

## Census and sample in Capital Surveys in Brazil<sup>1</sup>

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### Abstract

The long Brazilian dependence on foreign savings to foster its economic growth obliged the government not only to impose strict controls on capital flows but also to establish a system for registering them, including the stocks. With the liberalization of capital flows, the purpose of controls became increasingly more statistical and the nature of data collected changed. In this scenario, foreign capital surveys in the country have since been resumed. In latest surveys, the method of collection has changed significantly, turning from paper to electronic online responses and focusing on statistical needs. Recently, in the period between censuses, data collection has been complemented by sample surveys. This article aims to give an overview of the systems by which statistics of flows and positions of different capital modalities are collected. In the sequence, it describes the method utilized in the census surveys and its evolution to samples survey, as well as the data inputting. An analysis of the series resulting from each process is provided to illustrate the differences and the results.

Key words: foreign investment, collection of statistics, measurement of investment position, communication of statistics

### 1. Introduction

The Brazilian economy has a long history of tapping foreign savings to foster its economic growth. These resources flow to the economy under the modalities of Foreign Direct Investments (FDI), external debt, and, more recently, equity capital. Considering that investments can flow back and debt bears interests and amortizations to be paid, the Brazilian Central Bank (BCB) established a set of systems to register the exchange trade and the position of investments and debts.

With the increasing liberalization of the current account and the capital account, especially from the 90's on, the register systems were simplified and became declaratory, with the Central Bank's role being converted from controller to monitor.

In 1995, in addition to administrative data collected through the register systems, the BCB began to conduct surveys with enterprises that host foreign investments and take out external loans. These surveys, which are conducted every five years, are improved in each edition. In addition to the country's liabilities survey, the BCB began to collect statistics on the assets owned by residents abroad. In this framework, the first Brazilian Capital Survey was conducted in 2001. Both surveys are intended to be censuses, since they seek to collect information from all enterprises and individuals recipient of almost every kind of foreign investment or holding capital abroad.

Even though investors and debtors' positions shown by periodic surveys are complemented by statistics on flows, sample surveys began to be conducted in 2011 with the aim of following these positions more closely and increasing data periodicity. In this context, a survey with a sample composed of direct invested enterprises and short-term debtors is being conducted every year and a survey with a sample composed of residents (individuals and enterprises) holding assets abroad is being conducted every quarter.

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This paper aims to present this experience. In the second session, it gives an overview of the systems by which statistics on flows and stocks of different capital modalities are collected. In the next two sessions, the methodology underlying the census surveys and its evolution to the sample surveys is described, as well as the data inputting. A short analysis of the series resulting from each process is provided in the last session in order to highlight the differences and discuss the results.

## **2. Register systems**

Due to legal restrictions, transactions carried out in other currencies except the domestic currency, the real (BRL), are forbidden in the Brazilian territory. Therefore, all foreign currency exchanges must be registered by means of a foreign exchange contract, and is assumed as a transaction between a non-resident and a resident, following the principle of external accounts. Exchange contracts are registered at the International Transaction Reporting System (ITRS), managed by the Brazilian Central Bank. The contract contains information about the transaction – as the code of the transaction nature, the amount traded and the currency –, about the resident – like his name, the taxpayer code, economic activity – and about the non-resident – name, country, economic sector – for example. Each transaction must be registered in one single contract and there is no threshold for the registration requirement, thus assuring the registration of every legal currency exchange. Not only the contract registration provides for data in full details, transaction by transaction, but it is made online, thus allowing the Central Bank to monitor flows in real time. The Brazilian ITRS is the main source of data concerning flows compiled in the Balance of Payments.

Regarding positions, the Electronic Declaratory Registration Systems were implemented in modules between 1997 and 2001. The register must be made by the debtor or by the invested company, or by their representative, which is responsible for all information disclosed.

As for loans (including intercompany loans) and leasing operations, as well as import financing, fixed-income securities issued abroad and debt service settled abroad, they must be reported in the Electronic Declaratory Registration - Register of Financial Operations (RDE-ROF, in Portuguese). Each record represents one single liability, receives an individual ID code and must contain: the identification of all parties involved in the operation – debtor, creditors, agents, guarantors etc -, all the contract's financial details – principal amount and maturity, type of interest rate and spread, periodicity of payments, surcharges, fees, commissions, currency of denomination, type of operation. The ID code of the record should be informed when any payment linked to the original transaction is done and the exchange contract is registered at the ITRS.

It is important to notice that, in order to be accepted by the system, any exchange contract related to a flow, like disbursements, interest payments, amortizations, as well as any contract modification, due to debt reorganization, write-offs, or debt assumption, for example, must provide for the correct ID code from the original record in the RDE-ROF.

The RDE-ROF allows the monitoring and the control of the country's external debt, its amount, the currencies in which the debt was issued and its financial conditions. Since these systems are operated online, information of the ID code of the original operation on the occasion of an exchange contract registration, due to the payment of interest or due to the amortization of any of its installments, impact the total amount registered, affecting immediately the stock of external debt.

With this available information, the Central Bank is able to build a maturity profile, on a monthly basis, for the entire period. Currently, this figure is published on a monthly basis, referring to the current year, and on an annual basis, for which the maturity profile goes until 2040. Furthermore, such information constitutes a powerful tool in the formulation of economic policy.

The operation of the Electronic Declaratory Registration System for Foreign Direct Investments (RDE-IED, in Portuguese) is similar to the RDE-ROF. The resident company recipient of the FDI must have a registration number (ID code) in the system providing for the investment details and the investor's identification. Any cross border capital movement associated with this investment must be identified in the exchange contract, being registered in the file of the invested enterprise. This system is also prepared to register the reinvested earnings, although this is not mandatory.

Foreign investors under the modalities of equity capital and debt securities on the domestic market should nominate a domestic manager who will be their representative to the Central Bank and other Brazilian institutions. Each representative should register the investor and himself in the Portfolio Module of the Electronic Declaratory Registration System for Foreign Capital. The investor's ID code must be informed in all exchange contracts related to inflows channeled to investments in the capital market and or in the money market. Since the modality of investment assets is also indicated in the exchange contract, the Central Bank is able to classify capital flows according to different modalities of portfolio investments.

Notwithstanding data on the foreign investor portfolio position is collected by the Securities Exchange Commission (CVM, in Portuguese), the method is quite similar, since any foreign investor should have his resident representative who should inform the CVM about the transactions and the positions held by the original investor. This system registers non-resident positions on fixed-income securities and equities issued on the domestic market, equities issued abroad, as well as contracts in future markets.

The Central Bank, by means of the ITRS and the register systems described above, is able to monitor capital flows and the nominal positions of foreign investors and domestic debtors.

However, these systems do not provide information about the market value of stocks, which is a more adequate proxy for estimating the impact on exchange markets of eventual outflows, and should be the first valuation criteria according to international standards and definitions referring to the International Investment Position. The market value is, probably, the most important missing information of these register systems, especially with regard to direct investment positions. For this purpose, the conduction of surveys with the same enterprises already registered in these systems was taken into account.

### **3. Censuses Surveys**

The first survey aiming to compile statistics about invested enterprises and domestic debtor companies was conducted in 1996, inquiring about their position on December 31, 1995. The survey's target group involved all corporations for which a share of the paid-in capital is owned by non-residents, or holding liabilities with a non-resident entity above US\$ 1 million. The survey coverage of the totality of non-resident investments is checked against enterprises already registered in the RDE and in the ROF, in addition to likely new investment recipients and debtors identified by the ITRS.

Not only some economic inquired data - like the number of employees, the value of exports and imports etc - but also other good quality information are made available through the survey: reinvested FDI earnings, the corporations' FDI relationship (FDIR), direct investment valued at market value (MV) and valued at own funds at book value (OFBV), direct investment in special purpose entities (SPE), the FDI position classified according to ultimate investing country, by immediate investing country and by industry, as well as short-term trade credit liability.

In 2001, the BCB began to collect data on assets held by residents abroad via the Brazilian Capital Survey (BCS). The survey's target group included individuals and corporations holding assets against non-residents equivalent to or above US\$100 thousand.

This survey also provides additional and improved information as compared to available alternatives, like the reinvested earnings of direct investments abroad, assets classified as intercompany loans, position of assets abroad as direct investments, real state, portfolio investments, financial derivatives and other investments, classified by immediate host country, by industry and by currency. Again, an additional important feature is that data on stocks are mainly market valued.

Both surveys are conducted through the Brazilian Central Bank website. The electronic web form provides for several advantages to respondents and compilers as well. For respondents, it is easy to answer and send the questionnaire to the Central Bank. Also, he may resume an answer began before an interruption and he will have access to his former answered questionnaires. For compilers, this method provides for built-in checkups before the submission of answers, ensuring the quality of data provided, as well the fill in of all relevant questions. Also the compiler is able to find out if the answering is in progress and the response ratio can be analyzed on a daily basis before the deadline. Usually, the period of data collection is seven weeks, and the evolution of the number of respondents is followed day by day. It is also possible to estimate a curve, and the last two weeks are busiest than the first five. The team in charge to conduct the survey is ready to contact respondents in the event that delivered forms are much different from expected figures.

Electronic information sent by respondents is automatically stored in a data warehouse, thus allowing a preliminary data release shortly after the survey deadline. An automatic validation mechanism on the online system ensures that respondents' answers be consistent. After being collected, data may also be manually validated by two methods: (i) by checking significant variations not explained by the flows registered in the balance of payments; (ii) by crosschecking the survey's information with information obtained from different sources, e.g, the balance of payments, and national and international news.

A group of top 300 enterprises, chosen in terms of their share on the total stock, is more closely monitored. If necessary, a member of the team will contact the respondent and ask for further information.

In the first FDI Survey, the number of respondents totaled 6,322, which increased to 11,404 in 2000, 17,605 in 2006, and 13,662 in 2010. Meanwhile, the FDI stock declared in 1995, US\$ 41.7 billion, climbed to US\$ 670 billion in 2010.

The Brazilian Capital Survey conducted in 2001 revealed total assets abroad worth US\$ 68.6 billion, totaling 11,659 respondents. In 2011, the number of respondents rose to 21,716 and the total assets' value increased to US\$ 281.1 billion.

The FDI Survey is conducted every five years, while the BCS is conducted every year. However, the increase in the amount of stocks and the need for a more closely monitoring of flows and positions led to the conduction of sample surveys more frequently. Although FDI stocks recorded in the RDE system refer to the book value of the capital originally invested and the extra capital of each additional investment opportunity, the market value is not updated. Thus, a more frequent survey seems to be useful.

#### **4. Sample Surveys**

The Foreign Direct Investment Survey and the Brazilian Capital Survey revealed that investments in the country and abroad are very concentrated. Thus, the sample surveys were designed by utilizing thresholds including the most relevant respondents with regard to information required for measuring the total FDI, short-term trade credit liabilities and assets held abroad classified by instruments. Therefore, more frequent sample surveys are focused on these companies and individuals. The increased data periodicity was more than enough to offset the effect of the lower number of respondents.

The annual Foreign Direct Investment Survey<sup>2</sup> inquires companies about either (i) direct participation of non-residents in their capital and net worth of more than US\$100 million; or, (ii) companies with trade credit with non-residents worth more than US\$ 10 million. These thresholds comprise 80% to 90% of the total value, but represent only a small percentage of the total number of respondents, between 10% and 20% of the survey's target group (Table 1).

**Table 1: Defining the Samples for Brazilian Capital Survey and Foreign Direct Investment Survey**

Number of respondents	BCS survey - 2011		FDI survey - 2010	
	% of respondents	% of stock of equity capital	% of respondents	% of stock of equity capital
Top 100	1.5%	84.1%	0.7%	60.7%
Top 300	4.6%	90.7%	2.2%	76.9%
Top 500	7.6%	93.2%	3.6%	83.8%
Top 1 000	15.4%	96.1%	7.2%	91.2%
Top 3 000	46.1%	99.2%	21.6%	98.2%
Top 5 000	76.9%	99.9%	36.1%	99.5%
Top 10 000			72.2%	100.0%

Source: BCB

In the latest annual Foreign Direct Investment Survey, the sample survey referring to 2011 data, the total stock was estimated at US\$ 589 billion (Table 2). Out of this amount, 89%, or US\$ 523.3 billion, was obtained by the survey and 11%, or US\$ 65.7 billion, was inputted. The sample survey received only 3,176 responses, compared to 16,844 in 2010, when there was no threshold for respondents. It is noteworthy the voluntary participation of more than a thousand companies not obliged to declare, which increased the number of respondents in 2011.

**Table 2 - Imputation of Data – Foreign Direct Investment Equity Stock (inward)**

	2011 (US\$ million)	%
Total	589,190	100.0
Sample Survey Data	523,291	88.8
Imputed Data	65,899	11.2
Stock from previous survey (without threshold)	56,484	9.6
Flows	6,330	1.1
Newborn corporations - flows	3,084	0.5

Source: BCB

The quarterly BCS survey obliges residents with US\$100 million dollars abroad to declare. Even though this threshold comprises between 80% and 90% of the total value, it represents only a small percentage of the total number of respondents, something around 0.5% of individuals and between 10% and 20% of companies. In the latest Brazilian capital survey, referring to data collected for the 3Q2012, the stock of equity capital was estimated at US\$ 216.9 billion, out of which, US\$ 190.4 billion, was obtained through the survey and US\$ 26.4 billion was inputted. There were only 313 respondents, compared to 21,786 in the complete Brazilian capital survey (78 of total 19,456 households, and 235 of total 2,330 corporations).

The process of validation of data received from the samples is similar to that utilized in the complete surveys.

In order to input data, compilers mostly replicate the values referring to missing respondents declared in the previous survey, adding exchange rate correction (data is published in U.S. dollars, but investments may be denominated in other currencies), their flows registered in the Balance of Payments and data obtained through RDE from new companies.

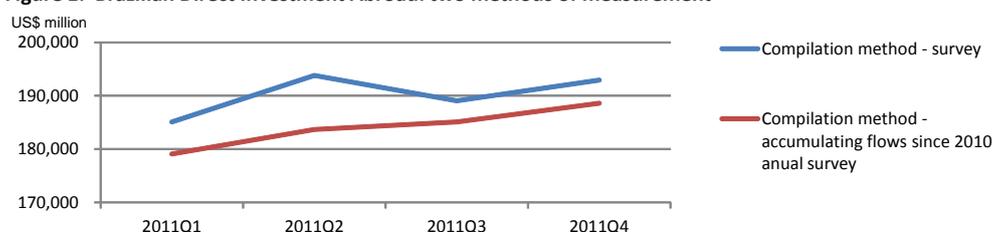
<sup>2</sup> The results for 2010 and 2011 are available at <http://www.bcb.gov.br/?CENSUS20112012>

One week before the deadline, aiming to ensure that all relevant respondents have been made aware of the need for declaring their investments to the Central Bank, they are contacted by members of the team by phone. In addition, an e-mail containing information about the declaration is sent to all potential respondents, which are identified via flows registered in the Balance of Payments, previous declarations and foreign capital RDE records. After the deadline, potential respondent companies that failed to answer the survey are once again contacted by the Brazilian Central Bank in order to assure that they were not obliged to declare.

### 5. Final remarks

The Brazilian ITRS permits the measurement of the flows of the different modalities of foreign investment in the country, as well as resident's investment abroad, having an ample coverage and being timeless. Stocks are compiled through other systems as the Electronic Declaratory Registers. The use of surveys started in 1996 permitted to the BCB to complement statistics on position as well as to improve the quality of them through the market value of the investments made. In the case of the stock of equity capital held by Brazilians abroad, for example, the survey provides for more adequate information than the alternative method of adding up the sum of the flows over an previous stock (Figure 1).

Figure 1: Brazilian Direct Investment Abroad: two methods of measurement



The high concentration of foreign investments in the country and of the resident asset holder's abroad stimulated the design of sample surveys, allowing the BCB to compile statistics of positions in shorter periodicity. The samples were defined via thresholds including the most relevant respondents with regard to information required for measuring the total FDI, short-term trade credit liabilities and assets held abroad classified by instruments.

The experience have shown the advantages of more frequent surveys in terms of quality of the statistics, and the use of the sample reduced significantly the costs for the respondents and for the BCB, with a limited effect on the quality of the results (Table 3).

Table 3 - Foreign Investment in Brazil and Brazilian investment Abroad: Universe and Sample Surveys

	1995	2000	2005	2010	2011
Number of corporations	6,322	11,404	17,605	16,844	3,176
Survey FDI equity stock - US\$ million	41,696	103,015	162,807	587,209	523,291
Imputed value FDI equity stock - US\$ million	-	-	-	-	65,899
Total value FDI equity stock - US\$ million	41,696	103,015	162,807	587,209	589,190

Brazilian Investment Abroad - Survey for position					
	2010 Annual	2011Q1	2011Q2	2011Q3	2011 Annual
Number of households	17,879	109	72	78	19,430
Number of corporations	2,191	227	228	235	2,308
Survey FDI equity stock - US\$ million	169,066	154,936	168,646	163,705	192,933
Imputed value FDI equity stock - US\$ million	0	30,145	25,153	25,364	0
Total value FDI equity stock - US\$ million	169,066	185,081	193,799	189,069	192,933

Source: BCB