

Invoice currency in Brazil

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Resumo

O artigo descreve a escolha da moeda de faturamento no comércio exterior brasileiro, focando no uso do real (BRL). A base de dados do MDIC é utilizada pela primeira vez com este propósito. Ainda que o dólar americano seja a moeda mais utilizada, o crescimento do faturamento em reais cresceu excepcionalmente. Afasta-se definitivamente a ideia de o real não ser utilizado no comércio exterior brasileiro. Importações brasileiras apresentam uma maior tendência para serem faturadas em moedas não-internacionais que as exportações. Evidências do comércio brasileiro não confirmam algumas constatações internacionais anteriormente obtidas. Ainda que sejam produtos homogêneos, açúcar e tabaco são os dois principais produtos exportações que são faturados em reais. Não há coincidência do uso do real como moeda de faturamento e como moeda de pagamento.

Palavras-chave: comércio internacional; uso do real; moeda de denominação; moeda de faturamento

Abstract

The article describes the invoice currency choice in the Brazilian foreign trade, focusing on the use of the Brazilian real (BRL). The MDIC database is freshly used with this purpose. Even the US dollar being far most used in Brazil than in other countries, the BRL use for denominating trade has unusually grown. We categorically move away from the idea that the BRL is not used in Brazilian international trade. Brazilian imports show a larger tendency to be invoiced in non-international currencies than exports. Brazilian trade evidence does not confirm some previous international findings. Albeit being homogenous products, sugar and tobacco are the two main exported merchandise denominated in BRL. BRL use as invoice currency and payment currency do not match.

Keywords: international trade; Brazilian real use; currency denomination; currency invoicing

JEL: F14; F39; F20; E58; E42; F13; D23

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I. Introduction

Discussions about Brazilian real (BRL)'s international role usually get to a common drawback: whether it does exist any international role. Here, departing from a base definition in which an international currency is one used beyond the limits of its issuing country, we report that some agents use the Brazilian currency for invoicing foreign trade indeed.

In this article, we describe the invoice currency choice in the Brazilian foreign trade, focusing on the Brazilian real (BRL) use. We register, for the first time, the Brazilian foreign trade according to its invoice currency, exploring the Brazilian Ministry of Development, Industry and Foreign Trade (MDIC) series from 2007 to 2011. In this way, this study intends to contribute to fill the gap regarding the Brazilian economy and the BRL use.

The literature gap on this issue may be explained by the historical fragility of the Brazilian economy, which can be noticed in the numerous currency replacements, mainly in the late 1980s. From 1986 to 1993, Brazil had five different currencies². The BRL adoption in 1994 is a milestone of economic transformations in Brazil, which now allows broadening the scope of current country's currency discussions.

Exports paid in BRL were not allowed in Brazil until April 2007. In the former shortage of foreign currency framework, exports revenue was the main source of obtaining foreign exchange. The obligation of receiving foreign trade revenue in a foreign currency was the way to deal with that restriction. The changes in the economic environment and the consequently more availability of foreign currencies allowed the withdrawn of this restraint, in an environment where restrictions to foreign exchange were also progressively removed.

Alongside this policy change, another government policy affected the BRL invoicing during the examined period. In October 2008, Brazil and Argentina launched a bilateral payment system, the Local Currency Payments System (SML, in the Portuguese acronym). By the request of SML settled trade operations to be invoiced in the exporter's national currency, traders willing to use the payment system were driven to invoice Brazilian exports in BRL or Brazilian imports in Argentinean pesos (ARS).

Even though, because of the Brazilian economic history, almost all Brazilian exports are invoiced in United States dollars (USD). The residual share is invoiced in other international currencies. However, the BRL invoice has significantly grown between 2007 and 2011. Here, we describe this growth, contributing to the understanding of the BRL in the international stage and to understanding the behavior of currency invoicing from the point of view of a non-international currency, reporting the data in a large collection of tables.

This article is presented in six sections. In the following section, we provide some background on currency internationalization and on the discussions about the use of vehicle currencies. Then, in section III, we describe our database and the methodology. Section IV describes in which currencies the Brazilian trade is invoiced. Besides the prevailing United States dollar (USD), we find that other international currencies and the local currency (BRL) are also used in trade and that, in imports, a small amount of trade is also invoiced in the exporter's non-internationalized local currencies. In this section we also point that BRL-invoicing share has grown during the observed period. Section V deals with the BRL-invoiced data. We describe the main trade partners and the main products invoiced in the domestic currency. In this section, we stress that some outcomes from the Brazilian trade analysis challenge some previous findings from the literature, both theoretical and empirical. Section VI concludes.

² The Brazilian currencies during that period were: 1967-86, the cruzeiro novo, renamed to cruzeiro in 1970 (BRB); 1986-89, the cruzado (BRC); 1989-90, the cruzado novo (BRN); 1990-93, the cruzeiro (BRE); and, 1993-94, the cruzeiro real (BRR). (Banco Central do Brasil 2007)

II. Currency internationalization and vehicle currencies

Currency internationalization is a process by which the functions of a domestic currency become acknowledged by economic agents beyond the issuing country's frontiers³. Two of these functions are the medium of exchange and the unit of account. They correspond, accordingly, in the international trade transactions, to the currency that denominates the asset exchanged for a good; and the currency used to denominate the invoice price of an operation. Although the currency used for invoicing a trade operation and for settling it may not be the same, some researchers found that they usually match, being the same currency used in both cases (Friberg and Wilander 2008; Ito et al. 2013; Zhang 2014).

Following these considerations, the incidence of a currency being used for denominating foreign trade is an indicator of level of its international acceptance⁴. By choosing a currency to invoice their trade, the exporter and the importer endorse their understanding that the chosen currency is acknowledged as unit of account for both of them and confirm it as a medium of exchange.

We may then ask which currency is to be chosen. It can be the currency issued by the exporting country, the one issued by the importing country, or a currency issued by a third party. This third-party currency, different from the ones issued by the trading countries, is known as vehicle currency. In this article, the term invoice currency identifies the currency in which the amount of a trade operation was invoiced.

Three literature tracks about vehicle currency choice are summarized by Goldberg and Tille (2008). The first one focus on financial transactions instead of trade. In this track, transaction costs arising from the currency use are essential to the choice of the currency in which an agent invoice. Transaction costs are primarily associated to currency liquidity characteristic in the international financial markets (Swoboda 1969; Swoboda 1968). The second track focus on relating the invoice currency choice of a product to specific characteristics of its industry. Agents trading products with homogenous characteristics and trading in specific markets would present a higher propensity to point an single international currency, which allows pricing and trading to happen without adding extra costs (Krugman 1980; McKinnon 1979). The third track relates the invoice currency choice to the currency's macroeconomic predictability. Accordingly, an agent choses the invoice currency in order to minimize the expected revenue volatility (Baron 1976).

In addition to the reasons why an agent choses for invoicing in a particular currency, other core questions about trade invoicing may be summarized in how the invoice currency choice influences the internationality⁵ of a currency and how the currency's internationality influences agents when choosing for a currency to invoice their operations. It is a reasonable assumption that international currencies are more likely to be chosen as invoice currency by two different parties, mainly because of the net externalities effect reported by Flandreau e Jobst (2009). The invoice currency is chosen because everybody else has made the same choice. Yet, an international currency's acceptance is function of its share in international trade payments, as summarizes Wu et al. (2010) when investigating conditions to the currency internationalization process. Therefore, the understanding of the BRL's international role and its world positioning relates in part to its use in Brazilian foreign trade, what we describe in this article in order to register the BRL use standing.

The research on the BRL as invoice currency intends to analyze the nine-time growth between 2007 and 2011 in its total share on Brazilian foreign trade, from 0.13% to 1.25%. Albeit being limited the BRL's total share as an invoicing currency, the usage-level difference in five years is significant.

³ Throughout this article, we use the term *country* in order to represent not only a country but also a set of countries forming a coalition intended to issue a single currency. E.g. the Eurozone that is composed by fifteen countries that, through a common monetary authority (the European Central Bank), issue the euro. The euro is legal tender over all countries' territory.

⁴ For a discussion on advantages and disadvantages of having an international currency see, for example, Papaioannou and Portes (2008), Frankel (2012) and Cohen (2012).

⁵ We understand internationality as the currency's property of having its properties acknowledged by non-resident agents.

III. Data and methodology

A. Trade data

We have analyzed the Ministry of Development, Industry and Foreign Trade (MDIC)'s monthly exports and imports data in the 2007 to 2011 period. The MDIC records every export and import transaction made from and to Brazil. Both export and import values are recorded as their FOB⁶ values (without freight nor insurance costs) by the MDIC. The data are obtained from the export declaration presented by an exporter to the MDIC and from the import declaration presented by an importer to the federal revenue service (*Receita Federal do Brasil*, RFB). In these declarations, traders declare each operation's invoice currency and amount. The declared amount is converted into USD, according to the daily exchange rate, and stored at the database in this currency.

The data we evaluate are detailed by country and by subitem according to the Mercosul Common Nomenclature (NCM in the Portuguese acronym, 8 digits). This nomenclature is an extension from the World Customs Organization's Harmonized Commodity Description and Coding System (HS). In the NCM two additional digits are aggregated to the original six from the HS system and the NCM is standardized for Mercosul customs purposes.

We could not obtain detailed data by firm, so it was not possible to verify, in particular, the hypothesis that registers in local currency are due to the multinational firms' internal accounting. Firms with Brazilian and foreign operations have their international intra-firm logistics accounted as exports and imports as they were different firms. Nonetheless, it is arguable that the accounting factor outweighs the commercial factor, so invoicing in the domestic currency would be because of the will to avoid foreign exchange volatility in one firm's balance and not because of an unrestricted currency choice. The unavailability of detailed data by firm prevents verifying this hypothesis.

The amounts registered in the Brazilian trade database are in the US currency. The use of this currency in the database as the record currency is significant itself. It explains how the domestic economy is dependent on an external reference. This pattern is not different from other countries, as we will discuss later on. However, the resort on the US dollar is observed in a high degree in Brazil. So, albeit the present study is focused on the invoice of Brazilian foreign trade in BRL, the presented data are shown in USD.

From the data, we dropped the records resulting from ships and aircrafts supply, unless otherwise mentioned. The operations registered under this purpose – like fuel, maintenance spare parts and food supply – take place in order to supply needs of foreign ships and aircrafts while in transit in Brazil. Albeit being exports, these expenditures are due to local consumption. Thus, we assume there is a natural bias when traders choose the domestic currency to invoice. Significant share of BRL invoice are due to these operations: 71%, in the 2007-8 average; and 23%, in the 2009-11 average). Not dropping them would overestimate transactions in the Brazilian currency resulting from cases when the buyer has limited ability to choose a currency rather than the local one.

Regarding import data, we must be particularly cautious concerning their interpretation. The MDIC's database records as origin country the one where the merchandise was produced, not the nationality of the foreign firm that carried out the sale (Ministério do Desenvolvimento, Indústria e Comércio Exterior 2013). So, there are merchandise which the documented origin is Brazil. These merchandises were formerly exported to a foreign country and, later, they were exported back to Brazil, being registered as a Brazilian import of a Brazilian merchandise. These Brazilian-origin merchandise data were also dropped from data tables because they do not provide a significant explanation to the origin of BRL-invoiced products, which is aimed in here. These Brazil-originated merchandises did not

⁶ Following the INCOTERMS 2010, the *free on board* (FOB) value is the one that considers the goods value without the addition of freight and insurance costs. It is to distinguish from the CIF value, which considers the good value plus the values of insurance and freight and is the usual method to register import data on the World Trade Organization (WTO) statistics.

reach a 0.05% until 2009 but showed a significant share in 2010, 17.68%, and in 2011, 8.65%. Most of these later figures are related to train imports: 12.56% and 5.03% are due to these operations.

Regarding the difference in inflation between the domestic and foreign currency, we assume it is absorbed by the exchange rate between the two currencies. Additionally, deflating by USD inflation (8.5%) or by BRL inflation (24.6%) would bring us different relative results with little contribution to our work. Studying the BRL use with data recorded in USD has a natural choice of reference. As the magnitude of BRL use growth (960%) is considerably higher than inflation rates, we dispel them as the exclusive cause for the overall event. Thus, the exchange rate volatility during the period replaces the series deflating and we present data in nominal current values for each year. We discuss the exchange rate volatility furtherer on this article.

B. International currencies

The definition of what is an international currency is not clear. From a currency that is globally dominant (Eichengreen 2011, 150–2) to a currency used outside the issuing country's borders (Frankel 2012), the use of this term is not standardized. Equally, a set of similar terms – like international reserve currency, internationally convertible currency, global currency – are used to indicate a large amount of currency conditions, making these terms an unsettled issue in the literature. Here, we consider as international a currency sufficiently used in the international stage and a non-international currency otherwise.

As criteria for a sufficiently used and convertible currency in foreign trade, those currencies available for trade in the *Continuous Linked Settlement* (CLS). The CLS is a private settlement system that offers the international settlement of transactions between different currencies. We choose the CLS participation as the criteria for convenience. The binary answer to the currency internationalization issue substantially simplifies the evaluation of a currency characteristics regarding to its perception by agents spread worldwide. This is why we consider a continuous index more appropriate to represent the currency internationality status. Nevertheless, the binary answer given by the CLS participation is a sufficiently comprehensive set, which is adequate to the considerations held here. This is why we make the choice for this set of currencies. Accordingly, the 17 currencies available in the CLS are the ones we consider with international status⁷ (CLS GROUP 2012).

IV. Invoice currencies in Brazilian foreign trade

We start describing exports in order to evaluate the invoice currency in Brazil foreign trade by describing the exports. As mentioned in Section I, Brazilian exporters were forbidden to receive their payment in domestic currency until 2007, the year our series starts. From 2007 to 2001, we may notice that the Brazilian exports' distribution by invoice currency is highly concentrated. Eleven currencies were used to invoice, having the USD been used to invoice approximately 95% of the total exported amount. All currencies used to invoice exports are international currencies, except the domestic BRL. Besides the USD, the remaining amount is invoiced mainly in euro (EUR) and residually in the other nine currencies: the BRL; the pound sterling (GBP); the Japanese yen (JPY); the Swedish krona (SEK); the Canadian dollar (CAD); the Australian dollar (AUD); the Swiss franc (CHF); the Norwegian krone (NOK); and the Danish krone (DKK). Table 1 shows a summary of these data on the exports group.

The USD is the major invoice currency. Its prevalence is significant and it is higher when compared to those observed in many other countries. Figure 1, adapted from Goldberg and Tille (2008), graphs the relation between the country's exports to the US share (vertical axe) and the country's USD use ratio in

⁷ In order to join the CLS, a currency shall be considered *sufficiently convertible*. For that reason, we use this market perception to evaluate which are the internationally convertible currencies in this article. Clearly, being part of the CLS is subject to political criteria, e.g. the US Federal Reserve (Fed) shall approve the currency. We understand these issues as non-economical restrictions to a currency being part of the CLS. This consideration is beyond this article's objective. Aware of that, we understand that a currency being party of the CLS is enough to indicate that it shows a high internationality level due to its *sufficient convertible* considerations.

export invoicing (horizontal axe). The 45°-line represents the hypothetical case in which USD invoicing matches exports to the US. We plot the Brazil point as the 2007-2011 average over the original figure. All the other points correspond to the original data resulting from observations held between 1996 and 2003.

Table 1 - Currency share on invoicing value of Brazilian exports and imports, by currency, 2007-11 (%)

Currency		Exports					Imports				
		2007	2008	2009	2010	2011	2007	2008	2009	2010	2011
US dollar	USD	94.7	94.4	93.8	94.3	94.5	85.5	85.7	83.2	83.6	83.8
Euro	EUR	4.76	4.95	4.51	4.28	3.80	11.1	10.7	12.2	11.6	11.3
Brazilian real	BRL	0.13	0.16	1.11	0.82	1.25	0.48	0.50	1.08	1.83	1.95
Pound sterling	GBP	0.21	0.19	0.34	0.37	0.34	0.42	0.30	0.39	0.40	0.34
Japanese yen	JPY	0.13	0.18	0.16	0.12	0.11	1.93	2.12	2.28	1.85	1.79
Swedish krona	SEK	0.06	0.10	0.01	0.00	0.00	0.17	0.23	0.23	0.26	0.34
Canadian dollar	CAD	0.02	0.01	0.02	0.02	0.02	0.04	0.03	0.04	0.04	0.04
Australian dollar	AUD	0.02	0.02	0.02	0.02	0.01	0.02	0.03	0.04	0.02	0.02
Swiss franc	CHF	0.01	0.01	0.00	0.01	0.00	0.30	0.28	0.38	0.33	0.30
Norwegian krone	NOK	0.00	0.00	0.01	0.00	0.00	0.05	0.09	0.09	0.11	0.11
Danish krone	DKK	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.01	0.02	0.01
Other currencies		-	-	-	-	-	0.07	0.02	0.03	0.01	0.02

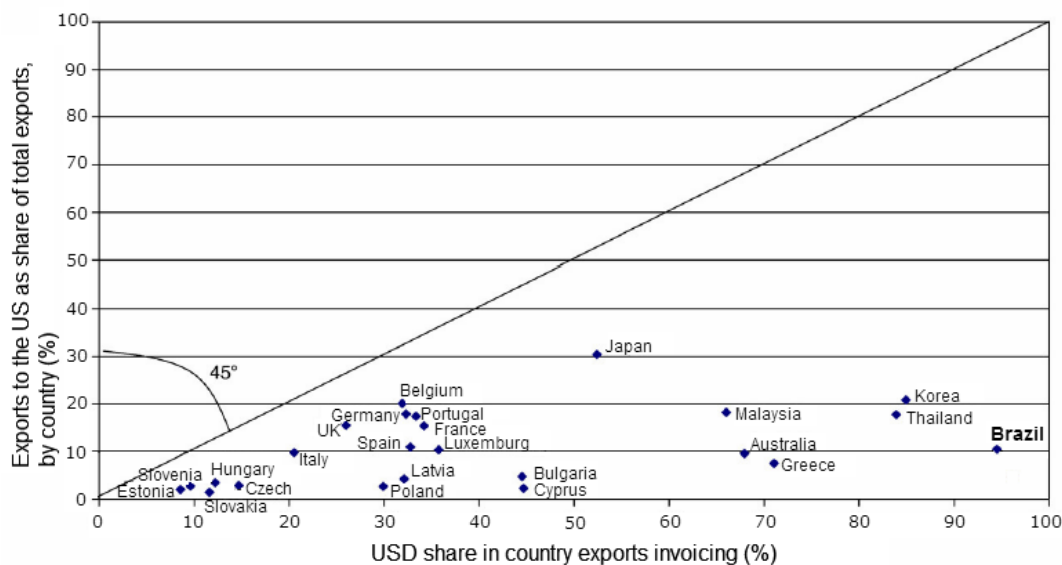
Source: Ministry of Development, Industry and Foreign Trade

Note: Conventions used: 0.0: numerical data resulting from rounding an originally positive numeric data, -: numeric data equals zero, not due to rounding.

We notice that invoicing in USD in Brazil is considerably higher when compared to the countries on the original sample. We emphasize, though, that the original sample consists mainly of European and some Asian countries. European countries largely trade with regional partners within the European Union itself. When choosing the invoice currency, these countries have the EUR as a regional choice to denominate their trade. In most cases, at least the counterpart country uses the EUR as domestic currency; in a large number of cases, the EUR is the domestic currency for both countries. Ligthart and Werner (2012) described the connection between a larger domestic currency denomination and the EUR using a Norwegian exports database analyzing the European currency introduction. Asian countries, by an analogous argument, could present a similar trend, albeit being in a smaller scale, when we consider the regional trade. Some studies found some degree of regional resorting on currencies like the JYN (Ito et al. 2013), the RMB (Chen and Cheung 2011) and the NZD (Fabling and Sanderson 2013). A desirable comparison, which is beyond the scope of this work, would contrast the Brazilian relation to the relation presented by other countries in Latin America, assuming they are counterfactuals more appropriate to the Brazilian case.

Anyway, the USD share in export invoicing remained stable during the series plotted in Table 1, whilst the BRL share in export invoicing significantly increased with the decrease of the EUR and other currencies' share. This confirms the curiosity about the BRL increase phenomenon. Yet, if the BRL was used as invoice currency on operations to 24 different countries in 2007, in 2011 the number of destinations where to the BRL was used grew to 96 countries.

Unlike Brazilian export invoicing, the invoice of imports does not hold exclusively in rather international currencies or BRL. Albeit international currencies' share is almost the whole of imports (99.98%), other non-international national currencies are also identified in addition to the BRL. The remaining 0.02% – about USD 220 million – is distributed among a large set of currencies. Minor operations are accepted by Brazilian importers to be invoiced in different currencies. During the analyzed period, the number of currencies in this set slightly increased from 32 (in 2007) to 36 (in 2001). The right side of Table 1 (imports) consolidates the data on international currencies and the BRL share.

Figure 1 - USD use in world exports

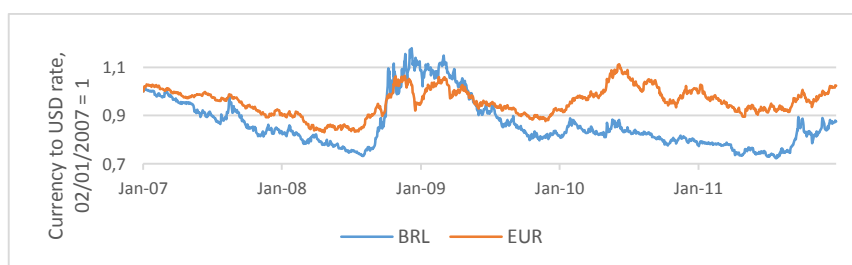
Note: Adapted from Goldberg and Tille (2008). Brazil's point is calculated from 2007-11 Ministry of Development, Industry and Foreign Trade data average. For all other countries, points are related to the original article observations, collected between 1996 and 2003.

Albeit still being predominant in Brazilian import invoicing, the USD has a smaller share: approximately 85%. On the other hand, EUR import share twice as large as its export share. It stayed steady at an 11% level. The BRL is third, growing from 0.5% to almost 2% in 2011, in a level similar to the JPY and above to the GBP.

Comparing BRL-invoiced exports and imports, imports in BRL has lesser grown. However, its 1.95% share is over the 1.25% export share.

One drawback challenging the BRL use growth is the foreign exchange variation. As reported in the previous section, Brazil's foreign trade is recorded in USD. Thus, changes in other currencies' share could be attributed to their exchange rate against the USD variation. Thus, we shall be cautious in concluding that there was substitution of invoicing in one currency to another by only evaluating the trade flow data detailed by the operation's invoice currency.

Figure 2 displays the variation of the BRL and the EUR against the USD from 2007 to 2011 normalized for the first day. During this period, the BRL pursued an appreciation trend against the USD, just strongly reversed during the deepening of the international financial crisis. The EUR followed a similar trend during the early period, on a smaller scale. After the crisis deepening, the EUR appreciation weakened and gap between the two currencies' rates could suggest some impact over the evaluation of nominal Brazilian trade data recorded in USD.

Figure 2 - Exchange rate variation (2007-11)

Source: Central Bank of Brazil

We focus on the BRL-invoicing share increase. Even considering the exchange variation in the period, the increase on invoice share was significant to the BRL: exports grew from 0.13% to 1.25%. It is a nine-time increase on the BRL-invoicing share, while the annual average exchange rate fluctuated less than 15%. Compared to the 2007 level, the daily closing rate average was 6% lesser in 2008; 2% higher in 2009; 10% lesser in 2010 and 14% lesser in 2011. As argued for inflation, exchange rate variation is not sufficient to be the only explanation to the BRL-use growth.

V. Trade in BRL outlook

We turn to the examination of the Brazilian trade data that have been invoiced in BRL. We divide this section into four different subsections. In the first one, we describe the trade data, observing the main origins and main destinations and exploring the major product that have been invoiced in the Brazilian currency. On the following subsections, we highlight the evidences we found from data, contrasting the latter to some results we would expect from trade theory.

Table 2 details BRL-invoiced exports by country. This table displays all countries whose 2007-11 average of its share in total exports invoiced in BRL is over 1%. Table 3 shows the imports flow.

A. BRL invoicing became more common

It is a fact that two different level of BRL-invoiced exports happened, albeit we cannot definitely state a growth trend because of the short evaluation period. Nonetheless, it is clear that invoicing in BRL is in a higher level in the 2010-11 period than in the previous years.

Table 2 shows the main export destination list, listing those countries that presented over 1% share in BRL-invoiced Brazilian exports on the series average. There are three columns for each year. The one in the left shows the total amount of BRL-invoiced exports, in millions of USD; the one in the middle shows the country's share in total BRL-invoiced Brazilian exports; and the one on the right shows the BRL-invoicing share in total exports to the country.

Even if twelve countries are listed as main destinations, the three Brazil's Mercosul partners (Argentina, Paraguay and Uruguay) represent over 85% of BRL-invoiced exports in the years between 2007 and 2010 and over 53% in 2011. If Mercosul partners showed an outstanding leadership in BRL-invoicing in the earlier period, invoicing in this currency spread across export partners in the last year. This diffusion suggests that exporters become more likely to use their domestic currency in invoicing. While just 24 countries were destination to exports invoiced in BRL in 2007, this number has risen to 96 different countries in the last year. This number has gradually risen until 2010 (60 countries), when it increased steeply in the next year.

Argentina and Paraguay are two special highlights on the list presented on Table 2. Paraguay was the leading country in the years 2007 and 2008 with more than two thirds of total BRL-invoiced exports. Argentina replaced Paraguay on that position on the following years, representing a maximum of 82% in 2009. What happened though was not a reduction of the amount exported in BRL to Paraguay but a sharp increase of Brazilian exports to Argentina in BRL. Considering the deflated values, BRL exports to Argentina have risen by more than 28,000% between 2007 and 2011, while the ones to Paraguay have risen by 59%. Subsection C goes deeper into the Argentinean case.

Now, let us contrast the exports figures to the imports one. Table 3 shows 90% of the total amount of these imports by country. Data are displayed by year in two columns. The left column shows the total BRL-invoiced amount imported from that origin, in millions of USD, and the right column shows the share of BRL invoiced imports compared to total Brazilian imports from that country.

As shown in Table 1, imports in BRL share is 1.95% against exports share of 1.25%. Like Brazilian exports destinations, the number of countries exporting in BRL gradually grew from 53 to 81 during the evaluated period. Albeit being in a similar level, the set of countries to which imports in BRL are destinations the most is substantially different from the exports-in-BRL set.

Table 2 – BRL-invoiced Brazilian exports main destinations, by country (2007-11)

Export destination	2007			2008			2009			2010			2011		
	USD M	Ctr/TBE	BRL/TE	USD M	Ctr/TBE	BRL/TE	USD M	Ctr/TBE	BRL/TE	USD M	Ctr/TBE	BRL/TE	USD M	Ctr/TBE	BRL/TE
Argentina	4.3	2.2	0.0	12.4	4.1	0.1	1,361	82	11	1,106	67.5	6.0	1,327	42.5	5.8
Paraguay	151.7	75.3	9.2	216.7	71.0	8.7	187.5	11	11	249.4	15.2	9.8	261.4	8.4	8.8
Uruguay	28.4	14.1	2.2	36.9	12.1	2.2	32.2	1.9	2.4	40.5	2.5	2.6	61.6	2.0	2.8
Bolivia	5.8	2.9	0.7	25.7	8.4	2.3	17.4	1.0	1.9	18.7	1.1	1.6	71.4	2.3	4.7
Belgium	-	-	-	0.1	0.0	0.0	0.0	0.0	0.0	124.4	7.6	3.6	170.3	5.5	4.3
United States	-	-	-	3.8	1.2	0.0	17.5	1.1	0.1	27.8	1.7	0.1	197.1	6.3	0.8
U Arab Emir.	-	-	-	-	-	-	0.0	0.0	0.0	-	-	-	126.9	4.1	5.8
Germany	-	-	-	0.8	0.3	0.0	13	0.8	0.2	10.5	0.6	0.1	68.9	2.2	0.8
Netherlands	0.6	0.3	0.0	3.8	1.2	0.0	0.5	0.0	0.0	0.0	0.0	0.0	63.9	2.0	0.5
France	6.1	3.0	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	4.1	0.1	0.1
U Kingdom	0.1	0.0	0.0	-	-	-	15	0.9	0.4	18.7	1.1	0.4	22.8	0.7	0.4
Canada	-	-	-	0.0	0.0	0.0	2.6	0.2	0.2	4.5	0.3	0.2	71.5	2.3	2.3

Source: Ministry of Development, Industry and Foreign Trade

Note: Countries whose 2007-11 average of its share in total exports invoiced in BRL is over 1%. Each year is split in three columns: left column (USD M) shows the total amount exported to the country in millions of USD; the middle column (Ctr/TBE) shows the country's share in total Brazilian exports in BRL; the right column (BRL/TE) shows the BRL invoicing share in total exports to the country.

Conventions used: 0.0: numerical data resulting from rounding an originally positive numeric data, -: numeric data equals zero, not due to rounding.

Table 3 – BRL-invoiced Brazilian imports main origins, by country (2007-11)

Import origin	2007		2008		2009		2010		2011	
	M USD	%	M USD	%	M USD	%	M USD	%	M USD	%
Germany	110	1.3	170	1.4	213	2.2	399	3.2	684	4.5
United States	202	1.1	214	0.8	273	1.4	357	1.3	536	1.6
China	1	0.0	5	0.0	80	0.5	309	1.2	467	1.4
Brazil	0	0.1	0	0.2	0	0.0	588	74	381	51
Switzerland	118	5.4	136	6.1	179	8.7	320	11	380	13
United Kingdom	1	0.1	2	0.1	46	1.9	145	4.6	373	11
South Korea	0	0.0	100	1.8	112	2.3	281	3.3	343	3.4
Sweden	11	0.8	15	0.9	18	1.6	115	6.7	129	5.9
Japan	9	0.2	15	0.2	51	0.9	100	1.4	116	1.5
Denmark	18	5.0	29	6.3	18	5.1	39	7.2	116	16
Italy	9	0.3	14	0.3	28	0.8	121	2.5	116	1.9
Ireland	21	4.8	24	4.8	55	11	66	12	87	13
France	32	0.9	23	0.5	43	1.2	109	2.3	85	1.6
India	1	0.0	55	1.5	127	5.8	23	0.5	72	1.2
Israel	1	0.2	2	0.1	5	0.7	6	0.6	68	7.5
Malaysia	0	0.0	6	0.4	14	1.1	42	2.4	63	2.8
Puerto Rico	-	-	-	-	17	11	68	32	59	22
Mexico	0	0.0	0	0.0	8	0.3	57	1.5	46	0.9
Taiwan	0	0.0	2	0.0	9	0.4	39	1.3	41	1.2
Thailand	0	0.0	0	0.0	8	0.6	22	1.2	33	1.4
Argentina	2	0.0	3	0.0	5	0.0	23	0.2	29	0.2
Belgium	0	0.0	0	0.0	6	0.5	9	0.6	27	1.5
Austria	0	0.0	0	0.0	3	0.3	8	0.6	22	1.5
Netherlands	0	0.0	4	0.2	18	1.8	19	1.1	22	1.0
Spain	0	0.0	0	0.0	0	0.0	6	0.2	12	0.4
Canada	11	0.7	15	0.5	9	0.6	4	0.2	11	0.3
Chile	0	0.0	-	-	-	-	0	0.0	11	0.2
Uruguay	5	0.7	5	0.5	3	0.2	1	0.1	11	0.6

Source: Ministry of Development, Industry and Foreign Trade

Note: Top 90% in amount origins of BRL-invoiced Brazilian imports. Each year is split in two columns: left columns is the total amount imported from the country in millions of USD; right column is the share of imports in BRL over total imports, by country.

Conventions used: 0.0: numerical data resulting from rounding an originally positive numeric data, -: numeric data equals zero, not due to rounding.

From Table 3, we notice that the countries that exported the most invoicing in BRL were the ones in which currencies with international acceptance are legal tender. Among the fifteen top exporters in BRL, only three have non-international currencies: China, South Korea and India. Indeed, the United States are the country that shows the second largest amount invoiced in BRL. When the non-international BRL is contrasted to the leading USD in the invoice currency choice, there are occasions in which the first is the chosen, suggesting the existence of other characteristics rather than solely the international use as determinant to the currency invoicing choice.

Regarding the distribution among countries, imports are concentrated in a few. Germany, the United States and China account for two-fifths of the total amount. The Mercosul partners do not show the same share in imports as in exports. Argentina is in the list but its level of USD 25 million of exports invoiced in BRL is far from the USD 1.25 billion level imported in its neighbor's currency. The bilateral balance of payments is not that negative as it is in BRL. Imports from Paraguay and Uruguay are not likely to be invoiced in BRL too.

We also note that some countries have a high share on BRL invoicing regarding Brazilian total imports. The cases of Switzerland and the UK draw attention for being a relatively high value in absolute terms for BRL invoiced imports invoiced when listed by origin, as well as more than one-tenth of imports from these countries are BRL invoiced in those years. Analysis of the products sold in BRL can contribute to understand these values and thus we pass to this observation.

After observing origins and destinations, we now want to understand what sort of products are being invoiced in BRL. Table 4 and Table 5 give us an overview of that for exports and for imports, respectively. Both tables present, for each year, two information for each detailed product. The one on the left is the total amount of trade that has been BRL-invoiced, in millions of USD; the one on the right is the product's share on total BRL-invoiced trade flow.

The top exported products are electrical energy, tobacco and sugar. They are a significant portion of BRL invoicing in exports and they are going to be deeply explored in future parts. The subsections containing the discussion about Argentina contains electrical energy, as Argentina was its only destination. A special subsection discusses tobacco and sugar.

Part of motor vehicles and footwear are the major sorts of products that follow on the exports list. Parts of motor vehicles are exported in BRL mainly to Argentina (95.9%). Paraguay holds 3.7% and the remaining share is split among Germany (0.18%), Bolivia (0.16%), Mexico (0.04%) and India (0.02%). Footwear holds a similar pattern, having Argentina, 95.7%, and Paraguay, 3.7%. Minor destinations are Bolivia (0.34%), Uruguay (0.28%), Japan (0.01%) and France (0.003%). The same similar pattern happens to iron and non-iron steel rolled products; white goods; and shampoo and other hair preparation. Mercosul countries as main destination also occurs to ceramic building products, which are mainly exported to Paraguay (94.4%).

The pattern where regional partners are the main destination does not hold to the other listed products. Alcoholic beverages are exported in BRL to the United States (41.3%); Paraguay (18.0%); Jamaica (14.4%); Trinidad e Tobago (13.2%); the Netherlands (5.3%) and other 5 destinations with less than 5% each. The United Kingdom (28.8%), Germany (25.1%), the United States (21.5%), Australia (9.9%), Canada (5.5%) and six others (below 5% each) are gelatin and derivatives destinations.

Looking into to imports, the main product that Brazilian importer may invoice in BRL is pharmaceuticals. They represented 60% of total BRL-invoiced imports in the series first year. Despite its amount grew during the observed period, its share has declined, what is attributed to a list of imports invoiced in BRL diversification.

Some oddness may come from pharmaceuticals BRL-invoicing because of they being produced by large companies exporting worldwide. We would expect them to be invoiced in the exporter's currency, the usual assumption on invoice currency choice.

Table 4 – BRL-invoiced exports, by product (2007-11)

Products	2007		2008		2009		2010		2011	
	USD M	%	USD M	%	USD M	%	USD M	%	USD M	%
Electrical energy	-	-	-	-	1066.0	64.8	343.2	21.3	274.3	8.9
Tobacco	-	-	-	-	-	-	135.8	8.4	495.5	16.1
Sugars	0.2	0.1	2.7	0.9	2.5	0.2	5.8	0.4	515.5	16.8
Parts of motor vehicles	3.9	2.0	7.5	2.6	18.5	1.1	128.7	8.0	291.4	9.5
Footwear (end product)	4.5	2.3	4.8	1.6	71.8	4.4	142.1	8.8	158.4	5.2
Alcoholic beverages	11.3	5.7	13.8	4.7	15.2	0.9	16.2	1.0	295.5	9.6
Iron/non-alloy steel rolled prods	5.4	2.8	11.2	3.8	42.6	2.6	121.5	7.5	122.1	4.0
White goods	6.0	3.1	8.0	2.7	48.6	3.0	116.0	7.2	65.9	2.1
Gelatin and derivatives	0.0	0.0	0.0	0.0	44.3	2.7	43.0	2.7	42.5	1.4
Shampoo and other hair preps	0.7	0.4	0.6	0.2	29.6	1.8	39.2	2.4	41.8	1.4
Ceramic building products	13.5	6.8	21.0	7.1	17.3	1.0	26.1	1.6	30.2	1.0

Source: Ministry of Development, Industry and Foreign Trade

Note: Products accounting for over 3% in at least a year are detailed. Each year's left column is the BRL-invoiced product's amount, in millions of USD. The right column is the product's share on total BRL-invoiced exports.

Conventions used: 0.0: numerical data resulting from rounding an originally positive numeric data, -: numeric data equals zero, not due to rounding.

Table 5 – BRL-invoiced imports, by product (2007-11)

Products	2007		2008		2009		2010		2011	
	USD M	%	USD M	%	USD M	%	USD M	%	USD M	%
Pharmaceuticals	349.3	61.4	429.0	49.8	643.6	46.6	1,306	39.3	1,601	36.3
Electrical equipment	25.4	4.5	163.0	18.9	364.6	26.4	756.6	22.8	924.5	21.0
Railway vehicles and materials	-	-	-	-	-	-	570.9	17.2	369.9	8.4
Machinery and appliances	48.2	8.5	67.5	7.8	82.2	5.9	154.5	4.6	284.6	6.5
Land vehicles other than railway	0.0	0.0	0.0	0.0	0.4	0.0	0.9	0.0	221.0	5.0
Organic chemicals	8.7	1.5	3.9	0.4	11.2	0.8	28.8	0.9	209.6	4.8
Miscellaneous chemical products	51.6	9.1	81.5	9.5	76.2	5.5	91.4	2.7	177.4	4.0
Optical and medical instruments	42.3	7.4	54.2	6.3	78.4	5.7	149.5	4.5	171.6	3.9
Beverages and spirits	-	-	0.0	0.0	31.0	2.2	55.2	1.7	128.3	2.9

Source: Ministry of Development, Industry and Foreign Trade

Note: Products accounting for over 2% in at least a year are detailed. Each year's left column is the BRL-invoiced product's amount, in millions of USD. The right column is the product's share on total BRL-invoiced imports.

Conventions used: 0.0: numerical data resulting from rounding an originally positive numeric data, -: numeric data equals zero, not due to rounding.

One explanation we may present is that these large companies also have local subsidiaries in the destination country. So, invoicing pharmaceuticals in BRL may be related to international shipment within the same corporate group. Within the same corporate group, choosing the remitter's or the remitee's currency may be the suitable solution for revealing exchange risk from one firm's accounts. Pharmaceuticals are most of BRL-invoiced imports from Germany (44%) and the United States (75%) and are almost all imports from Switzerland (90%). Indeed, 28.1% of BRL-invoiced pharmaceuticals come from the United States; 24.3%, from Switzerland; and 16.7%, from Germany. Other 20 countries are also on this origin list.

Electrical equipment is next as main BRL-invoiced imported products. They are 30.7% originated from South Korea and 29.7% from China. India (10.3%), Japan (6.7%) and other 50 countries follow. China and South Korea are the highlights regarding to total amount imported in BRL. India, however, is a highlight when considered the BRL-invoicing share. Almost half of BRL-invoiced electric equipment imports came from India in 2009. Considering the whole period, 25.3% of these products came BRL-invoiced from India.

The equipment to build railway tracks follows on Table 5 and they have Brazil registered as their origin. These are those operations, which the imported product was manufactured in the importing country. This sort of import seems to present a transitory characteristic, intending to fulfill particular needs, and happened in the last years of the series, requiring additional observations to confirm this idea.

The other listed products follow a pattern where a few countries are the major BRL-invoice origin and the remaining amount is distributed among several minor origins. This happens to machinery and appliances (Ireland - 21.0%; South Korea - 16.5%; China - 16.4%; Germany - 14.5%; United States - 8.7%; and 45 others); chemicals, including organic chemicals and miscellaneous chemical products (Germany - 59.0%; United States - 13.6%; Israel - 8.8%; France - 6.1%; and 25 others); and optical and medical instruments (Germany - 29.3%; United States - 14.3%; Japan - 12.7%; and 35 others). BRL-invoiced imports showing less diversified origin countries are beverages and spirits, which came from the United Kingdom (70.9%), United States (20.5%), Chile (5.2%) and six others, and land vehicles, of which 98.8% come from the United Kingdom and mainly consist on passenger automobiles.

Concluding our description of BRL-invoiced trade, we focus on the products to which the BRL was the main choice of invoicing. We consider the entire period and only products with USD 10M or greater flows. Shares above 75% are shown in Table 6.

B. BRL exports to Argentina shows a distinct pattern

A number of countries have shown significant increases, as the 2011 figures are expressively higher and more spread among countries than the previous ones. Argentina is the highlight. It presented an increase from USD 4.3 M in 2007 to USD 1,327 M in 2011. BRL-invoiced exports accounted, in 2010 and in 2011, for 6% of total exports to the Brazil's largest trade partner.

Table 6 - BRL-invoice share on total trade, by product and by country (2007-11)

BRL-invoiced exports			BRL-invoiced imports		
Product (destination)	USD M	%	Product (origin)	USD M	%
Fiber-cement articles (Paraguay)	42.4	91	Chemicals: phenols (Germany)	11.2	92
Tomato preparations (Paraguay)	28.3	90	New pneumatic tires (Slovakia)	11.8	87
Iron flat-rolled products (Paraguay)	18.8	89	Antisera and other blood fractions (Switzerland)	916.9	85
Electrical energy (Argentina)	1,938.5	87	Electronic hardware (Ireland)	24.6	81
Poultry meat (Bolivia)	13.2	83	Composite diagnostic or laboratory reagents (Germany)	368.6	78
Brazil nuts (Bolivia)	17.5	77			
Soya-bean oil (Paraguay)	27.1	77			
Candles and the like (Paraguay)	17.4	76			

Source: Ministry of Development, Industry and Foreign Trade

Note: Products listed are those that total flow is over USD 10 million and share is 75% or above. Amounts are the Brazilian total trade flow. The reported share is the BRL-invoiced flow divided by the total flow.

Electrical energy explains much of BRL-invoicing to Argentina growth. Its occurrence began in 2009 and it accounted for over 75% of total exports in BRL in that year. This strong weight decreased to a 20% level in 2011 though, suggesting that the increase in BRL-invoicing was not just a result from this new addition to the exports list.

Government's influence to the large energy contracts suggests the possibility of some bias on the invoice currency choice. Thus, we detach electrical energy figures from other traded products and present them on Table 7, which shows products that accounted for 3% or more of BRL-invoiced exports in at least one observed year. In 2009-10 figures, all exported electrical energy to Argentina was invoiced in BRL. This number has changed in 2011, when just slightly more than a half was invoice in BRL. Albeit the electrical energy addition to the exports portfolio invoiced in BRL had a strong weight, it does not explain the overall change in BRL-invoicing. Other products on the exports basket also started to be invoiced in the domestic currency, contributing to Argentina become a leader as BRL user on trade.

Footwear, parts of motor vehicles and rolled products of iron or steel are products that became the main ones exported with BRL-invoicing. All these three presented in 2011 a total exports amount over USD 100 M and an expressive growth on the series beginning in 2007. In 2011, more than 75% of footwear was invoiced in BRL. The BRL-invoiced share in that year for part of motor vehicles was 13% and for iron and steel products was 24%. Conversely, wooden planks, bananas, tuna and others main products in the earlier years kept the same level until the later years. A wider BRL-invoiced exports basket is the explanation for the overall growth to Argentina and started to happen from 2009 figures.

Table 7 - BRL-invoiced exports to Argentina, by product (2007-11)

	2007	2008	2009	2010	2011
Total BRL-invoiced exports (USD M)	4,3	12,4	1.361,2	1.106,0	1.327,3
Electrical energy exports in BRL (USD M)	-	-	1.066,0	343,2	274,3
... share in exports in BRL to Argentina (%)	0	0	78	31	21
... share in total electrical energy exports (%)	0	0	100	100	52
Exports, excl. electrical energy (USD M)	4,3	12,4	295,2	762,8	1.053,1
Products (USD M)					
Footwear	-	-	79,7	152,6	191,7
... End products	-	-	69,5	135,4	150,0
... Parts of footwear	-	-	10,2	17,2	41,6
Parts of motor vehicles	-	0,3	13,5	121,2	283,9
Rolled products of iron or steel	-	1,9	32,6	108,2	108,1
White goods	-	-	43,6	111,3	60,0
Shampoos and other hair preparations	-	-	29,1	38,3	40,7
New pneumatic rubber tires	-	-	-	12,2	58,5
Television receivers	-	-	3,0	39,8	19,9
Furniture	-	0,1	9,6	18,0	19,3
Wooden planks	2,7	2,0	1,5	1,9	1,7
Bananas	1,0	1,3	2,3	2,2	1,8
Tuna	-	0,5	3,5	3,8	5,0
Cellular polyurethane plates or sheets	-	0,6	4,1	2,0	3,1
Electric boards and panels	-	0,5	0,0	-	0,3
Onions and shallots	0,6	0,1	0,0	0,0	0,2
Iron reservoirs or tanks	-	0,4	0,3	0,0	-
Parts of heater machines	-	0,7	3,2	0,0	-
Electrical transformers and inductors	-	1,4	0,2	0,0	0,0
Other goods	0,2	2,5	68,9	151,3	259,0

Source: Ministry of Development, Industry and Foreign Trade

Note: Products accounting for over 3% in at least a year are detailed.

Conventions used: 0.0: numerical data resulting from rounding an originally positive numeric data, -: numeric data equals zero, not due to rounding.

The Argentinean-Brazilian Local Currency Payment System (SML) launching on late 2008 could be a reason for such noteworthy change of behavior in invoicing on exports to Argentina. The SML is operated by the both countries' central banks and its payment orders provide an aggregated exchange transaction between BRL and ARS. The expediency of central bank provided exchange transactions on the international wire transfer is an appeal for traders, which are required to invoice exports in their domestic currency.

Roughly, 51% of the amount invoiced in BRL is paid through SML payment orders from its launch until 2011. The comparison of our MDIC's database to SML's may be misleading though. We have to be aware to the methodology mismatch when such comparison is made. MDIC's data consist on shipped good and the price registered is the FOB price converted from BRL to USD by the exchange rate of export declaration date. SML's data consists on financial payments registered in BRL and reported monthly. For the magnitude comparison we presented, we converted monthly SML data to USD by the month's average exchange rate. In section VI, we will go deeper in this comparison.

The SML launching overlaps the deepening of the 2007-8 international financial crisis, what could be an alternative explanation for two major partners resort on their domestic currencies as an invoicing reference. The financial crisis affected Brazilian relations to countries, being then a possible explanation to the overall BRL-invoicing effect. Evaluating this effect and evaluating whether the BRL-invoicing growth is a trend would require a more extensive time-series though. Nevertheless, the policy that established the SML certainly made available for traders a convenient way to use the domestic currency, thereafter affecting their decision on currency choice.

Unlikely exports, no governmental intervention may be credited to the BRL use growth in imports, at least in a direct way, as we suggested to the Local Currency Payment System (SML) be a partial reason to exports growth invoiced in BRL. In the case of payments related to Brazilian imports, the bilateral payment system require them to be invoice in Argentine pesos (ARS). Thus, there is no direct impact over BRL use.

As observed in Subsection A, Argentina is not one of the main origin of products denominated in BRL, as it is a main destination for BRL-invoiced products. Indeed, invoices in the Brazilian currency are just 0.2% of total imports. Only 30 products use the BRL as invoice currency during the observed period. Pharmaceuticals accounts for almost 70% of total imports in BRL throughout the period, having veterinary vaccines over 44% share. They are almost entirely invoiced in BRL. Medicaments accounts for other 25%, whilst others pharmaceuticals and some plastic products were the only invoiced in BRL in 2007 and 2008. In the later years, the number raised to a 20 different products level, confirming some basket diversification, as reported for exports.

C. Homogeneous commodities exported in BRL

Sugar and tobacco are the two main products exported in BRL (Table 4). These products' lead on the list brings us an intriguing question. As homogeneous products in the international market and for being traded in commodity exchanges, we would expect traders to resort on an international currency to invoice (McKinnon 1979, 75–76; Krugman 1980). What we find from Brazilian trade data is the opposite though. The exporter's non-international local currency, the BRL, was used to invoice.

In 2011, sugar topped the list by total amount of exported products invoiced in BRL. In this year, 3.5% of total exported sugar was invoiced in BRL, a larger share than the 1.25% reported to total exports. Table 8 lists Brazilian exports of sugar invoiced in BRL by country. The United Arab Emirates were the destination for about a quarter of the total in that year, the only year it happened to this country on the series. Sugar was also a relevant product on BRL-invoiced exports to the United States, being the second most significant product revenues to this destination. Two other destinations were also prominent in exports of this product: Canada (USD 66 million) and Nigeria (44 million USD). Ghana, Colombia, Venezuela and Yemen South Africa are destinations, which imported sugar invoiced in BRL in a range

from USD 20 to 30 million each. At least, an attempt to invoice this homogenous product in the exporter's currency may be stated from the last year's data.

Table 8 - Sugar Brazilian BRL-invoiced exports, by country (2007-11)

Destination of sugar exports (USD M)	2007	2008	2009	2010	2011
United Arab Emirates	-	-	-	-	126.8
Canada	-	-	-	-	65.9
Nigeria	-	-	-	-	48.9
Ghana	-	-	-	-	28.0
Colombia	-	-	-	-	24.5
Yemen	-	-	-	-	22.1
Venezuela	-	-	-	-	21.7
South Africa	-	-	-	-	20.7
Angola	-	-	-	-	15.8
Paraguay	0.1	1.7	2.3	5.3	4.4
United States	-	-	-	-	12.5
China	-	-	-	-	12.4
Algeria	-	-	-	-	11.6
Bolivia	0.1	0.9	0.2	0.5	8.6
Mexico	-	-	-	-	10.1
Total countries (qty)	2	3	3	3	40

Source: Ministry of Development, Industry and Foreign Trade

Note: Countries accounting for over 1.5% of BRL-invoiced exports during the 2007-2011 series are listed.

Conventions used: 0.0: numerical data resulting from rounding an originally positive numeric data, -: numeric data equals zero, not due to rounding.

Similarly to sugar, tobacco stood out in BRL invoicing. Non-manufactured tobacco, which represents almost all Brazilian tobacco exports, was the form that presented the higher BRL-invoicing share. In 2011 (Table 9), 17% of tobacco exports was invoiced in BRL, what had been around 5% in the previous year and did not happened in previous years. In manufactured form, only 1% was billed in dollars in 2011. Main destinations were Belgium, Russia, Germany, the Netherlands, Poland, Turkey and China.

Like general data, tobacco exports in BRL spread between destinations. There were no events until 2009 but the number of destination countries sharply rose to 31 in 2011. Even if it was the same companies to export tobacco denominated in BRL, a larger number of importers accepted this denomination.

Table 9 - Brazilian BRL-invoiced Tobacco exports, by country (2007-11)

Destination of tobacco exports (USD M)	2007	2008	2009	2010	2011
Belgium	-	-	-	124.42	167.12
Russian	-	-	-	-	69.25
Germany	-	-	-	-	52.03
Netherlands	-	-	-	-	44.29
Poland	-	-	-	-	24.69
Turkey	-	-	-	-	20.35
China	-	-	-	-	15.37
Portugal	-	-	-	-	13.91
Ireland	-	-	-	-	11.83
United Kingdom	-	-	-	9.17	0.47
Total countries (qty)	-	-	-	6	31

Source: Ministry of Development, Industry and Foreign Trade

Note: Countries that exported at least USD 10M of unmanufactured tobacco (NCM 2401) in the 2007-11 series are listed.

Conventions used: 0.0: numerical data resulting from rounding an originally positive numeric data, -: numeric data equals zero, not due to rounding.

Tobacco was the main exported product to Belgium, which presented just other few items invoiced in BRL. To that destination, machinery parts were also denominated in BRL at amount level comparable to those of bordering countries. The spot as main destinations of BRL-invoiced exports was also granted to Germany and the Netherlands by tobacco, considering the larger exports volume during the evaluated series. It did not happen to Russia just because of exports in BRL having started just in 2011 to this country.

D. Payment and invoicing currencies match?

After analyzing the invoicing in BRL, an immediate question is how the BRL-invoice operations are paid. Invoicing in a selected currency mainly implies the exchange rate risk distribution between the exporter and the importer. Paying in a selected currency highlights the dependence on the currency's availability as a medium of exchange for the parties. Are BRL-invoiced trade operations also settled in Brazilian currency? Does invoice and settlement currencies match on Brazilian trade? How the payment currency choice works for a currency that is not widely available in international markets?

Similar interest has made some researchers to work on this issue for other countries and currencies. Friberg and Wilander (2008) report on a Swedish exporters' survey that payment and invoicing currencies are usually the same, while studying the Swedish krone use. Analogously, Ito et al. (Ito et al. 2013) promote a wide-ranging study questioning all Japanese manufacturing firms listed in the Tokyo Stock about currency invoicing. They also find that invoicing and payment currencies match. The theoretical model on international currencies developed by Zhang (2014) results on compatible outcomes with their empirical findings.

Here, we do not use firm questionnaires in order to deal with this issue. Conversely, we benefit from the large-scale oversight made by the Brazilian supervisor on foreign transactions. Although in compliance with banking secrecy regulation, no firm level data can be used, the wide coverage of registered operations may assist us to identify whether the invoice and payment currency-matching hypothesis holds in Brazilian trade.

Besides of having to register every foreign exchange financial transactions, every operation between a resident and a non-resident agent held in Brazil must be registered at the Brazilian central bank. Financial institutions are requested to report all operations above BRL 10,000. This is the same limit an individual would face to legally carry money in cash on a cross border movement without having to report it, according to the anti-money laundry regulations. Additionally, we assume that financial institutions outside Brazil do not significantly provide services in BRL – if so, the account is available through a corresponding bank offering an account hold in fact in Brazil. So, any payment made in BRL is assumed to be held in Brazil, meaning that financial institutions providing BRL transfer services are under Brazilian market regulation, thus having to register these operations at the Central Bank of Brazil. The payment orders between a resident and a non-resident in Brazil in BRL are known as an international transfer of BRL (TIR, on the Portuguese acronym for *Transferência Internacional de Reais*). In the case of an Argentinean counterpart, another option is available. A SML payment order is a cross border remittance of BRL from Brazil to Argentina, which may be used to receive the payment for Brazilian exports. The SML payment for Brazilian imports is not considered for our purposes as it is fixed in *pesos* (ARS), even if the importer's payment is indeed made in BRL.

Financial settlement (payment) and good settlement (shipment) do not happen usually in the same date. The shipment date may also do not match with trade declaration record date. Thus, comparing trade data to financial data may be tricky. In addition, reported trade data are usually the FOB value¹, while the financial transaction would include the freight and insurance when possible. Aware of this, we cross both data in order to obtain, in large numbers, some intuition about the payment-invoicing currency match.

¹ Following the INCOTERMS 2010, FOB value is the one that considers the goods value without freight and insurance.

From 2007 to 2011, just 0.03% of total TIR are trade-related. During the entire period, figures for financial payments denominated in BRL are slightly over 11% of the BRL-invoiced trade amount. The SML accounted for USD 1,963M and trade-related TIR for just USD 18M for a total BRL-invoiced trade current of USD 17,403M.

Table 10 shows the share of reported financial payments over the bilateral trade. All counterpart countries for TIR payment orders on the 2007-2011 period are presented. To Argentina, we include the SML payments on the calculation. In this case, the period under consideration starts on October 2008, when the payment service was launched.

From the table, we notice that Angola is the only country where payments in BRL surpasses the invoicing in BRL. Payments from Angola just occurred in the end of 2008. Therefore, the related shipment might have occurred during the observed series, suggesting that the invoice currency was not BRL.

Table 10 - Relationship between trade-related financial operations in BRL and BRL-invoiced trade, 2007-11

Country	Payments share on trade (%)		Trade-related financial current (USD million)
	Incoming transfers / Exports	Outgoing transfers / Imports	
World	28.6	0.1	1,967.0
... TIR	0.2	0.1	17.6
Argentina	51.3	-	1,949.8
... TIR	0.0	-	0.3
... SML *	51.4	n/a	1,949.4
Italy	11.6	-	0.4
Japan	3.3	-	0.4
Paraguay	0.8	-	8.3
United States	0.5	-	1.0
Angola	-	863.0	0.2
Germany	-	0.4	6.8
China	-	0.0	0.0

Source: Ministry of Development, Industry and Foreign Trade; Central Bank of Brazil

Note: TIR and SML refer, respectively, to TIR payment orders and SML payment orders. Trade refers to MDIC's trade data. As SML payment orders are invoiced in the remittee's currency, SML outgoing transfers are exclusively invoiced in ARS, not in BRL. [*] Calculated for the Oct 2008-Dec 2011 period, when the SML was operative. Data was converted from BRL into USD by the monthly average of daily average exchange rate (PTAX). Conventions used: 0.0: numerical data resulting from rounding an originally positive numeric data, -: numeric data equals zero, not due to rounding; n/a: not applicable.

All countries show BRL-denominated payments in one year and no payments in the preceding or in the following years. Denominating payments in the Brazilian currency seem to be substantially unusual. The United States and Germany are exceptions. Respectively, eighty-four and sixty-seven payments were made from or to these countries spread along several years, suggesting a more common use for some agents, albeit being a small portion of total trade

An interesting issue comes from Argentina figures. BRL-denominated payments did not took place from or to this country before the SML launch. After this service being provided by the central banks, just a few TIR payments were made. However, SML payments represents over half of total BRL-invoiced Argentinean payments on its operational period. If we analyze the latter two-year period, the amount of SML payments equates more than 80% of the exported amount.

Looking into large numbers, we find that the currency used for invoicing and for payment do not match on the Brazilian BRL-invoiced trade data. Thus, the reported growth on BRL-invoiced trade does not indicate a growth in the use of BRL as a medium of payment. The growth in invoicing seems to be lead by causes rather than liquidity improvements for this currency.

VI. Final remarks

We reported that the BRL is being used to invoice Brazilian foreign trade. For the first time, as far as known, the foreign trade database was evaluated by invoice currency. As a result, a number of intriguing questions were raised. It is quite clear that future developments of the present research may provide additional interesting results about the Brazilian currency and its use on the international stage.

Understanding the use of domestic currencies – most of which with considerably limited international use – in an environment where a leading global currency largely prevails lights regional economy's particularities. This study requires utmost attention to minor effects affecting agents and the ones caused by them. This reinforced sensitiveness allows new issues to be developed.

We have shown how the BRL is used for invoicing in the Brazilian foreign trade and we could notice, from a trade viewpoint, a variety of questions concerning the BRL status in the international stage; questions which allow and demand specific analytic deepening. Overall, we dispelled the notion that the Brazilian currency does not survive when contrasted with other currencies character known international. When contrasted to the currently most prominent international currency in the Brazil-United States trade, case in which the USD is the counterpart's currency, we observed that economic agents choose to invoice in BRL in some cases. The conditions to this occurrence remains as an unsettled question, suggesting future studies.

We found that the BRL-invoiced products that shows the largest exported volume are not those we would presume from theory. Tobacco and sugar, both homogenous and traded in global markets, lead the BRL-invoiced export list.

We also notice that Argentina presented an outstanding growth in BRL use. We point the governmental stimulus, held by the provision of bilateral payment orders combined to exchange transactions. The lack of exchange liquidity and financial instruments may be costly to traders and dealing with that restriction may influence the agents' invoice currency choice.

In addition, we found that invoicing and payment currencies in BRL do not match. This result to the Brazilian trade invoiced in BRL does not correspond to previous findings brought from Swedish and Japanese firms. In opposition to these studies in which a same currency is found to perform both roles on a trade operation, in Brazil, the BRL-denominated amounts for invoicing and for payments diverge by far. Conditions that imply BRL-invoicing for local agents survive even if the BRL use as medium of payment is greatly constrained.

Ultimately, in the work reported here, we shown that the BRL is blatantly used to invoice trade. If the USD performs a prevailing role in Brazilian trade, the presence of the BRL in remaining share is observed to grow with respect to other international currencies. So, the discussion whether there is any role in foreign trade has to be turned on reasoning the causes of BRL invoicing and the level of its use. The set of questions aiming the understanding of the international use of BRL is large.

When does a trader prefer to use the BRL? Which are the conditions for BRL invoicing? In which degree does the decision of a non-international local currency issuance in Brazil affect resident agents' production? In the absence of the restrictions caused by the BRL non-internationality, what would be the expected trade in BRL share? These are some of the questions that remain for future research. From this work, we could find that, even in the presence of fully convertible and fully accepted currencies, there are conditions which make agents to agree trade on a non-international currency: in Brazilian exports, in BRL; in Brazilian imports, on a set of non-international currencies.

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