4.89]^{***} \quad\quad [93.91]^{***} \; R^2 = 0.999 \; SE = 0.301$

$\ln GDP_t = -13.220 + 0.248 \ln K + 0.740 \ln L$
$\quad\quad\quad [-8.05]^{***} [2.94]^{***} \quad [8.97]^{***} \quad\quad\quad\quad R^2 = 0.999 \; SE = 0.072$

$\ln K_t = -1.214 + 0.147 \ln K_{t-1} - 0.321 \ln UE_t + 1.060 \ln GDP_t + 0.102 \ln ExtDebt_t + 0.015 \, \Pi_t$
$\quad\quad [-5.25]^{***} \; [1.66] \quad\quad [-2.06]^{**} \quad\quad [11.32]^{***} \quad\quad [1.30] \quad\quad\quad\quad [1.63]$

$\Pi_t = 0.9 \ln P + 0.1 \, \Pi_{t-1}$
$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad R^2 = 0.999 \; SE = 0.133$

$\ln UE_t = 0.873 - 0.118 \ln P_t + 1.078 \ln IFF_t - 0.025 \dot{Y}_t$
$\quad\quad [0.11] \quad [-0.38] \quad\quad [3.67]^{***} \quad\quad [-0.01] \quad\quad R^2 = 0.999 \; SE = 0.628$

$\ln CapFlight_t = 7.913 + 0.828 \ln IFF_t + 0.274 \ln P_t - 0.098 \ln GDP_t - 1.932 \dot{Y}_t$
$\quad\quad\quad [1.17] \quad [2.95]^{***} \quad\quad [1.295] \quad\quad [-0.242] \quad\quad [-1.047] \quad R^2 = 0.998 \; SE = 0.468$

$\ln IFF = -3.854 + 1.029 \ln UE_t$
$\quad\quad [-12.55]^{***} \; [66.54]^{***} \quad\quad\quad\quad\quad\quad R^2 = 0.998 \; SE = 0.588$

The shift of the policy stance from one of fiscal to monetary dominance only to relapse into the former regime is the main reason why we find no evidence that Brazil's fiscal policy over the period as a whole played any significant role in driving inflation. That does not mean we can rule out the monetary impact of large fiscal imbalances in sub-periods, such as 1996-2012. Rather, that impact would also depend on whether deficits were primarily financed through monetary expansion.

8. Available evidence based on IMF Country Reports and Staff Reports for Article IV Consultations show that, while deficits were mainly financed through central bank credits and monetary expansion during much of the earlier period 1960-1969, bond financing together with foreign financing became much more important in the more recent period.[18] This is another reason why researchers are unlikely to find any significant link between fiscal deficits, the money supply, and inflation. This is quite a different scenario from the earlier period, 1948-1964, in Brazil when there was a strong link between deficits, money supply, and inflation. This led to an asymmetric response of revenue and expenditures to inflation (due to the faster speed of adjustment of expenditures than revenues to inflation) which further widened the deficits leading to more money creation and inflation in a vicious circle.[19]

9. Nominal income (GDP), which was formulated as a standard Cobb-Douglas function, is driven by capital formation (gross public and private investment) and labor supply. Productivity and technology are assumed to remain fixed. Both capital and labor were found to be significant at the 95 percent confidence interval (with their coefficients adding to one).

10. Nominal income was found to be a significant driver of gross fixed investment. While contracting new external debt seemed to have a positive impact on capital formation, the relationship was not significant at the 90 percent level. The interest rate (based on the expected rate of inflation as an opportunity cost of holding money) was also not significant in explaining investment, perhaps due to the fact that interest rates were administratively set for many years in Brazil under successive governments.

To summarize, each component of the SEM can be classified into three broad categories—macroeconomic, behavioral, and target (or what we are trying to explain). How these broad classes of drivers impact the target variables (e.g., underground economy, capital flight, and illicit financial flows) are captured in Table 2.

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18. International Monetary Fund, "Fiscal Sustainability and Monetary Versus Fiscal Dominance: Evidence from Brazil, 1991-00," in *Brazil: Selected Issues and Statistical Appendix*, IMF Country Report No. 01/10 (Washington, DC: IMF, January 2001), 9; International Monetary Fund, "Brazil: Staff Report for the 2012 Article IV Consultation," in *Brazil: 2012 Article IV Consultation – Staff Report*; Public Information Notice on the Executive Board Discussion; and Statement by the Executive Director for Brazil, IMF Country Report No. 12/191 (Washington, DC: IMF, July 2012), 22, 57, 73.

19. Kar, "Government Deficits and Inflation."

Table 2. Brazil: Components of the Structural Equations Model and How They Impact Target Variables[†]

Nature of the Equation in the Model	Direct or Indirect Impact Between and Among Targets and Intermediaries	Significance of Direct and Indirect Impact	Number of Times Variable Appears within Model
Macroeconomic			
Government Expenditures (G)	Direct P on G	Significant	One
Government Revenues (R)	Direct GDP on R	Significant	One
Broad Money Supply (M)	Indirect through prices	Significant	Two
Formation of Prices (P)	Direct M, π on P	Significant; insignificant	Five
Gross Capital Formation (K)	Direct GDP, UE, π on K	Both significant; insignificant	Two
Nominal Income (GDP)	Direct K on GDP	Significant	Four
Behavioral			
Inflationary Expectations (π)	Direct P on π	Significant	Three
Target Variables			
Underground Economy (UE)	Direct P, IFF on UE	Insignificant; significant	Three
Capital Flight (CapFlight, CF)	Direct IFF, P, GDP on CF	Only IFF significant	One
Illicit Financial Flows (IFFs)	Direct UE on IFF	Significant	Three

[†] Impact of exogenous variables (i.e., those determined outside the SEM) are not shown in the table.

The following observations are salient:

- Of the ten equations listed in the left-most column, six are macroeconomic, one is behavioral, and three are target variables in the sense that they are of particular interest to the study. We note that only prices (P) and GDP have a direct impact on the target variables such as the underground economy and capital flight. Although prices have a direct impact on the underground economy and capital flight, the impact was found to be statistically insignificant. Even nominal income (GDP) was not found to be statistically significant in explaining capital flight. That is why macroeconomists find it difficult to trace the direct impact of economic variables on the underground economy (except for taxes, which are not modeled in this study). It is therefore not surprising that academic literature has only found a weak link between macroeconomic variables (e.g., fiscal deficits, interest rates, and inflation) and capital flight. There are hardly any empirical studies on illicit financial flows thus far.
- Macroeconomic variables tend to interact within each other rather than with the target variables, such as illicit flows and the underground economy.
- However, macroeconomic and behavioral variables interact with the underground economy, capital flight, and illicit flows in complex ways. For instance, the underground economy is found to have a significant negative impact on official investment. It seems that a faster rate of growth of the underground economy can deplete investment that would otherwise be invested in the official economy. However, the relationship is only significant at the 90 percent level. Investment, in turn, drives economic growth. Hence, the underground economy, by hampering legitimate investment, indirectly deters growth, although the direct (negative) relationship between the two was not found to be statistically significant.
- The underground economy tends to be driven mainly by other governance-related drivers, such as illicit flows, rather than by macroeconomic or behavioral factors.
- Prices and nominal income variables percolate the most throughout the ten-equation system (five

and four times respectively) followed by inflationary expectations, the underground economy, and illicit flows (thrice each). The more endogenous variables appear in the system, the higher the risk that small deviations between actual and simulated values can get compounded.

viii. Inequality, Capital Flight, and Illicit Flows

The following results from a multiple regression analysis seek to throw some light on whether there is a link between economic growth, income inequality, and capital flight.

Table 3.   Multiple Regression Analysis: Links between Economic Growth, Income Inequality, and Capital Flight

Source	SS	df	MS		
Model	6365.00073	3	2121.66691	Number of obs = 42	
				F (3,38) = 1937.31	
Residual	41.6161147	38	1.09516091	Prob > F = 0.0000	
				R-squared = 0.9935	
Total	6406.61685	41	156.258947	Adj R-squared = 0.9930	
				Root MSE = 1.0465	

ced_ger_ln	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
gdp_growth	7.795613	4.274226	1.82	0.076	-0.8571048	16.44833
Gini	0.961393	0.0522824	1.84	0.074	-0.009701	0.2019795
gdp_ln	1.004467	0.0178712	56.21	0.000	0.9682884	1.040645
_cons	-13.38388	3.015685	-4.44	0.000	-19.48882	-7.278946

One of the main impediments to including the Gini into the SEM is the fact that continuous data on the Gini is only available for 1976 to 2011, which will introduce small sample bias in dynamic simulations. So we interpolated the series for the period 1970-1975 before regressing broad capital flight on the factors shown in the table above. The regression results show that worsening income inequality also seems to drive capital flight, although the relationship is only significant at the 90 percent level.

IV. The Legal and Policy Environment in Brazil

Our finding that illicit flows through trade misinvoicing comprise the largest proportion of capital flight from Brazil suggests curbing capital flight will require strong customs and tax enforcement and oversight. Brazil has also long struggled with corruption, a problem that led to some public unrest preceding the 2014 FIFA World Cup, but our finding of the persistent size of Brazil's underground economy suggests that the country faces much broader governance issues. Brazil has made great strides in recent years towards bringing its anti-money laundering regime in line with the international standards embodied in the Financial Action Task Force (FATF) Recommendations, but these legal changes have not necessarily been accompanied by effective enforcement.

i. Customs, Trade, and Tax

Responsibility for customs enforcement lies with the Secretariat of the Federal Revenue of Brazil (RFB). Brazil has taken strong steps to curb trade fraud through imports recently, establishing the National Centre for Customs Risk Management in 2012 to coordinate analysis and investigations of fraudulently documented transactions.[20]

Traders must declare all imports and exports of goods through the Integrated Foreign Trade System (SISCOMEX), a computerized tracking system operated by RFB. Imports are processed according to a risk-based system similar to that in place in many other countries. In recent years, 12-16 percent of imports were subject to inspection, only half of which were physically inspected. Risk assessment is based entirely on the contents of the import declaration as filed; additional documentation is requested only if the shipment is flagged for further inspection.

Brazil is a signatory to the WTO Customs Valuation Agreement, under which Brazil agrees to apply the "transaction value" principle, valuing imported or exported goods at the "price actually paid or payable" for the goods—in effect, the price that is reflected on the invoice between parties. The agreement allows for customs authorities to request additional documentation to support the stated price in cases where it is deemed suspect, but in practice, Brazil accepts the declared value in 99.8 percent of all transactions.[21]

While Brazil's customs regime appears sufficiently rigorous for a country its size, its apparent shortcomings given the large volume of illicit outflows through trade is not surprising. Customs enforcement in Brazil, as in most other countries, is intended to ensure the collection of proper tax and tariff revenue, and Brazil does not tax exports (except for a few select goods). Thus there is no revenue to be gained from scrutinizing export transactions. However, nearly three-quarters of Brazil's illicit outflows through trade occur via exports.

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20. World Trade Organization, *Trade Policy Review: Brazil,* WT/TPR/S/283 (Geneva: WTO, 17 May 2013), 47, Accessed 14 July 2014, http://www.wto.org/english/tratop_e/tpr_e/tp383_e.htm.
21. *Ibid.*, 48.

Instead, export transactions ultimately fall primarily under the purview of tax enforcement, as the value received for exported goods strongly affects the rate of income tax the exporting company will pay. Specifically, companies will under-invoice exports in order to reduce the amount of profit they declare in Brazil, generally under a tacit agreement with the importer to remit the remaining value to an offshore account controlled by the company's owner.

Brazil's efforts to address the problems of abusive transfer pricing are admirable and worth noting. Transfer pricing is the method by which related companies (i.e., companies with some common ownership) account for the movement of goods and services between jurisdictions. In general, it is governed by the international "arm's-length principle," which purportedly mimics the accounting of similar transactions between unrelated parties. In reality, though, transfer pricing rules can be readily manipulated to minimize taxable profits in high-tax jurisdictions and shift capital to low-tax jurisdictions. Although for many countries much of the capital flight that occurs through abusive transfer pricing is related to services and intangibles and thus not captured in our data, as Brazil has demonstrated, the tactics to address abusive transfer pricing and trade misinvoicing are very similar.

Brazil has moved away from the arm's-length principle by instituting more objective methods for determining an appropriate price, establishing ceilings for deductible expenses and fixed profit margins on certain transactions.[22] Brazil also recently required imports and exports of certain commodities to be priced in accordance with current world market prices, independent of a company's costs or the structure of the transaction.[23] Brazil also recently instituted a law extending this regime in order to subject transactions with entities located in tax havens to the same strict scrutiny as transactions with related parties.[24] This is a simple but powerful tool to address the large role tax havens play in trade misinvoicing, but it is too early to statistically tell whether it has been effective.

ii. Transparency and Governance

Brazil has consistently fared poorly in common indices of governance and corruption. While much of the legal framework needed to combat corruption has been put in place over time, its success depends on the amount of political will available to strictly and fervently enforce it over the medium- and long-term.[25]

22. PwC, "Brazil," in *International Transfer Pricing 2013/14* (New York: PwC, 2013), 284, accessed 3 July 2014, http://www.pwc.com/gx/en/international-transfer-pricing/assets/itp-2013-final.pdf.

23. Law 12,715/12, effective January 1, 2013. See also PwC, "Brazilian Federal Revenue Department issues further guidance on changed introduced by Law 12715," *Tax Insights*, January 9, 2013, http://www.pwc.com/en_GX/gx/tax/ newsletters/pricing-knowledge-network/assets/pwc-brazil-law12715-guidance.pdf.

24. RFB Normative Instruction No. 1037, June 4, 2010. See also Walter Stuber and Adriana Maria Gödel Stuber, "Brazil: Brazilian Tax Authorities Issue a New List of Favored Taxation Countries," *Mondaq*, June 10, 2010, accessed 3 July 2014, http://www.mondaq.com/x/102618/Income+Tax/Brazilian+Tax+Authorities+Issue+a+New+List+of+Favored+Taxation+Countries.

25. "Corruption by Country: Brazil," Transparency International, accessed 14 July, 2014. http://www.transparency.org/country#BRA.

The use of anonymous legal entities is a significant transparency issue facing many countries in both the developing and developed world, and Brazil is no exception. While Brazil operates a central registry of legal entities and has made this registry open to the public, this registry does not collect information on the ultimate "beneficial owner" of legal entities controlled by foreign citizens or foreign legal entities, suggesting that it is relatively easy to form and operate an anonymous company in Brazil. Furthermore, Brazil does not regulate corporate service providers, who in many other countries serve as gatekeepers, collecting identification information for incorporators and screening for money laundering risks.

Brazil has effectively instituted transparency surrounding the licensing and extraction of its substantial oil, gas, and mineral deposits, scoring highly in the Natural Resource Governance Institute's Resource Governance Index. Brazil is also a founding member of the Open Government Partnership, and has included several commitments related to extractives in its action plans. Although a scoping study has been performed, Brazil is not yet a candidate for EITI membership.

Brazil is also one of the jurisdictions endorsing the OECD Declaration on Automatic Exchange of Information in Tax Matters earlier this year. This unprecedented declaration will enable Brazil's tax authorities to collect information on Brazilian taxpayers' overseas assets automatically, and compare this data against their tax filings. Brazil is also a signatory to the Convention on Mutual Administrative Assistance in Tax Matters and has bilateral relationships with many other jurisdictions to exchange tax information upon request. While adoption of these instruments places Brazil at the forefront of tax information sharing, the true test is how the information collected under these arrangements is used, which is beyond our capacity to examine here.

iii. Financial Regulation and Governance

Brazil is a member of FATF and the Grupo de Acción Financiera de Sudamérica (GAFISUD), and underwent a Mutual Evaluation in 2010, which found Brazil's laws to be largely or partially compliant with most of the Recommendations.[32] However, significant holes remain—as noted, beneficial ownership information is not available for all legal entities; legal entities cannot be subject to liability for money laundering; and terrorist financing is not a distinct criminal offense, among others.

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26. Financial Action Task Force, *Mutual Evaluation Report: Federative Republic of Brazi*l (Paris: FATF / OECD, 25 June 2010), 195, accessed 14 July 2014, http://www.fatf-gafi.org/countries/a-c/brazil/documents/mutualevaluationreportofbrazil.html.

27. "2013 Resource Governance Index: Brazil," Natural Resource Governance Institute, accessed 14 July 2014, http://www.resourcegovernance.org/sites/default/files/country_pdfs/brazilRGI2013.pdf.

28. "Brazil," Open Government Partnership, accessed July 14, 2014, http://www.opengovpartnership.org/country/brazil.

29. See José Roberto Rodriguez Afonso, et al., *Transparência Fiscal: Uma Análise da Indústria Extrativa Mineral Brasileira*, World Bank, 10 October 2012. http://eiti.org/files/Brazil%20Scoping%20Portuguese.pdf.

30. "Countries commit to automatic exchange of information in tax matters," Organization for Economic Co-Operation and Development, 6 May 2014, accessed 14 July 2014, http://www.oecd.org/tax/exchange-of-tax-information/countries-commit-to-automatic-exchange-of-information-in-tax-matters.htm

31. Global Forum on Transparency and Exchange of Information for Tax Purposes, "Brazil," in *Exchange of Tax Information Portal*, accessed 14 July 2014, http://eoi-tax.org/jurisdictions/BR#agreements.

32.   FATF, *Mutual Evaluation Report*.

Furthermore, despite the strength of Brazil's AML laws on paper, it is not clear that they are being effectively enforced. The FATF Evaluation noted that despite Brazil's high risks of money laundering activity, the government pursued comparatively few investigations and obtained almost no criminal convictions for money laundering. The Evaluation stated that this was likely due to structural and logistical factors, such as short statutes of limitation, overtaxed courts, and limited prosecutorial experience with complex financial cases, rather than a lack of motivation.

iv. Policy Recommendations

No set of policy changes is capable of completely eliminating illicit financial flows. Instead, the goal should be to substantially curtail illicit flows,[33] through policies guided by two main principles: greater transparency in domestic and international financial transactions, and greater cooperation between developed and developing country governments to shut down the channels through which illicit money flows. Brazil has already demonstrated a clear willingness to establish such principles, through its commitments to open government and tax information exchange. In the paragraphs that follow, we offer several key policy recommendations to guide the Government of Brazil in curtailing future illicit financial flows.

a. Customs and Trade Reform

Addressing trade misinvoicing, the largest component of illicit financial flows out of Brazil, is a complex undertaking, but the overall goal can be stated simply: ensure that goods being imported or exported are recorded at a value based on the accurate market price of the goods. While this necessarily requires greater vigilance on the part of customs inspectors and increased flexibility for them to question transactions, they cannot bear full responsibility for it. And as noted above, Brazil already gives its customs and tax inspectors significant ability to reconsider transaction values. Instead, trade misinvoicing should be targeted from multiple angles, with an eye towards proactive deterrence rather than retroactive punishment.

First, laws should be implemented specifically criminalizing trade misinvoicing for the purposes of evading taxes or tariffs, or to avoid money laundering controls. Additionally, importers and exporters should be required to include and sign statements on declarations certifying that the prices stated are accurate and honest. These simple steps could have a powerful deterrent effect through the greater risk of detection and through the personal liability the declarations create.

Next, trade misinvoicing detection and identification should be incorporated into the generally accepted accounting and auditing practices used in Brazil. Accountants and auditors of importing or exporting businesses should be trained to identify red-flag transactions and verify whether they were accurately invoiced. Both the executives and the auditors of Brazilian companies involved

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33. Raymond Baker et al., *Hiding in Plain Sight: Trade Misinvoicing and the Impact of Revenue Loss in Ghana, Kenya, Mozambique, Tanzania, and Uganda: 2002-2011* (Washington, DC: Global Financial Integrity, May 2014), 43.

in international trade should be required to sign statements in the company's annual accounts certifying that all transactions included therein were invoiced in accordance with the law. As with customs declarations, these simple statements would increase personal responsibility and accountability for companies' pricing decisions, deterring knowingly fraudulent conduct.

Finally, while Brazil has already taken steps towards considering misinvoicing as a risk category for goods shipments and integrating pricing data into its processes, this should be expanded to include goods in every Harmonized Code category. Customs inspectors should have access to improved and expanded real-time world market pricing data, against which they can easily compare the declared values of imports and request further documentation as needed. This data is now becoming available from several sources.

b. Financial Transparency and Governance

Requiring legal entities registered in Brazil to disclose their beneficial owners—i.e., the natural persons who ultimately control the company, regardless of the chain of ownership or legal authority in between—is a powerful transparency measure that affects numerous problem areas related to illicit financial flows. Laundering the proceeds of crime and corruption becomes much more difficult, hidden relationships between trading parties become much easier to identify, and banks' customer due diligence requirements become substantially less onerous. Moves toward beneficial ownership transparency in several major economies—the United Kingdom, France, and others—are already underway. The central registry that Brazil already has in place should be augmented with a legislative requirement for every registered company to list its beneficial owners, without regard to the legal structure through which they control the company.

Brazil has already committed to joining the worldwide movement towards automatic exchange of tax information, the "new global standard" as declared by the G20, and should now swiftly look towards implementation of the system and effective utilization of the data to be gathered. The OECD will be releasing a Commentary document later this year elaborating on the Common Reporting Standard, and many countries will begin developing systems to collect and accept the large amounts of data that will be required. The key to ensuring that this process meets Brazil's needs is collaboration: contributing to discussions on interpretation of the standard and developing connections with other nations' tax authorities. Building the technical and human capacity of RFB will also be crucial to effectively utilizing the data.

Finally, Brazil should take the remaining steps necessary to fully implement the FATF Recommendations and strengthen its anti-money laundering practices. While the government can address much of the remaining concerns from the 2010 mutual evaluation with relatively minor legislative amendments, addressing the structural factors needed to improve its implementation of AML laws will require a much more holistic approach, including developing the capacity of the court

system and prosecutors and revising other procedural rules and regulations to handle complex financial cases.

c. Effective Implementation

Overall, Brazil has an established financial infrastructure, a strong commitment to democratic governance, and many of the laws and procedures needed to curb illicit financial flows and rein in the underground economy already in place. However, these advantages must be coupled with the capacity and political will to fully implement and enforce such measures. Curtailing illicit financial flows must become a priority throughout the Brazilian government.

V. Conclusion

The period 1960 to 2012 covered in this study saw massive structural changes in the Brazilian economy: it evolved from one subject to various controls to a more market-based open economy. Furthermore, over this 53-year period, Brazil experienced significant macroeconomic shocks such as high and highly variable inflation, hyperinflation, large fiscal deficits, and crushing external debt leading to debt default and deep recessions. This study analyzed the volume and pattern of both broad capital flight and illicit financial flows from Brazil. While estimates of broad capital flight were based on the World Bank Residual method adjusted for deliberate trade misinvoicing, illicit flows were based on the Hot Money Narrow method, which was also similarly adjusted. We only considered gross outflows and not a net of flows in both directions. As the Residual method as well as the method of estimating illicit flows involve, either partly or wholly, capital that is illegally earned, transferred, or utilized, netting out such flows would be methodologically unsound.

Over the 53-year period, Brazil lost a total of US$590.2 billion through broad capital flight, of which US$401.6 billion was through illicit outflows. On average, these outflows represent 2.2 percent and 1.5 percent of GDP, respectively. The volume of capital flight increased exponentially from the 1960s through the 1990s, although the pace declined over the last decade ending 2009. The continued increase in capital flight in the 1990s has to do with outflows of licit capital in response to increasing macroeconomic shocks such as hyperinflation and an onerous debt burden.

While both capital flight and illicit flows have tended to increase throughout the five decades, they tended to decline as a share of GDP. Starting at about 2.6 percent of GDP on average during the 1960s, capital flight fell slightly over the next two decades to touch 2.4 percent of GDP in the 1980s. After that, the volume of capital flight increased back to 2.6 percent of GDP in the 1990s, before outflows declined significantly to 1.9 percent of GDP in the last decade ending 2009. Over the last three years, capital flight again increased slightly to 2.1 percent of GDP.

Outflows of illicit capital were around 1.5 percent of GDP in the 1960s and 1970s, increasing to 1.7 percent of GDP in the 1980s, before descending back to the vicinity of 1.4 to 1.5 percent of GDP in the decades that followed.

We found that both capital flight and illicit outflows react predictably to macroeconomic shocks: outflows seem to lead crises by a year or two, increase steadily throughout the period of economic stress, and decline steadily in the aftermath. However, we found that the response of capital flight to the "great recession" that started in early 2008 was more convincing than the behavior of illicit outflows, which registered a plunge in the period 2010-2012.

An econometric model consisting of nine structural equations and one behavioral equation was tested for the period 1965 to 2011. Six of the structural equations relate to the official economy and

three capture how broad capital flight, illicit financial flows, and the underground economy—which we found to be 38.9 percent of the official economy on average per year of the study period—interact with one another. Tests using the model showed that Brazil's fiscal policy did not play a significant role in driving inflation. Prices were mainly driven by increases in broad money supply. While fiscal deficits in the early 1960s and 1970s were financed through central bank credits and money creation, bond financing together with foreign financing became much more important in the 2000s.

The model captured several aspects of the interaction between the above-ground, or official, economy and the underground economy, illicit flows, and capital flight. On the one hand, nominal income (GDP) was found to be a significant driver of investment (gross fixed capital formation). On the other hand, growth of an underground economy, mainly driven by illicit flows, tended to divert resources away from the official economy and had a significant negative impact on investment. In other words, investment was being pushed by favorable developments in the official economy but pulled back by growth of the underground economy, which was solely driven by illicit flows. Perhaps the most significant finding of the model developed in this study is that, while the underground economy is mainly driven by illicit flows, broad capital flight was driven by governance-related factors as well as macroeconomic drivers. Based on limited data, we found that worsening income inequality also seems to drive capital flight, although the relationship is significant only at the 90 percent level.

The policy measures required to curtail capital flight and illicit flows are linked to the results of the model simulations and guided by two main principles: 1) greater transparency in domestic and international financial transactions and 2) greater cooperation between governments to shut down the channels through which illicit money flows. These include taking stronger legal measures against trade misinvoicing, instituting transparency of company ownership, and building the technical and human capacity needed to effectively utilize the data that will be shared under emerging tax information exchange arrangements.

Overall, Brazil has an established financial infrastructure, a strong commitment to democratic governance, and many of the laws and procedures needed to curb illicit financial flows and rein in the underground economy already in place. However, these advantages must be coupled with the capacity and political will to fully implement and enforce such measures. Curtailing illicit financial flows must become a priority throughout the Brazilian government.

Appendix I. Capital Flight & Illicit Financial Flows by Year

Table 1. Brazil: Broad Capital Flight and Illicit Financial Flows, 1960-2012
(in millions of U.S. dollars) 1/, 2/

Year	World Bank Residual Method Outflows (WBR) (1)	Hot Money Outflows (HMN) (2)	Trade Misinvoicing Outflows (GER) (3)	Broad Capital Flight (1+3)	Illicit Financial Outflows (2+3)
1960	.	0	127	.	127
1961	.	0	153	.	153
1962	.	137	286	.	424
1963	.	77	302	.	378
1964	.	217	346	.	563
1965	699	31	230	929	261
1966	725	25	224	949	249
1967	1,236	35	263	1,498	297
1968	0	1	294	294	295
1969	0	41	309	309	350
1970	0	0	553	553	553
1971	225	7	659	884	666
1972	861	0	715	1,576	715
1973	0	0	1,015	1,015	1,015
1974	2,143	68	2,014	4,157	2,081
1975	604	438	3,015	3,619	3,453
1976	0	0	1,812	1,812	1,812
1977	4,816	628	2,106	6,922	2,734
1978	2,790	0	1,602	4,392	1,602
1979	1,370	0	3,599	4,969	3,599
1980	2,371	340	4,203	6,574	4,543
1981	0	418	4,002	4,002	4,421
1982	3,386	375	3,128	6,515	3,503
1983	0	586	3,013	3,013	3,600
1984	0	0	2,543	2,543	2,543
1985	1,463	530	4,111	5,574	4,641
1986	4,218	0	4,129	8,347	4,129
1987	9,392	805	4,379	13,770	5,184
1988	3,099	827	6,016	9,115	6,842
1989	0	819	6,487	6,487	7,307
1990	1,380	296	6,799	8,179	7,096
1991	35	0	6,414	6,449	6,414
1992	1,543	1,393	5,987	7,530	7,380
1993	7,175	815	5,916	13,091	6,730
1994	1,970	442	7,022	8,992	7,464
1995	0	0	7,681	7,681	7,681
1996	918	1,992	7,336	8,254	9,328
1997	13,588	3,160	10,178	23,766	13,338
1998	45,379	2,911	9,072	54,451	11,983
1999	12,358	0	8,306	20,663	8,306
2000	5,930	0	9,430	15,360	9,430
2001	0	498	9,761	9,761	10,259
2002	8,142	154	8,832	16,974	8,986
2003	9,556	933	11,221	20,777	12,153
2004	2,981	2,145	13,856	16,837	16,001
2005	0	225	16,716	16,716	16,941
2006	0	0	10,805	10,805	10,805
2007	0	3,152	14,347	14,347	17,499
2008	17,947	0	22,375	40,321	22,375
2009	0	0	22,237	22,237	22,237
2010	11,260	3,559	29,001	40,261	32,560
2011	8,255	1,274	33,042	41,296	34,316
2012	31,380	0	34,286	65,666	34,286
Cumulative	**219,194**	**29,353**	**372,254**	**590,234**	**401,607**
Average	**4,567**	**554**	**7,024**	**12,297**	**7,577**

1/ All U.S. dollar figures are nominal
2/ (.) indicates no available data, whereas (0) indicates a value of 0.

Appendix II. The Components of Brazil's Trade Misinvoicing

Table 2. Brazil: The Components of Trade Misinvoicing, 1960-2012

(in millions of U.S. dollars) 1/, 2/

Year	Import Misinvoicing		Export Misinvoicing		Total Inflows (b+c)	Total Outflows (a+d)	Gross Trade Misinvoicing (a+b+c+d)
	Over-Invoicing (a)	Under-Invoicing (b)	Over-Invoicing (c)	Under-Invoicing (d)			
1960	43	78	41	84	119	127	246
1961	52	90	91	101	181	153	334
1962	96	25	50	191	75	286	362
1963	146	12	107	155	119	302	421
1964	124	21	52	221	74	346	419
1965	65	54	62	165	116	230	346
1966	32	41	53	192	95	224	319
1967	72	60	64	191	124	263	387
1968	38	139	48	256	187	294	481
1969	104	59	126	205	185	309	495
1970	263	26	142	290	167	553	721
1971	316	6	151	343	157	659	816
1972	352	53	246	363	299	715	1,014
1973	387	128	447	628	576	1,015	1,591
1974	1,359	219	576	654	795	2,014	2,809
1975	1,882	0	387	1,133	387	3,015	3,402
1976	1,382	6	949	430	955	1,812	2,767
1977	972	401	1,017	1,135	1,418	2,106	3,524
1978	930	127	825	672	952	1,602	2,554
1979	1,718	275	654	1,881	929	3,599	4,528
1980	2,241	103	979	1,962	1,082	4,203	5,285
1981	1,727	90	1,831	2,275	1,921	4,002	5,923
1982	997	940	1,000	2,131	1,940	3,128	5,069
1983	1,300	875	1,465	1,714	2,341	3,013	5,354
1984	297	1,727	1,418	2,246	3,145	2,543	5,688
1985	463	1,159	1,228	3,648	2,387	4,111	6,498
1986	492	1,340	1,152	3,637	2,491	4,129	6,620
1987	611	1,969	1,388	3,768	3,357	4,379	7,736
1988	541	2,278	2,327	5,475	4,606	6,016	10,621
1989	1,027	2,065	2,428	5,461	4,493	6,487	10,980
1990	1,543	1,639	2,076	5,256	3,715	6,799	10,515
1991	1,287	1,886	1,810	5,127	3,696	6,414	10,109
1992	300	1,660	2,406	5,686	4,066	5,987	10,053
1993	1,946	914	3,677	3,970	4,591	5,916	10,506
1994	1,829	3,395	3,506	5,193	6,901	7,022	13,923
1995	1,552	4,904	3,137	6,129	8,041	7,681	15,722
1996	1,695	4,477	5,325	5,642	9,801	7,336	17,138
1997	2,600	6,494	5,070	7,578	11,563	10,178	21,741
1998	2,222	6,298	2,632	6,850	8,930	9,072	18,002
1999	2,712	4,446	1,702	5,594	6,148	8,306	14,454
2000	2,410	6,655	2,206	7,020	8,861	9,430	18,291
2001	2,522	8,188	1,884	7,238	10,072	9,761	19,833
2002	2,063	7,423	1,776	6,769	9,199	8,832	18,031
2003	2,136	5,906	1,748	9,085	7,653	11,221	18,874
2004	1,999	9,529	2,744	11,857	12,274	13,856	26,130
2005	2,643	10,870	2,239	14,073	13,108	16,716	29,824
2006	2,716	13,896	4,353	8,089	18,249	10,805	29,054
2007	4,674	18,948	7,059	9,673	26,008	14,347	40,355
2008	5,603	23,853	7,108	16,772	30,960	22,375	53,335
2009	4,662	19,066	9,847	17,574	28,913	22,237	51,150
2010	10,996	23,147	14,675	18,005	37,821	29,001	66,822
2011	13,533	28,971	18,624	19,509	47,595	33,042	80,637
2012	11,520	32,258	24,688	22,766	56,946	34,286	91,232
Cumulative	**105,191**	**259,188**	**151,596**	**267,063**	**410,784**	**372,254**	**783,038**
Average	**1,985**	**4,890**	**2,860**	**5,039**	**7,751**	**7,024**	**14,774**

1/ All U.S. dollar figures are nominal
2/ (.) indicates no available data, whereas (0) indicates a value of 0.

Appendix III. Illicit Flows to GDP and Trade

Table 3. Brazil: Illicit Flows to GDP and Trade, 1960-2012

(in millions of U.S. dollars or as percent) 1/, 2/

Year	Illicit Financial Flows	GDP	Total Trade	Illicit Financial Flows to GDP	Illicit Financial Flows to Total Trade
1960	127	15,166	2,729	0.84%	4.65%
1961	153	15,237	2,863	1.00%	5.34%
1962	424	19,926	2,688	2.13%	15.78%
1963	378	23,021	2,862	1.64%	13.21%
1964	563	21,212	2,665	2.65%	21.13%
1965	261	21,790	2,667	1.20%	9.79%
1966	249	27,063	3,206	0.92%	7.77%
1967	297	30,592	3,284	0.97%	9.04%
1968	295	33,876	3,968	0.87%	7.43%
1969	350	37,459	4,531	0.93%	7.72%
1970	553	42,328	5,532	1.31%	10.00%
1971	666	49,204	6,608	1.35%	10.08%
1972	715	58,539	8,774	1.22%	8.15%
1973	1,015	79,279	13,202	1.28%	7.69%
1974	2,081	105,000	22,117	1.98%	9.41%
1975	3,453	124,000	22,309	2.78%	15.48%
1976	1,812	153,000	23,943	1.18%	7.57%
1977	2,734	176,000	25,383	1.55%	10.77%
1978	1,602	201,000	27,743	0.80%	5.77%
1979	3,599	225,000	34,901	1.60%	10.31%
1980	4,543	235,000	45,124	1.93%	10.07%
1981	4,421	264,000	47,370	1.67%	9.33%
1982	3,503	282,000	41,242	1.24%	8.49%
1983	3,600	203,000	38,750	1.77%	9.29%
1984	2,543	209,000	42,215	1.22%	6.02%
1985	4,641	223,000	39,972	2.08%	11.61%
1986	4,129	268,000	37,990	1.54%	10.87%
1987	5,184	294,000	42,539	1.76%	12.19%
1988	6,842	330,000	49,575	2.07%	13.80%
1989	7,307	426,000	54,267	1.72%	13.46%
1990	7,096	462,000	53,936	1.54%	13.16%
1991	6,414	407,000	54,567	1.58%	11.75%
1992	7,380	391,000	58,909	1.89%	12.53%
1993	6,730	438,000	66,159	1.54%	10.17%
1994	7,464	614,000	79,737	1.22%	9.36%
1995	7,681	769,000	100,644	1.00%	7.63%
1996	9,328	840,000	104,728	1.11%	8.91%
1997	13,338	871,000	117,237	1.53%	11.38%
1998	11,983	844,000	111,792	1.42%	10.72%
1999	8,306	587,000	99,779	1.41%	8.32%
2000	9,430	645,000	113,762	1.46%	8.29%
2001	10,259	554,000	116,668	1.85%	8.79%
2002	8,986	504,000	110,161	1.78%	8.16%
2003	12,153	552,000	124,084	2.20%	9.79%
2004	16,001	664,000	163,111	2.41%	9.81%
2005	16,941	882,000	196,157	1.92%	8.64%
2006	10,805	1,090,000	233,645	0.99%	4.62%
2007	17,499	1,370,000	287,294	1.28%	6.09%
2008	22,375	1,650,000	380,320	1.36%	5.88%
2009	22,237	1,620,000	286,667	1.37%	7.76%
2010	32,560	2,140,000	393,452	1.52%	8.28%
2011	34,316	2,480,000	492,985	1.38%	6.96%
2012	34,286	2,253,090	470,957	1.52%	7.28%

1/ All U.S. dollar figures are nominal
2/ (.) indicates no available data, whereas (0) indicates a value of 0.

Appendix IV. Estimating Brazil's Underground Economy

Measuring the informal, or underground, sector of an economy has been of interest to many researchers concerned with development. There are primarily three categories of techniques used to measure for informality.

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, MIMIC models aim to link unobserved variables to observed ones to derive the size of the underground economy.[34]

Due to data constraints, we model our estimates of the underground economy in Brazil according to the 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 the works of Tanzi.[35] We model our estimates very similar to Tanzi's, but along the lines of Macias due to data limitations and the issues related to using the ratio of currency demand to holdings of money.[36] Our final model was as follows:

$$Ct = \beta_0 + \beta_1 + \beta_2 Tax_t - \beta_t IR_t$$

Where C is the currency held outside banks normalized by the price level, Y is real income, Tax represents total tax revenue collected, 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 vector error correction model (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

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[34.] Friedrich Schneider, "Measuring the Size and Development of the Shadow Economy. Can the Causes be Found and the Obstacles be Overcome?," in *Essays on Economic Psychology*, eds. Hermann Brandstaetter and Werner Güth (Berlin: Springer Publishing Company, 1994a).

[35.] Vito Tanzi, *The Underground Economy in the United States: Annual Estimates, 1930-80*, IMF Staff Papers 30(2) (Washington, DC: IMF, June 1983).

[36.] Jose Brambila Macias, *The Dynamics of Parallel Economies. Measuring the Informal Sector in México*, MPRA Paper No. 8400 (Munich: University Library of Munich, 2008), 4.

gives us an estimate of the extra currency in the economy. This figure is then multiplied by the velocity of money, similar to Tanzi's and numerous other studies, to get our final estimate.[37]

Our estimates put the average size of the underground economy to GDP at 38.9 percent over the entire period of study. This puts our estimates similar to, but slightly less, than Schneider et al.'s estimate of 39.0 percent for the period 1999-2007.[38]

Chart 4. Underground Economy in Brazil, Decadal Averages, 1960-2012
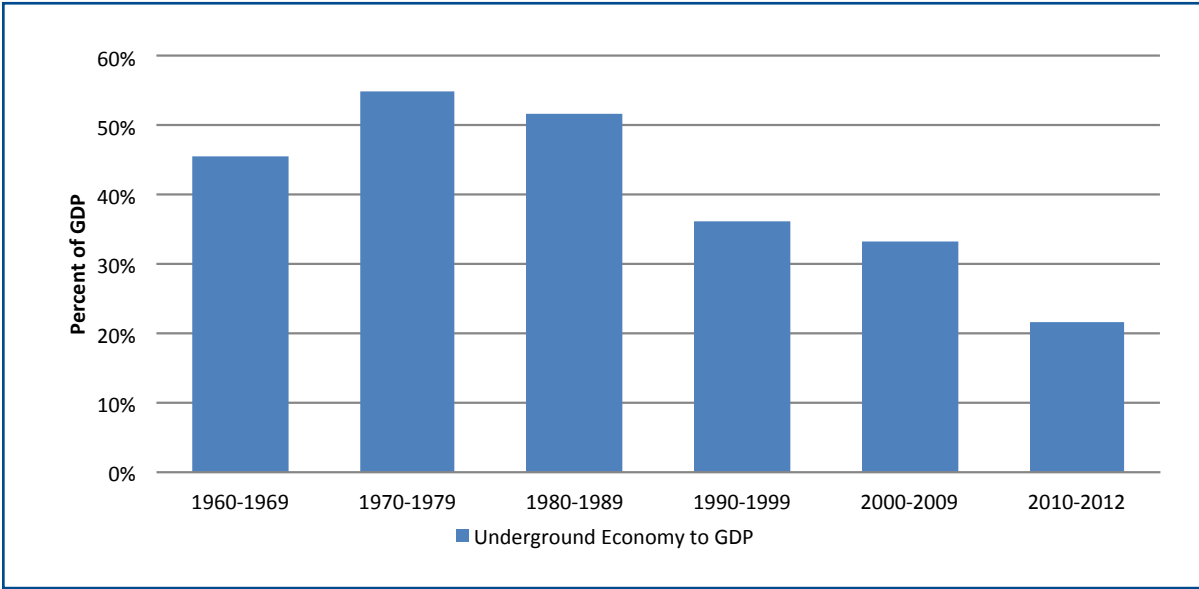(in percent of GDP)

Table 4. Underground Economy in Brazil, Decadal Averages, 1960-2012
(in percent of GDP)

Year	Average Underground Economy to GDP
1960-1969	45.76%
1970-1979	55.09%
1980-1989	51.78%
1990-1999	36.30%
2000-2009	33.27%
2010-2012	21.79%
1960-2012	**38.90**%

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37. Tanzi, *Underground Economy.*
38. Friedrich Schneider, Andreas Buehn, and Claudio E. Montenegro, "New Estimates for the Shadow Economies all over the World," *International Economic Journal* 24:4 (2010), 454.

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About Global Financial Integrity

Global Financial Integrity (GFI) is a non-profit, Washington, DC-based research and advocacy organization, which produces high-caliber analyses of illicit financial flows, advises developing country governments on effective policy solutions, and promotes pragmatic transparency measures in the international financial system as a means to global development and security.

About the Author

Dev Kar is the Chief Economist at Global Financial Integrity. Prior to joining GFI, Dr. Kar was a Senior Economist at the International Monetary Fund (IMF), Washington DC. During a career spanning nearly 32 years at the IMF, he worked on a wide variety of macroeconomic and statistical issues, both at IMF headquarters and on different types of IMF missions to member countries (technical assistance, Article IV Consultations with member countries, and Use of IMF Resources). He has published a number of articles on macroeconomic and statistical issues both inside and outside the IMF. Dr. Kar has a Ph.D. in Economics (Major: Monetary Economics), an M. Phil in Economics (Major: International Economics) from the George Washington University, and an M.S. in Computer Science (Major: Database Management Systems) from Howard University. His undergraduate degree in Physics is from St. Xavier's College, University of Calcutta, India.