

Brazilian Economy Dependence on China

RENATA KLAFKE, LUIZ A. PILATTI

Departamento de Engenharia de Produção

Universidade Tecnológica Federal do Paraná – Ponta Grossa (UTFPR)

Rua Monteiro Lobato, s/nº.

PONTA GROSSA, BRAZIL

Nena.klafke@gmail.com, lapilatti@utfpr.edu.br

ALEXANDRE ROBERTO LAGES

Núcleo de Políticas Públicas Rouger Miguel Vargas

Universidade Estadual de Ponta Grossa (UEPG)

Rua Penteado de Almeida, n 228, Centro.

PONTA GROSSA, BRAZIL

alexlages@uol.com.br

Abstract: - This paper analyzes the influence of the Brazilian exports on China as a variable key for its economic growth during the period between 2000 and 2013. The data were obtained from secondary sources and treated with the use of statistical software. The results show a high correlation between income distributions and the dependence on exports to China. So, based on this circumstance, the reduction of Brazilian poverty depends on China's demand. This work also shows the relationship between employment and income distribution and the gap of these correlations, which is not the immediate effect of exports in this distribution.

Key-words: - Brazilian Commodities, Export, Economic Growth

1 Introduction

A contemporary subject has drawn the attention of Brazilian society and has interfered in the labor dynamics recently. Although there is an argument that the improvement of socio-economic numbers primarily occurred as a social policies result, it is necessary to determine the correlation between the market—consumer growth in China and the demand for Brazilian commodities in the improvement of income distribution.

This issue emerged in recent years from economists [1;2] and was instigated by the rapid decrease in Brazilian economic development, which coincided with the gap/unsteadiness of China's economy, although it has been much lower than the slowdown in other countries.

To avoid a high degree of dependency on social development tied to external market oscillations, [35] reiterated the importance of transforming social development policies but also policies of income transfer, which has occurred with the main government program to eradicate poverty in Brazil, known as the *Bolsa Família*.

From 2000 until the present, with the increase in the gross domestic product (GDP) mainly because of

the positive trade balance [3], the number of unemployed in Brazil began to decrease. The demand for technical workers and workers with a higher education degree increased faster than the qualified available workforce, which made the unemployment levels in the country reduce and improved social indicators, such as poverty reduction, rising income and consumption indicators [4].

Trade and services increased their participation on the total employment over the last 20 years [36], which is around one percentage point between the beginning and the end of the period, while the industrial sector accumulated a decrease of 6 percentage points between 1992 and 2012 (from 27% to 21%). The report also indicated that the industry participation has not decreased uniformly. It initially decreased about 4 points between 1992 and 1998, remaining stable until 2008 and finally presenting its sharpest decline between 2009 and 2011.

Part of the problem in Brazil is because of the effort concentration from the government in directing benefits to the exports of agricultural products [37]. There was not enough incentive in the industrial technological renovation or in the global markets to

compete for higher value-added products. Some economists call this process deindustrialization, which occurs when the incentives begin to focus on domestic consumption with lower taxes and credit increases, similar to the crisis that occurred in 2008. The commodity's valuation prices in the global market, even with a considerably low dollar in the period before the 2008 crisis, along with greater international liquidity strengthened the dependency relationships of the Brazilian economy on the Chinese market (commodities) [5].

Internal policy with a floating exchange, although with specific interventions of the government's monetary policy, along with the primary surplus and inflation target (economic tripod) prioritized the "health" of the national economy. In such cases, industrial incentives by the government are virtually nonexistent [6;7]. The call for an exchange rate adjustment favoring exports in 2008 was not heeded by the government's internal policy. The so-called "currency wars" performed by the Chinese exchange rate that favored exports of their country became a problem for the Brazilian exports [8;9] once the American Monetary Policy expansion pressured the exchange rate for most of the years preceding the 2008 crisis; however, even during this period, Chinese growth demanded more and more products from Brazilian commodities [10].

To understand the pursuit of this eastern country, even the world economic crisis that began in the US in 2008 was not able to contain China's growth, which had already reached 9.3% in 2010 [11]. Even with a communist political regime, China resembles a capitalist economy. There are explanatory elements for this marked expansion in recent years, ranging from the exchange-rate policy to cheap Chinese labor as well as productivity gain in the economy [15].

Brazilian politics, which generally prioritize a primary surplus, provided the country with favorable ratings by economic agencies even at the end of 2000, leading the country to win a grid investment by the three main rating agencies: Moody's, Standard & Poors (S&P) and Fitch Ratings.

With this favorable economic scenario, there was an existing mobility of capital, especially in foreign direct investment (FDI) to Brazil, maintaining further pressure on the exchange rate [12]. Access to this capital, liquidity and the global demand for commodities contributed to the continued growth, even with GDP rates lower than other emerging countries in this period.

The combination of low policy inflation with a policy distributive of higher income by the governments resulted in better social gains [13;14]. In the subsequent period post-2008, when the global

economic downturn and the international demand reduction led the countries to look for new paths, the Brazilian fiscal policy had increased the demand by prioritizing domestic household consumption, so the shift from dependence on exports to the domestic market appeared to be the only approach. The tax reductions on Industrialized Products (IPI) of various sectors, such as automotive, building materials, and furniture, combined with a credit increase and interest reduction resulted in an unemployment level of 4.5 % in the country.

Briefly, the basis for the distribution of income was the commodities valuations and the international liquidity excess in the first moment (from 2000 on), which increased the Chinese trade level internationally [15] when Brazil strongly increased its exports to that country. In a second moment, the economic policy sustained in the inflation control and the successive primary surpluses achieved created conditions in Brazil to generate employment in the period of the greatest international retraction (2008 crisis), strengthening greater distribution of income through job creation. In 2010, the GDP reached 7% and was driven by the rise of household consumption [16].

Therefore, this work aims to indicate the effective occurrence of an independent economic development in Brazil and whether such a development was opportune for the growth of the Chinese economy. In this way, the indicator's reductions that measured the unemployment level, social inequality or even poverty essentially occurred because the momentary capacity increased (Chinese demand for commodities) and the services sectors of the population profited from more money circulating in the economy in a given period of time [4;17].

2 Literature Review

2.1 Poverty and the Multidimensional Poverty Index

For many leftists, including [20], the origin of all evil is the capitalist system, or more specifically, the idolatry of money and wealth and property accumulation. In contrast, [22] addressed a different situation in today's society. According to them, there is a subjective poverty in which the person is responsible for social poverty. With that same reasoning, the study of [20] illustrates that the misery and all its manifestations are not only a result of liberal economic exploration but also an independent phenomena and individual responsibility. In this vein

evokes the bourgeois thoughts, which are essentially the three causes of individual poverty [20]:

- Educational Deficit (lack of knowledge in the “natural” market and how to act within it).
- Planning Problem (family budget planning disability).
- Moral behavior disorder (tendency to idleness, drunkenness, vagrancy etc.).

The partial incapacity in dealing with these social issues caused the so-called “Welfare State” creation in the 19th century in Europe, i.e., the philanthropic actions provided by the state’s social policies would help to minimize the causes of poverty. These actions had higher proportions in the following century with the crash of the New York Stock Exchange in 1929 [18;19;20]

Based on historical factors, mainly colonial, Brazil developed industrialization late. The backward economic independence is one of the main causes that generated internal social problems in Brazil [8].

According to the Ministry of Development (Hunger Combat Department), there were about 16 million people in conditions of “extreme poverty” in 2011, i.e., family living with a monthly income of less than USD 30.00 per person.

Some authors, such as [23], argued that social inclusion and poverty reduction primarily operate through redistributive policies. In contrast, other scholars argued that economic development, particularly resulting from industrialization, is a reduction of the variables that drive society to poverty, unemployment and hunger since the spending of the social public administration tends to be inefficient in solving problems of health, education and inequality [21,22,23].

According to the “Investments to End Poverty Report” written by Randel and German [24], Brazil has been an example for other developing countries in developing and implementing public policies to reduce the number of people who live in extreme poverty (people living with less than \$1.25 a day, according to UN criteria); however, it is ratified [24] that it is much easier to remove people from extreme poverty to the poverty line than to the middle class because welfare policies are inefficient in changing culture and education in society.

In Brazil, the effective reduction of poverty through social policies began with programs such as Bolsa Familia (introduced in 2003), Brazil without Misery (introduced in 2011) and Affectionate Brazil (introduced in 2012) [24]. Between 2001 and 2011, the Brazilian population with an individual

household income up to USD 1.25 per day fell from 14% to 4.2% [25].

In 2000, the United Nations began to use the Multidimensional Poverty Index (IPM) for a better picture of people living in difficult circumstances. It replaced the Human Poverty Index (HPI) since the HPI is broader and is related to the Human Development Index (HDI), such as addresses and the same dimensions of health deprivation, education and standard of financial life, which have sub-indicators, such as the access to electricity, access to clean water, cooking gas, household quality and child nutrition [9;26].

A family is multi-dimensionally poor if they suffer deprivation in at least 30% of the indicator compositions. The higher the MPI, the greater the degree of poverty. According to a UN survey, the share of the population with goods deprivation fell from 4% to 3.1% between 2006 and 2012.

2.2 Commodity Importance in the Brazilian Economy

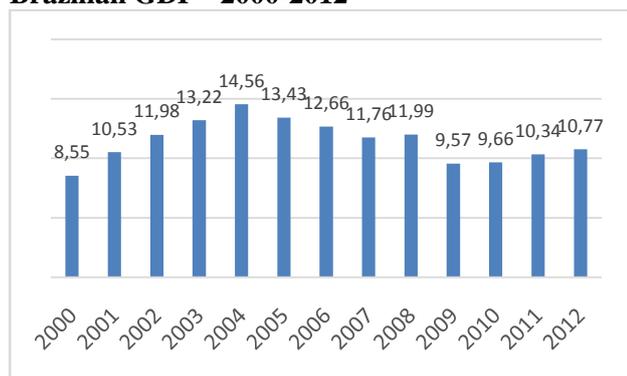
Agribusiness is one of the largest sectors of the Brazilian economy. The country leads the rankings in soybean exports and is known worldwide for meat and oil exports (MDIC, 2014). Due to favorable natural conditions, such as climate and land, as well as the Kandir¹ law of 1996 among other aspects, the primary sector draws the engine of the exports.

According to the Ministry of Industry and Trade [27], Brazil exported USD 225,101 million in 2014. In percentage terms, 48.7% were primary products, 35.6% manufactured goods and 12.9% were semi-manufactured goods. The primary sector consists of basic products of little value, so there was little economic expression, i.e., lower profitability, compared to a higher value-added product. Exports ordinarily influence the performance of the Brazilian trade balance as well as the participation in the composition of the Brazilian GDP both positively and negatively.

Graph 01 shows the percentage of the Brazilian exports in the share of the gross domestic product (GDP) from 2003 to 2012. Graph 02 shows the % share of the Brazilian Commodities Exports over the Total Exported, and graph 03 demonstrates the Commodities participation % of the Brazilian Commodities Exports to China over the total exported to China from 2000 to 2012.

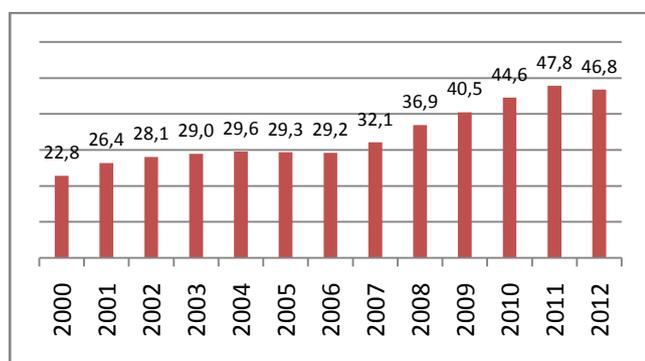
¹ Law Kandir refers to a federal tax incentive law for Brazilian exports.

Graph. 1 % Share of the Brazilian Exports in the Brazilian GDP - 2000-2012



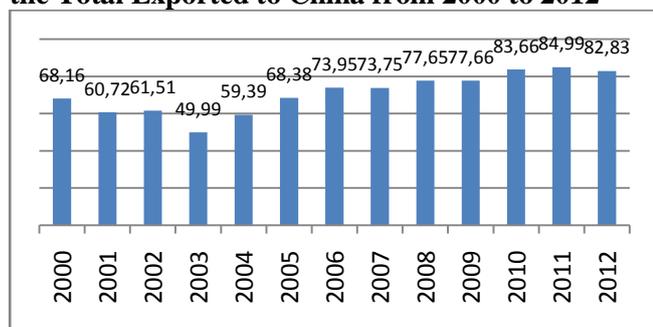
Source: MDIC (2014)

Graph. 2 % Share of the Brazilian Commodities Exports over the Total Exported



Source: MDIC (2014)

Graph. 3 Commodities Participation % of Brazilian Commodities Exports to China over the Total Exported to China from 2000 to 2012



Source: MDIC (2014)

From the graphs above, it is noticeable that in the year 2004, the global exports accounted for 14.56 % of GDP; however, a clear reduction was found in this composition after 2008, a factor earlier presented in this article, which suggests a change of attitude when the government attempted to look for better growth rates of economic activity and focused on the domestic consumption facilitation, as observed in the monetary and fiscal expansionary policies. Extending

the analysis, in almost 10 years, Brazilian exports accounted for an average of 11.79% of the GDP.

At the same time of the rise of the commodity prices and consequently the Brazilian exports to China (main buyer) proved to be solid and growing, it supported the hypothesis of external dependency; however, the increasing activation of employment and income derivatives from this segment and the correlation of these variables summarized in income distribution and in Brazilian exports to China are notable. Unequivocally, the composition of exports to the Chinese market has been almost completely in commodities.

3 Methodology

For this study, secondary statistical data were obtained from the Brazilian Institute of Geography and Statistics (IBGE), the Ministry of Industry and Trade (MDIC) and the Institute of Applied Economic Research (IPEA).

The analysis period corresponds to the years of 2000 to 2013, which includes the end of the Liberal Government (until 2002) and the Workers Party (PT), or The Left Party. It was necessary to use the linear interpolation method to estimate the years 2000 and 2010, and the same technique used by IPEA because there was no disclosure of data of these periods for the “working population” variable.

This study focused on the following dimensions: Gini Indicator, Brazilian Commodities Export to China, Brazilian Global Exports, Employed Population and the National Consumer Price Index (IPCA). The variables chosen for this study are in accordance with similar studies, which used the GDP in order to measure a nation’s wealth, and that also used others indicators such as Gini Index and Employment to measure social development [28;29]

a. Model, Hypothesis Test and Variables Definitions

Below is the model used to estimate the distribution of income:

$$Y = \beta_0 + \beta_1x_1 + \beta_2x_2 + \dots + \beta_px_p + \epsilon_t \quad (1)$$

T is the observed period, Y is the explained variable (the dependent), β is the intercept and parameters and $(x_1 + x_2 + x_p\dots)$ are the explanatory variables (independent).

Variables:

Gini index: According to IPEA (2004), the Gini indicator is the income inequality within a country. It varies from 0 to 1, and the closer to zero, the smaller

the inequality. In this study, it was used to measure the concentration of income (the dependent variable).

Brazilian Commodities Export to China:

Export of primary products produced in Brazil to China.

Brazilian Global Exports: All Brazilian exports.

This was the control variable of this study.

Employed Population: People who worked or had jobs over the period examined [3]. Another control variable.

National Consumer Price Index (IPCA):

Variable that represents the inflation [3]. This was the third control variable.

The control variables of this study are the overall exports from Brazil, the employed population and the National Index of Consumer Price (IPCA). Brazilian global exports showed multicollinearity problems, so it was excluded as an exogenous-explanatory variable. Maravelakis et al. (2002) justified the control variables adoption to adjust the parameter that someone wants to control.

The main explanatory variable assumes that the Br commodity exports to China have an inverse relationship to the dependent variable, which is the GINI Index in this case.

The hypothesis is that there is a strong relationship between Brazilian commodity exports to China and the Brazilian income distribution for the reference period.

The adopted model was comprised of a multiple linear regression analysis using conventional tests to validate the template created, such as variance, Durbin Watson, significance of the parameters (r^2) and multicollinearity through the statistical software GRETL.

4 Results and Discussions

The GDP growth and the development of the Chinese population have demanded more and more Brazilian agricultural commodities [30]. After all, with more money circulating in the economy and with the improvement of purchasing power, people tend to consume more.

As a model to support this argument, the Gini Index presents itself as a hypothesis of the Brazilian income distribution improvement.

Table 1 presents the results of the initial statistical analysis.

Table 1 Statistical Results

| | |
|-------|----------|
| R^2 | 0,977939 |
|-------|----------|

| | | |
|---------------------------------|----------------|---------------------------------------|
| Adjusted R-squared | 0,971321 | |
| F - Statistics (GL) (3,9) | F = 159,643 | significance: p-value < 0,00001 |

Source: Authors (2015)

It can be seen in the ordinary least squares model (OLS) that an R^2 of 0.97, i.e., independent variables, has a high degree of explanation in relation to the dependent variable. Thus, the income distribution in Brazil is 97%, which is explained by the inflation (IPCA) as well as by the employed population and commodity exports to China. Although inflation has little representation in the test analysis of an individual parameter, which will be presented in the sequence, the price stability provides a favorable and stable picture without the gradual loss of the purchasing power synthesized on inflation. The employed population necessarily reflects an increase of the income distribution given the low unemployment rates observed in the reference period. Commodity exports to China in this parameter were revealed to be an important explanation variable dependence that Brazil has on China.

Brazil's exports to China provided economic growth that allowed a better distribution of income and job creation. The management efficiency of the economy, combined with more creative public policies, focused on improving the lives of Brazilians, was putting Brazil in a different direction during the 2000 years [31].

In the test, only the independent variable "Global Export" showed a high degree of correlation with the variable "Commodity exports to China," so it was excluded. In this sense, the new composition did not present a multicollinearity problem or the need to increase the sample size to adjust it because the proposed period did not measure the period after 2013 due to the recent political and economic changes or before 2000, as the government policies were different.

The inverse relationship between the Gini index and the exogenous variable (commodity export to China and occupied population) is based on the behavior of this indicator in which lower rates represent the best Gini index of income distributions, while the rise of the occupancy rate as well as the increase of commodity exports to China improve the distribution. Increasing employment and exports in the context of price stability leads to an improvement of the quality of life for the Brazilian population. When employed, the population can increase family

income, improve their education and acquire durable goods, among other things [32], which can improve the people's quality of life (QoL) and, over the years, social indicators [33].

A direct relationship is only presented by the IPCA control variable—as the inflation indicator reference—and is justified on the endogenous variable, which is directly related to the inflation. According to [34], employability and inflation reduction allow for representative social gain over time because it allows for better conditions for long-term consumption.

Below is the hypothesis test in the analysis of variance (F).

$$H_0 = \beta_1 = 0, \beta_2 = 0 \dots$$

$$H_1 = \beta_1 \neq 0, \beta_2 \neq 0 \dots$$

Based on the variance test, it is noticeable that the relevance of the commodity exports to China, employed population and the inflation are significant variables, i.e., there is little chance of error if H_0 is rejected. Table 2 shows the degree of significance of the parameters of the T test.

Table 2: Degree of significance - t test and Durbin – Watson Test

| VARIABLE | COEFICIENT | ERROR | STAT. T | P-VALUE |
|---------------------|---------------|--------------|---------|-----------------|
| Constant | 0,806820 | 0,0271414 | 29,727 | <0,00001 *** |
| Expo commodities | -4,01425E-013 | 1,51820E-013 | -2,644 | 0,02673 ** |
| Occupied Population | -2,84487E-06 | 3,01918E-07 | -9,423 | <0,00001 *** |
| IPCA | -0,0250365 | 0,0721531 | -0,347 | 0,73657 |
| Durbin Watson | 1,97921 | | | |

Source: Authors (2015)

The degree of significance indicates the error of rejecting H_0 ; therefore, the alternative hypothesis is accepted, which states that these parameters are different from zero; however, the IPCA variable showed a chance of almost 74% of being zero, which is not significant.

The Durbin-Watson test showed that there was no auto correlation in the residuals. Initially, the residuals presented an autocorrelation problem; however, when using the Prais Winster method, it was solved. In summary, the significant variables Commodity Export to China and Occupied Population began to influence the income distribution with only a one-year lag. In other words, income distributions are less sensitive in the short-term to the trade relations benefits when intensifying exports, even with a low aggregation of value that commodities synthesize. Employability will present

varied result in the distribution of income at least one year later.

Also, the heteroscedasticity test did not show any problems, which was already expected, since during the studied period, Brazil did not have any economic turbulence, such as currency change or crisis. These factors could affect the comparison between periods with a different variance.

5 Conclusion

The growth and development of any economy are influenced by several variables, which must be carefully observed to determine which ones are responsible for the variation in the socioeconomic indicators. Structural changes, which leverage a favorable sustainable growth scenario, can result in long-term social achievements, which are characterized not only as a cause but also as an effect in the social structure.

The purpose of this work was to indicate the effective occurrence of an independent economic development in Brazil and whether such a development was opportune for the growth of the Chinese economy.

Between 2000 and 2010, the results suggest that the inequality of the national income began to reduce with Chinese growth, specifically because of the higher Chinese demand for Brazilian commodities; however, inequality decreased due to two main factors: Brazilian commodity exports to China and labor expansion. These factors explain 97% of the reduction of the Gini Index of the country.

In economic terms, although changes in China worsen the Brazilian crisis, some authors (Arsenault, 2011; Jenkins, 2012) consider the biggest problem was that Brazil has not done anything in industrial terms during the boom period. The government did not do the necessary reforms to reduce their weaknesses. Instead, Brazil has been trying to stimulate the production and domestic consumption, and extend their partnership to other markets such as India and Russia.

As the political and economic scenario has been changing in both countries chosen for this study, especially in Brazil, another study with latest data would also be interesting for evaluation.

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