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# **Tertiary Activities and Informality: Quantitative Importance and Interconnections within the Economy in Brazil<sup>1</sup>**

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## **Abstract**

This paper studies the importance of the Tertiary sector and the informal sector for the Brazilian economy, making an interconnection between them and with them and the rest of the economy and the formal sector. To do so, this work makes use of the data presented in the System of National Accounts and the National Survey of Households (PNAD), both from IBGE, and the Leontief model. The results show: a) the importance of the Tertiary sector for the Brazilian economy in terms of employment (around 61% of the occupied persons), and income generation (around 67% of the economy Value Added); b) the high share of the informal sector in the Brazilian economy (around 58% of the occupied persons and 34% of the income); c) the combination of these factors results in an economy with low wages and salaries and with an high concentration of income; and d) that the present productive structure of the Brazilian economy contributes to the concentration of income in the country.

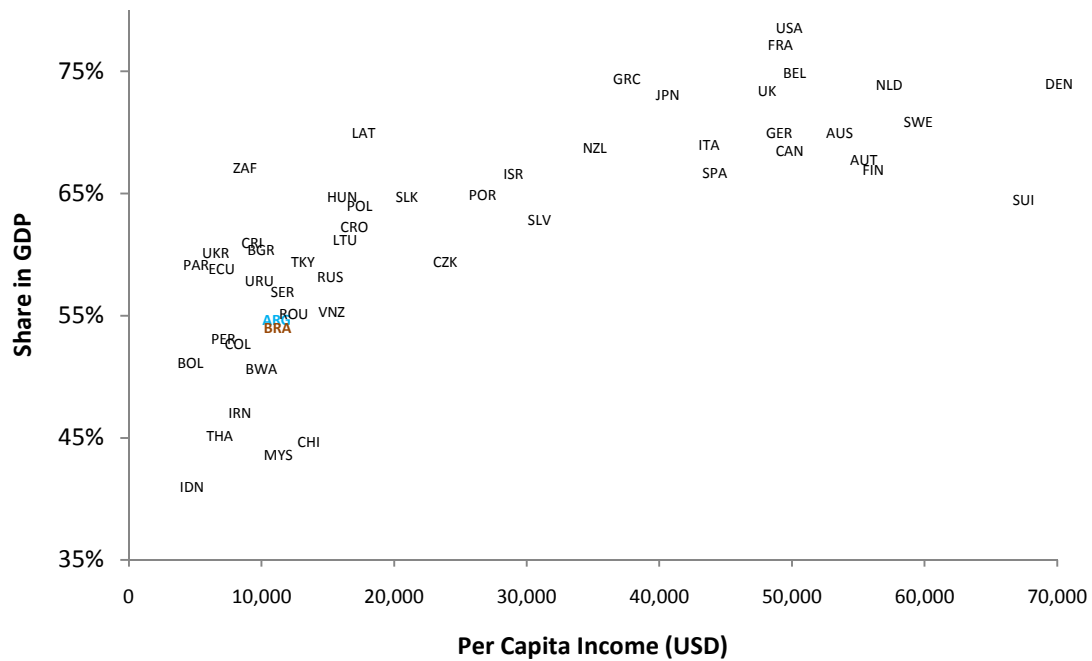
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## 1. Introduction

Tertiary activities are becoming more and more important all over the world. Their share in income formation increases with the level of economic conditions within countries, as Figure 1 exhibits.

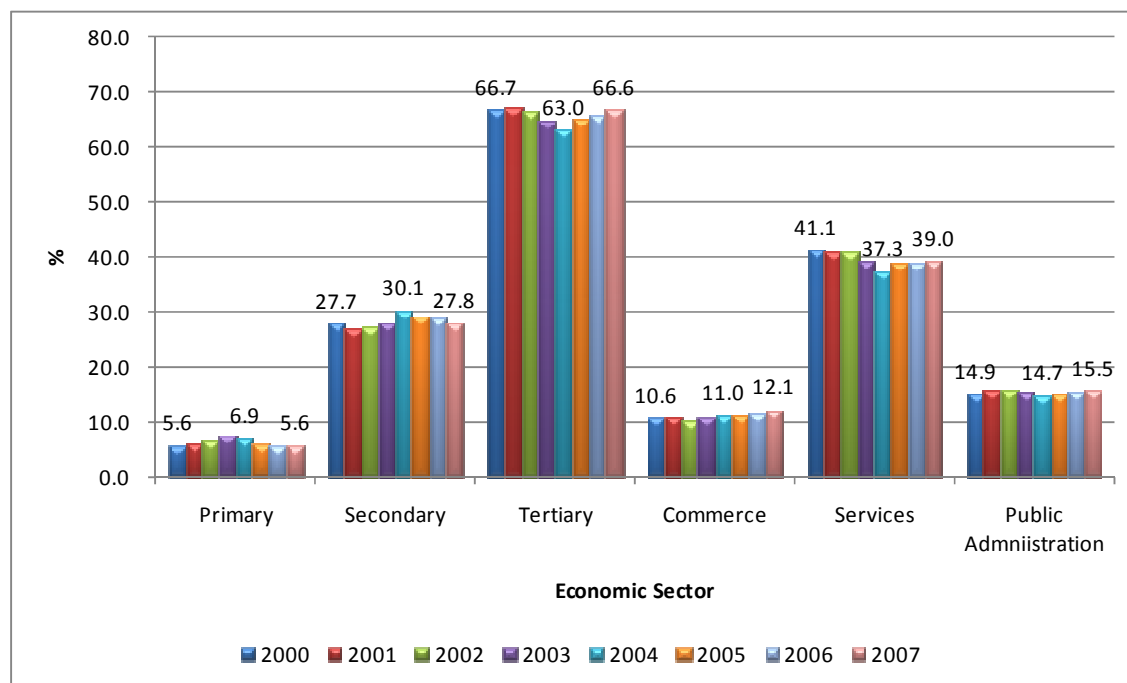
**Figure 1 – Share of tertiary activities in GDP across countries**



Source:

A comparison with other countries in the same range of GDP per capita values indicates that Brazil occupies an average position. According to the Brazilian National Accounts, the share of such activities in Brazil's value added was 66.6% in 2007. This share has been relatively stable since 2000, decreasing to 63% in 2004, but recovering ever since to reach a value comparable to 2000 in 2007. Inside the tertiary sector it can also be observed that the sectors of commerce and public administration have been growing, while the sector of services had a decrease in its share of the economy value added (Figure 2).

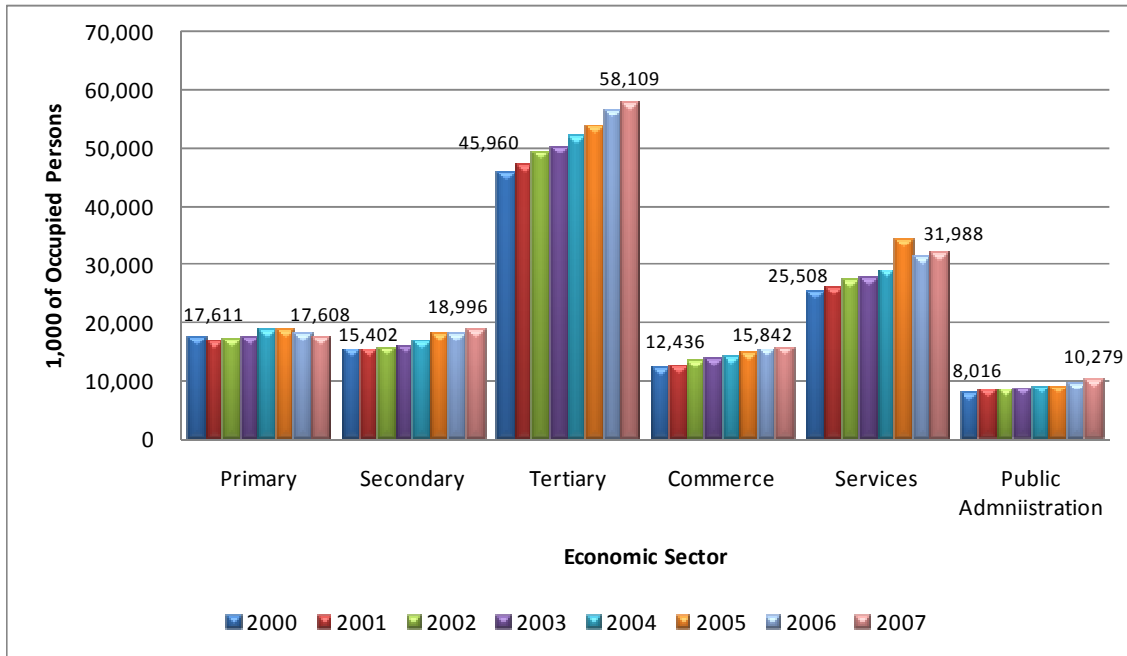
**Figure 2 - Share in the Value Added (%) by Economic Sector -Brazil, 2000 – 2007**



Source: Estimated from National Accounts, IBGE.

Another way to look at the importance of the sector is to observe the total number of person employed in each one of the sectors, as displayed in Figure 3. The share of the tertiary sector in the economy grew from 58.2% in 2000 to 61.4% in 2007, with the number of persons employed growing from 45.9 million in 2000 to 58.1 million in 2007. This growth occurred in all the main sub-sectors of the tertiary, but the greatest increase was observed in the services sub-sector from 25.5 million in 2000 to 32.0 million in 2007. It also call attention that the number o people employed in the primary sector stayed relatively constant in 17.6 million (share of 22.3% in 2000 and of 18.6% in 2007) while in the secondary sector there was an increase from 15.4 million to 19.0 million employed persons and its share in the economy also keep relatively constant around 20%.

**Figure 3 - Total of Occupied Persons by Economic Sector -Brazil, 2000 – 2007**



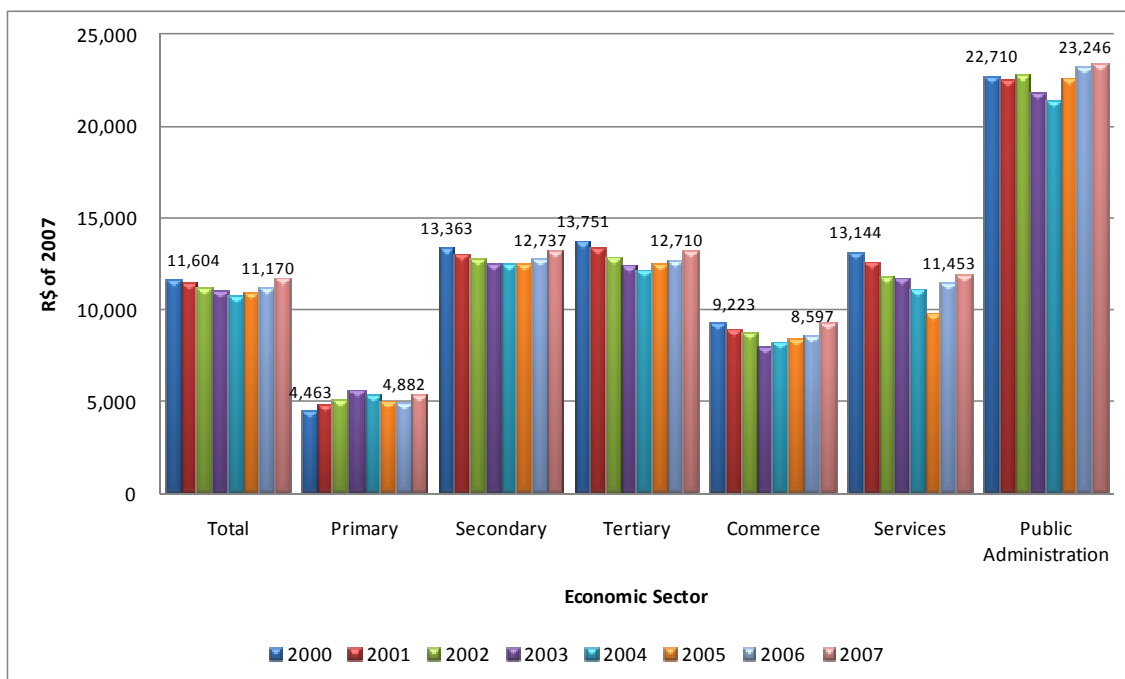
Source: Estimated from National Accounts, IBGE.

In terms of average income, the average income of the workers in the tertiary sector are comparable with the ones received by the worker in the secondary sector (around R\$ 12.7 thousand yearly income in 2007) with the lower average income being in the primary sector (R\$ 4.9 thousand yearly income in 2007). However if one looks inside the tertiary sector it is possible to see that the average income in the public administration sector (R\$ 23.2 thousand yearly income in 2007) is overall the double of the other sectors in the tertiary (R\$ 8.6 thousand yearly income in 2007 for commerce and R\$ 11.5 thousand for services) and also for the economy as a whole (R\$ 11.2 thousand yearly income in 2007). Overall there was a decrease of the average income of the workers in the economy until 2004, and after that time with the growth of the Brazilian and World economies the average income of the works started to rise.

Therefore, in dealing with tertiary activities, one considers with a relevant share of economic activities within a country. Given the nature of such activities, their location is predominantly urban, what poses a particular set of concerns, including excessive growth of cities. One of such concerns relates to informality, for this sort of activity is particularly

prone to be offered by small establishments, with a small amount of start-up capital, and geographically restricted markets.

**Figure 4 - Average Yearly Income of the Occupied Persons - R\$ of 2007 - Brazil, 2000 – 2007**



Source: Estimated from National Accounts, IBGE.

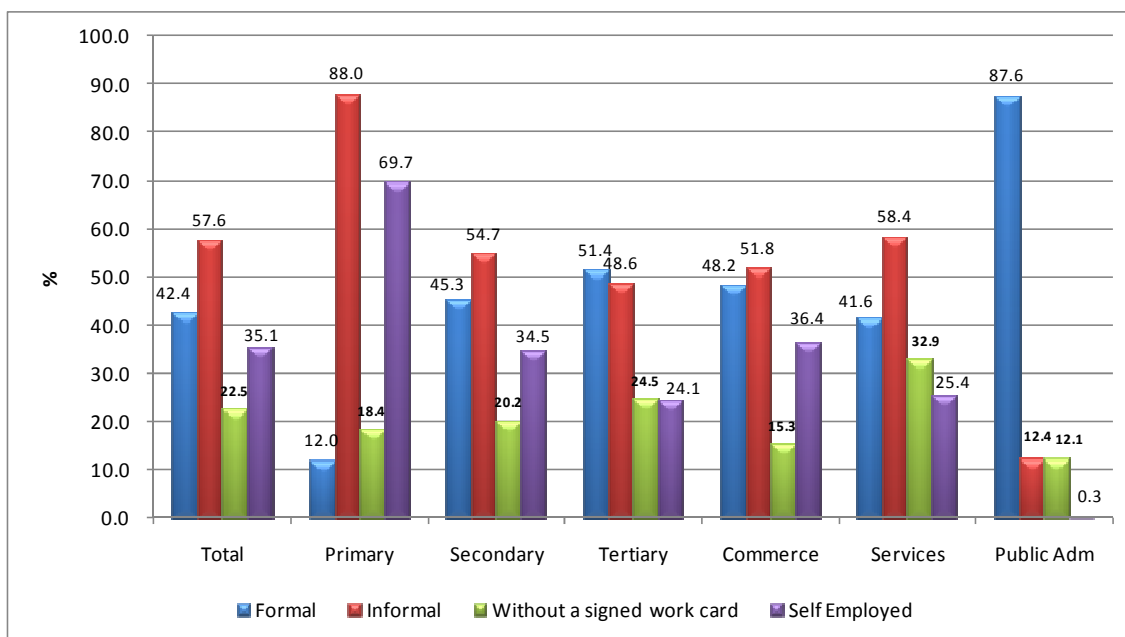
Thus, a second aspect of this work is the consideration of informality, which all over the Brazilian economy. The definition of formality and informality is not an easy one and varies depending on the different hypothesis that can be made, the papers by Feijó, Silva and Souza (2009), Henley, Arabsheibani and Carneiro (2009), and Ulyseia (2006) present a good discussion about this matter. The definition used in this paper is the one used by IBGE, as defined in IBGE (2008), and which follows the direction of the International Labor Organization (see Hussmanns, 2003). The formal sector is defined as being composed by the workers with a signed card, the public servants, the military, and the employers of formally constituted enterprises. The informal sector is formed by the workers without a signed card and the self-employed (which includes, besides the self-employed,

the non paid workers, and the informal employers, i.e., of not formally constituted enterprises).

As Figures 5 and 6 show, agriculture is the sector with the highest level of informality, 88.0% of occupation, and 70.8% of income, but this sector accounts for only 18.6% of total occupation, and 5.6% of total income, as saw above. The tertiary sector has a level of informality that corresponds to 51.4% of its occupation and 31.0% of its income. Within this sector, Public Administration presents the highest level of formality (87.6%) with responds for 93.0% of the income generate in this sub-sector. Commerce presents a share of informality in the occupation of 51.8%, with a share of income of 42.3%, while services, holds 58.4% of informality in the occupation, which corresponds to 42.3% of its income.

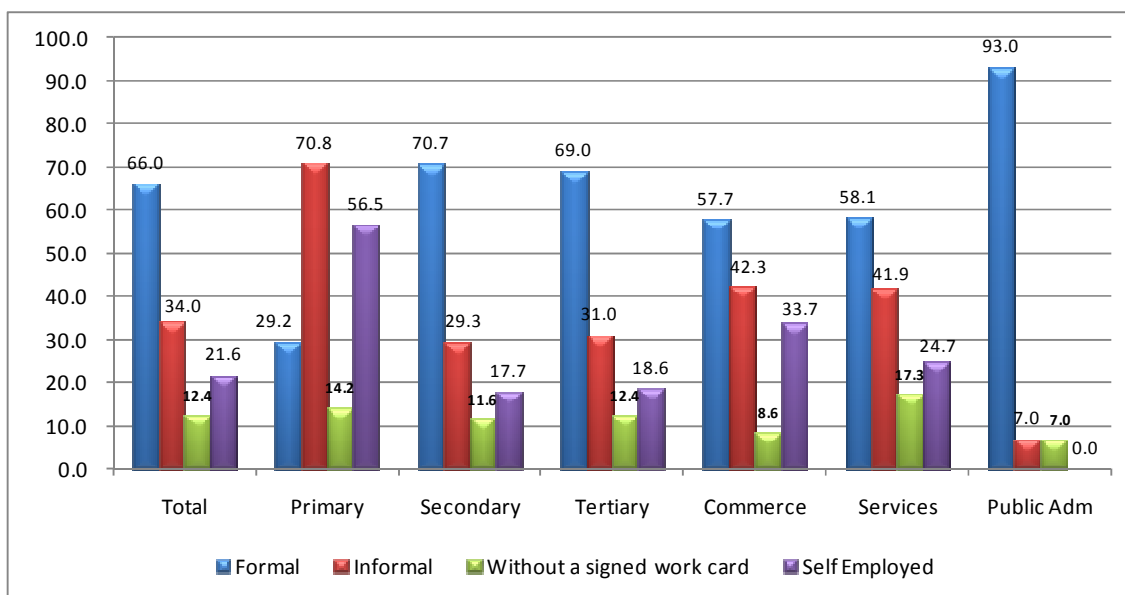
However, despite the high level of informality observed in the Brazilian economy. The growth rate of informality in all of the economic sectors have been smaller than the growth of formality which leads to a decrease in the share of informality in the Brazilian economy in the 2000's, as can be observed in figure 7.

**Figure 5 – Share of Formal and Informal Occupied Persons by Economic Sector - Brazil, 2006**



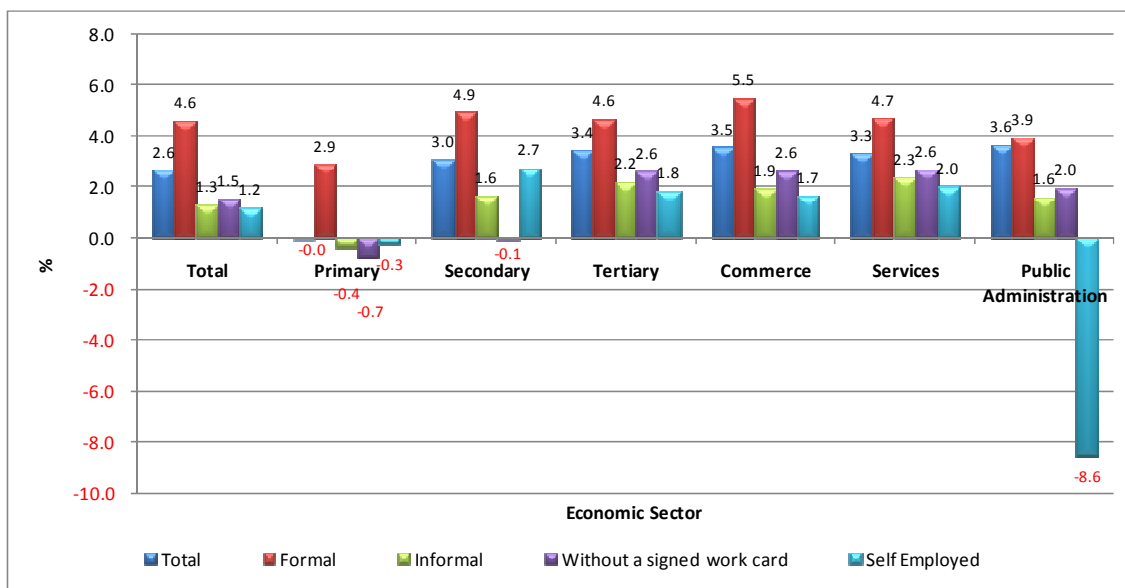
Source: Estimated from PNAD and National Accounts, IBGE.

**Figure 6 – Share of Income by Source, Formal and Informal, by Economic Sector - Brazil, 2006**



Source: Estimated from PNAD and National Accounts, IBGE

**Figure 7 – Growth Rate of Occupied Persons, Formal and Informal, by Economic Sector - Brazil, 2000-2007**



Source: Estimated from National Accounts, IBGE



Therefore, informality is not a marginal issue, since 57.6% of occupations and 34.0% of income are generated by informal activities. Reasons for its existence can be many, but the difficulty in establishing a business, the high tax burden, the difficulty in coping with indirect labor costs, and a poor enforcement of present regulations can be cited<sup>2</sup>. It is not the object of this paper to investigate the causes behind the existence of such a high level of informality within Brazilian economy. Instead, we will try to establish its importance, in quantitative terms, and to reveal the sort of connections with other activities within the economy. For that, we will use a Leontief model, to be described below.

The paper is organized in 4 sections. The following section presents some information on the distributive aspects involved in the increasing importance of tertiary activities, and how these aspects differ between formal and informal activities. Section 3 presents a summary of the Leontief model which was used to estimate the importance of tertiary activities and in the degree of informality within each sector. Section 4 presents the results, which are commented on in the concluding section.

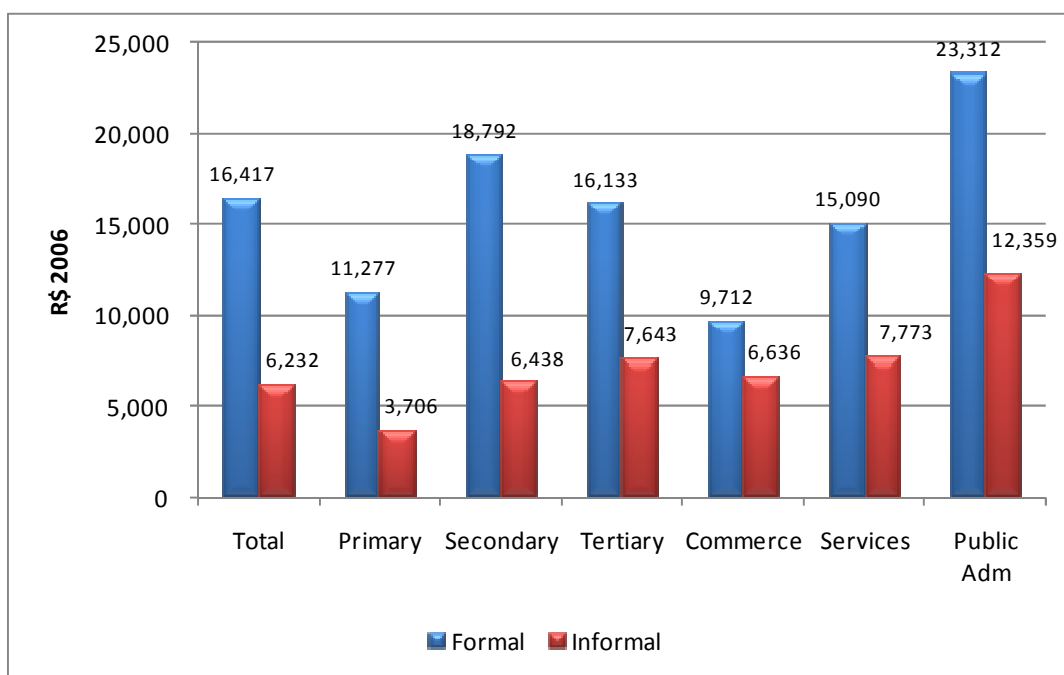
## **2. Income distribution in formal and informal activities**

Another aspect related to informality is income distribution. As the data in Figure 8 reveals, the average yearly income for informal activities is always lower than for formal activities. Comparing the relation between formal and informal occupation with relation to income, the highest difference is for the primary sector in which the average income in the formal sector (R\$ 11,3 thousand) is 3.0 times the income in the informal (R\$ 3.7 thousand), the difference in the secondary sector is 2.9 folds (R\$ 18.8 thousand in the formal and R\$ 6.4 in the informal), while the smallest difference, of 2.1 folds is found in the tertiary sector (R\$ 16.1 thousand in the formal and R\$ 7.6 thousand in the informal). For the economy as a whole the difference is 2.6 times (R\$ 16.4 thousand in the formal and R\$ 6.2 thousand in the informal). The high yearly average income being in the Public Administration sector.

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<sup>2</sup> For a discussion, see Kon (2003, 2007 and 2009), and Jennekin (2008), Azzoni (2005) and Azzoni and Andrade (2005)

**Figure 8 – Average Yearly Income in the Formal and Informal Activities by Economic Sector - R\$ of 2006 – Brazil 2006**



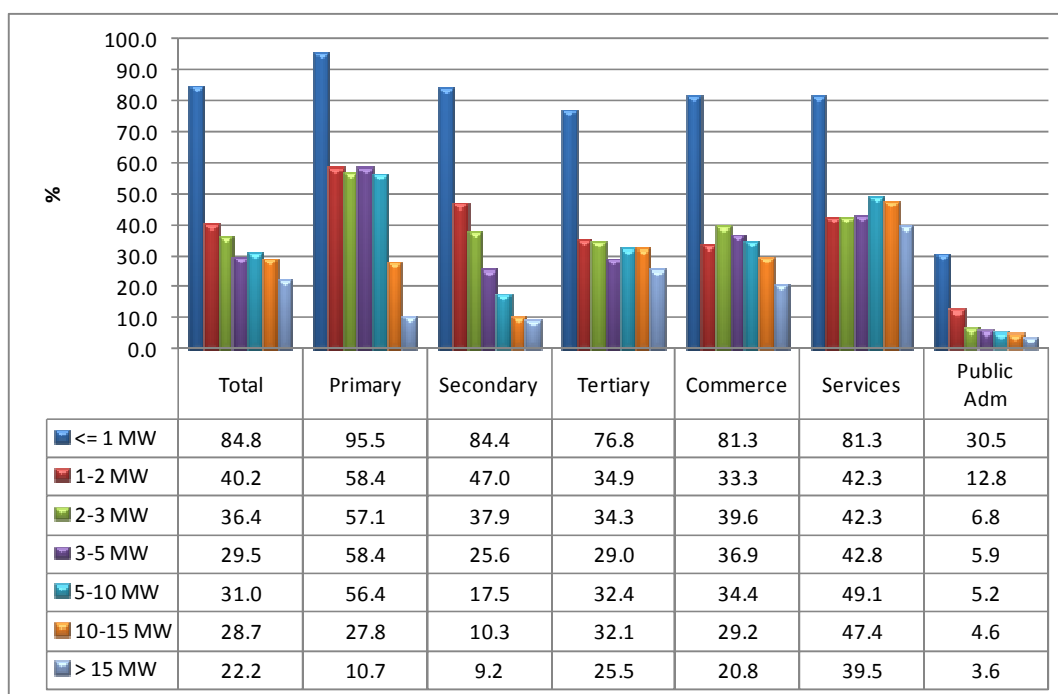
Source: Estimated from PNAD and National Accounts, IBGE

Data shown in Figures 9 to 12 provide more details on the aspect of informality. In Figures 9 and 10 it can be seen that in general as the level of income increases in the economy, the level of formality also increases. Of all the economic sectors the greatest degree of informality is found in the primary sector, and mainly in the occupied persons that receives up to 1 MW. The share of occupied persons in the informal sector, which receives up to 1 MW, is usually above 80% and its share of income is above 75%, indicating that the most of the informality occurs in low paid jobs. For the tertiary sector the decrease of informality presents a different pattern from the rest of the economy, while for the most part of the sectors there is a more accentuated decrease in the share of the informal sector, in the tertiary sector the share of informal occupied persons decrease from 76.8% in the first income group to 34.9% in the second income group (1 to 2 MW) and stays around this value up to the last income group when it decreases to 25.5%, this patterns is the main reflex of what happen in the service sector that is the main sub-sector inside the tertiary

sector. The same pattern is also observed in relation to the income share of the informal sector in the economy (Figure 10).

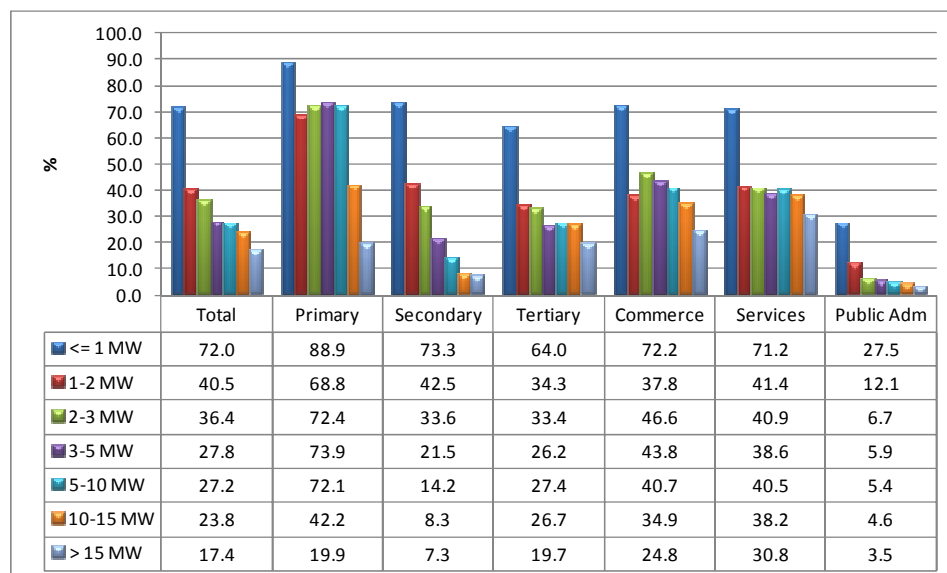
Figures 11 and 12 which present the relationship between the share of occupied persons and the share of income of the formal and informal activities in the economy by income group and economic sector for 2006, show that: a) as the income level increases the share of occupied persons is small than the share of income in each income bracket, indicating the high concentration of income in the Brazilian economy; b) in general the differences are greater in the informal sector than in the formal sector which indicates that the bulk of the income distribution concentration might be occurring in the informal sector.

**Figure 9 – Share of Informally Occupied Persons in the Economy, by Income Group – Brazil 2006**



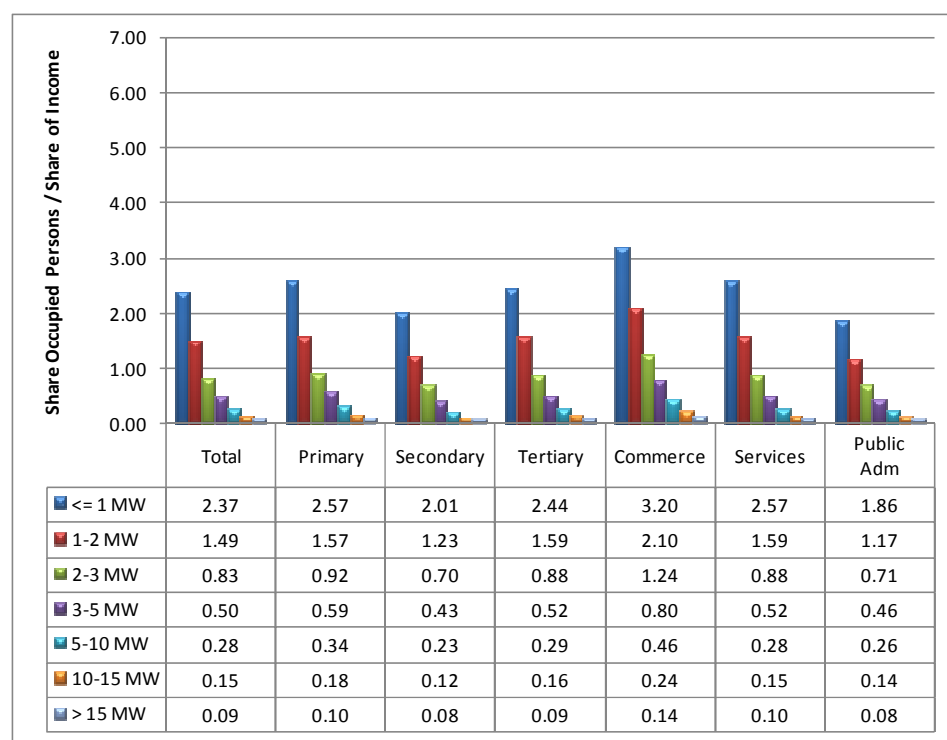
Source: Estimated from PNAD and National Accounts, IBGE

**Figure 10 – Share of Income from the Informal Sector in the Economy, by Income Group – Brazil 2006**



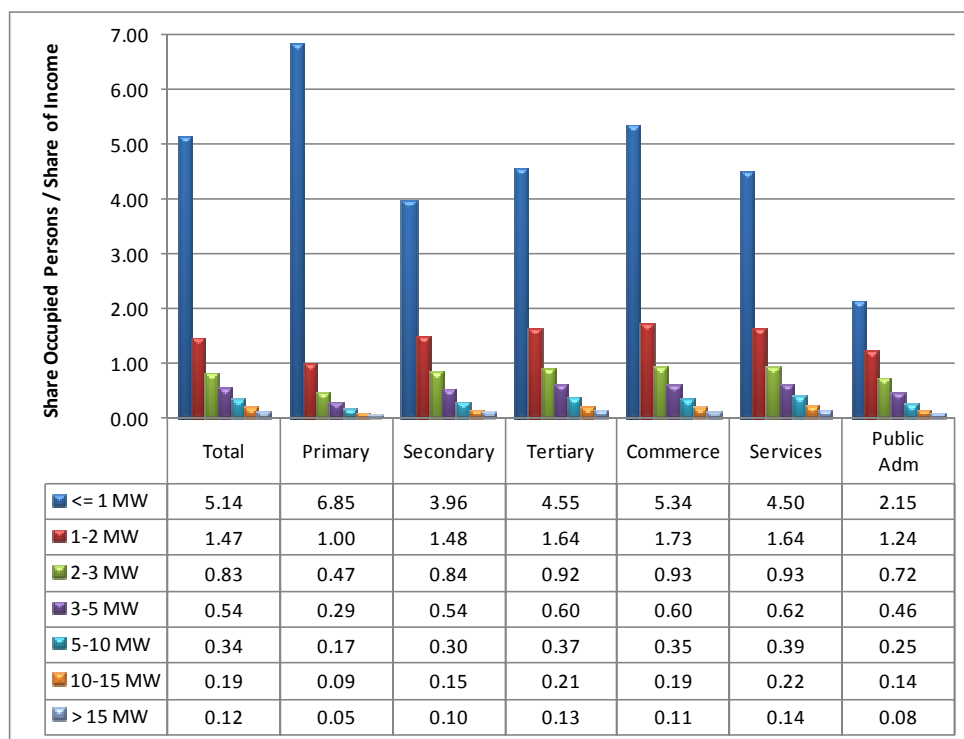
Source: Estimated from PNAD and National Accounts, IBGE

**Figure 11 – Relationship between the Share of Occupied Persons and the Share of Income of the Formal Activities in the Economy, by Income Group and Economic Sector – Brazil 2006**



Source: Estimated from PNAD and National Accounts, IBGE

**Figure 12 – Relationship between the Share of Occupied Persons and the Share of Income of the Informal Activities in the Economy, by Income Group and Economic Sector – Brazil 2006**



Source: Estimated from PNAD and National Accounts, IBGE

### 3. Estimating the impacts on income distribution of changing the shares of tertiary and informal activities

The numbers above indicate that tertiary activities are a significant part of the Brazilian economy, and that informality, which is also important, varies across sectors. They also show that the pattern of income distribution varies across sectors and, within which sector, between their formal and informal segments. This points to an income inequality scenario in the future as the Brazilian economy evolves, probably approaching the situation in the present developed economies, in which the share of tertiary activities is higher than it is presently in Brazil. Additionally, what would be the impacts on income inequality of an increase (decrease) in the degree of informality in different sectors, especially in the tertiary activities?

In order to estimate such impacts, a Leontief type of model is estimated. The economy is divided into 49 sectors of economic activity, and an input-output matrix for the year of 2006 is estimated and utilized. Each sector is divided into formal and informal activities, and inside the informal into without a signed card and self-employed. Besides the input-output relationships embedded in the input-output matrix, the model also considers the distribution of payments to factors of production. These will be split into the 7 income brackets, expressed in minimum wages (MW) of 2006 (R\$ 350 of 2006 per month): less or equal to 1 MW; 1 to 2 MW; 2 to 3 MW; 3 to 5 MW; 5 to 10 MW; 10 to 15 MW; more than 15 MW. The source for such information is PNAD – Pesquisa Nacional Por Amostras de Domicílios, combined with the information from the System of National Accounts, both from IBGE.

### ***3.1. The Leontief Model***

The intersectoral flows existing in a given economy, which are determined by both technological and economic factors, can be described by a system of simultaneous equations represented by

$$X = AX + Y \quad (1)$$

where  $X$  is a vector ( $n \times 1$ ) with the total output of each sector,  $Y$  is a vector ( $n \times 1$ ) with each sector's final demand, and  $A$  is a matrix ( $n \times n$ ) with the technical coefficients of production (see Leontief, 1951). The sectoral final demands are usually treated as exogenous to the system and, therefore, the output vector is uniquely determined given the final demand vector, that is,

$$X = (I - A)^{-1}Y \quad (2)$$

where  $I$  is the ( $n \times n$ ) identity matrix and  $(I - A)^{-1}$  is the ( $n \times n$ ) with the Leontief inverse.

### 3.2. Estimating the model for the Brazilian economy

The model described above was estimated for the Brazilian economy for the year 2006, using the information the System of National Accounts and the methodology presented by Guilhoto and Sesso Filho (2005). The economy is split into 49 sectors, distributed into: agriculture (1); extractive (2); manufacturing (29); public utilities (1); construction (1); commerce (1); services (11); and public administration (3). In each sector, the wages, salaries, and payment to self-employed are distributed to the three categories of agents: formal occupied persons, employers without a signed card, and self-employed. In each sector and in each of these four categories of agents, their income is distributed to the 7 income brackets considered.

## 4. Model Results

Using the Leontief model it was possible to estimate the direct and indirect impacts of an increase in the final demand of each sector over the number of occupied persons and the income in the formal and informal economy as well as in each one of the 7 income groups considered in this paper. The results for occupied persons are presented in Figures 13 to 15 while the results for income are presented in Figures 16 to 18.

The first rows of Figure 13, which start in F1 present the results for the 7 income groups of the formal sector, then the ones which start in I1 present the results for the informal sector, the ones starting with T1 are the result of the addition of the formal with the informal economy, while TT represents the final result over occupied persons, for the economy. The yellow lines are reference to separate the primary, secondary and tertiary sectors. The one most to the right is used to mark where the public administration sector starts. Overall it can be observed that the bulk of the impact over occupied persons in all the sectors occur in the first two income groups (up to 2 MW) and in the informal sector. The main results in term of employment occur: a) in the primary sector, mainly due to the high number of people occupied in the agriculture; b) in the secondary activities linked with the transformation of agricultural goods, due to the indirect effect of these activities, and in the apparel sector

given that this sector has a high direct demand of labor force; and c) in the tertiary sector, with a special highlight to the domestic service sector, followed by the sector of lodging and food, services rendered to the families and commerce. Overall the tertiary sector produces a higher impact over employment than the secondary sector.

When taking into consideration the direct and indirect effects it is possible to observe that the share of employment formal and informal, Figures 14 and 15, in the economy has a tendency to be close to half and half, with the clearly exception of the primary sector that has a great share of the informal labor force, and the public services that has a great share of the formal labor force. This result can be explained in part by the level of integration found into the Brazilian economy, which has a tendency to level out the impacts of the formal and informal sectors.

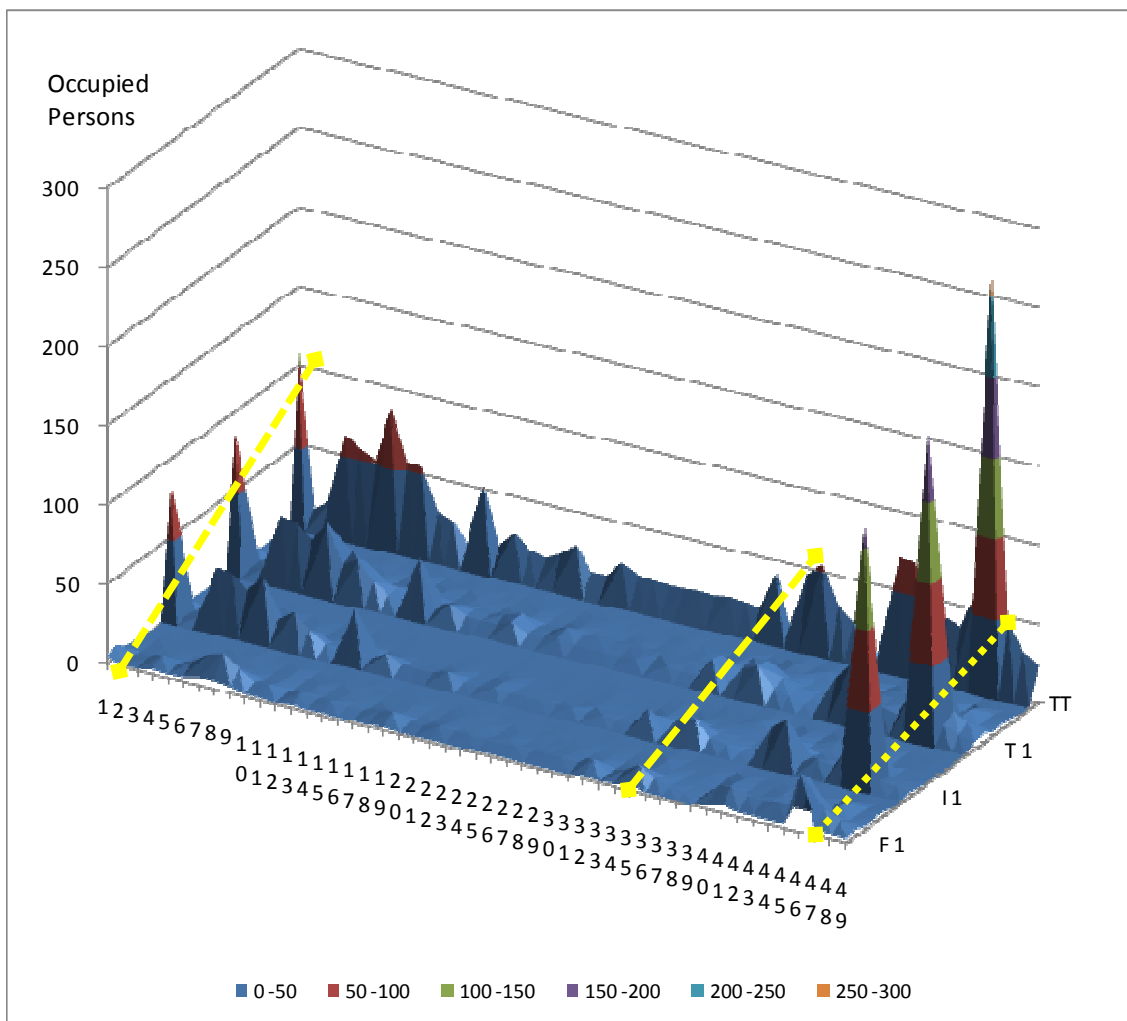
Figure 16 can be interpreted in the same way as Figure 13, described above, but now with reference to the impacts over the occupied persons income. Overall it can be observed that the most of the impact over the income generation occurs in the formal sector, and in the tertiary sector, that is intense in labor force. While in the previous analysis of occupied persons it was show that there is tendency to concentrate the impacts in the first two income groups, for the income, the impacts are more evenly distributed among the income groups. But, given that the higher income groups have a smaller share of persons, this shows that the productive structure of the Brazilian economy as a tendency to concentrate income.

Taking into consideration the direct and indirect effects it is possible to observe that the share of the income in economy, Figures 17 and 18, has a tendency to be great in the formal sector than in the informal sector, the exceptions being the primary sector, and repair services and domestic services in the tertiary sector.

From the above it should be pointed out that the most of the employment occurs in the low paid jobs, while the most of the income goes to the formal sector and the higher income groups. This should call for actions on the government side to implement economic policies directed to improve the income in the lower income groups. It is clear that for this to be possible this kind of economic policy needs to be direct to improve the productivity of the labor force which in most of the cases could only be achieved by increasing the level of education of the population.

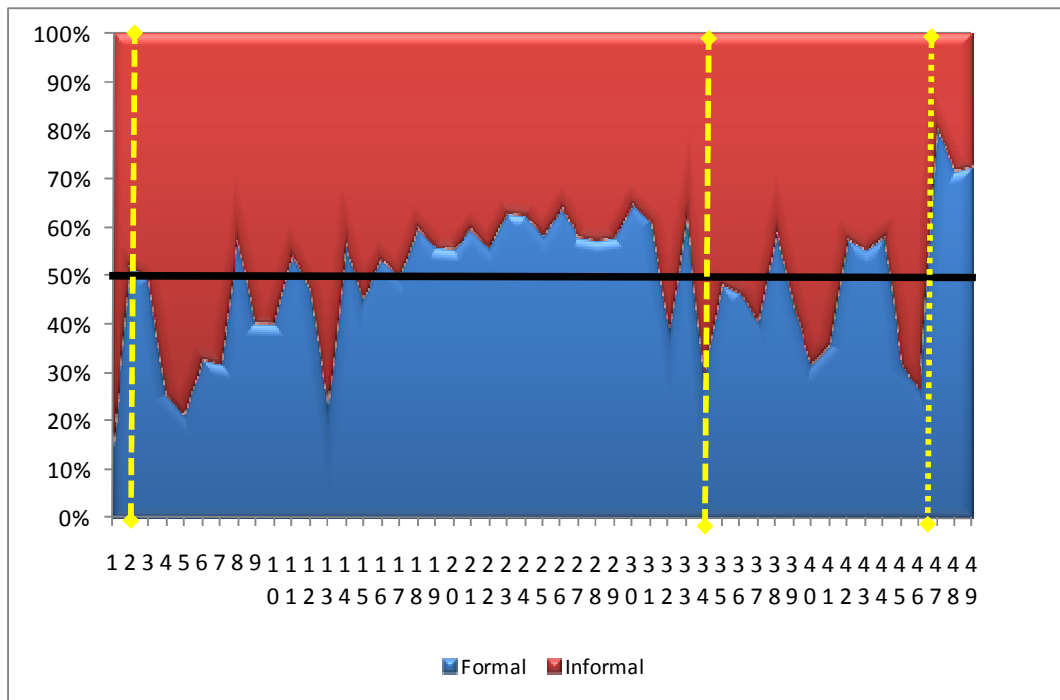


**Figure 13 – Impact of an Increase of R\$ 1 Million in of Production in each Economic Sector over the Number of Occupied Persons (Formal, Informal and Total) – Brazil 2006**



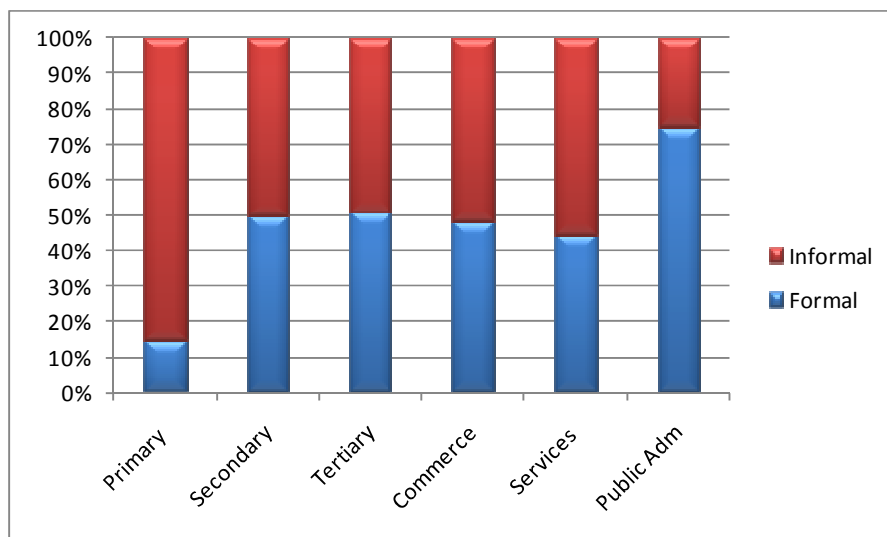
Source: Model Results

**Figure 14 – Share of the Number of Occupied Persons in the Formal and Informal Sectors Resulting from the Impact of an Increase of R\$ 1 Million in of Production in each Economic Sector – Brazil 2006**



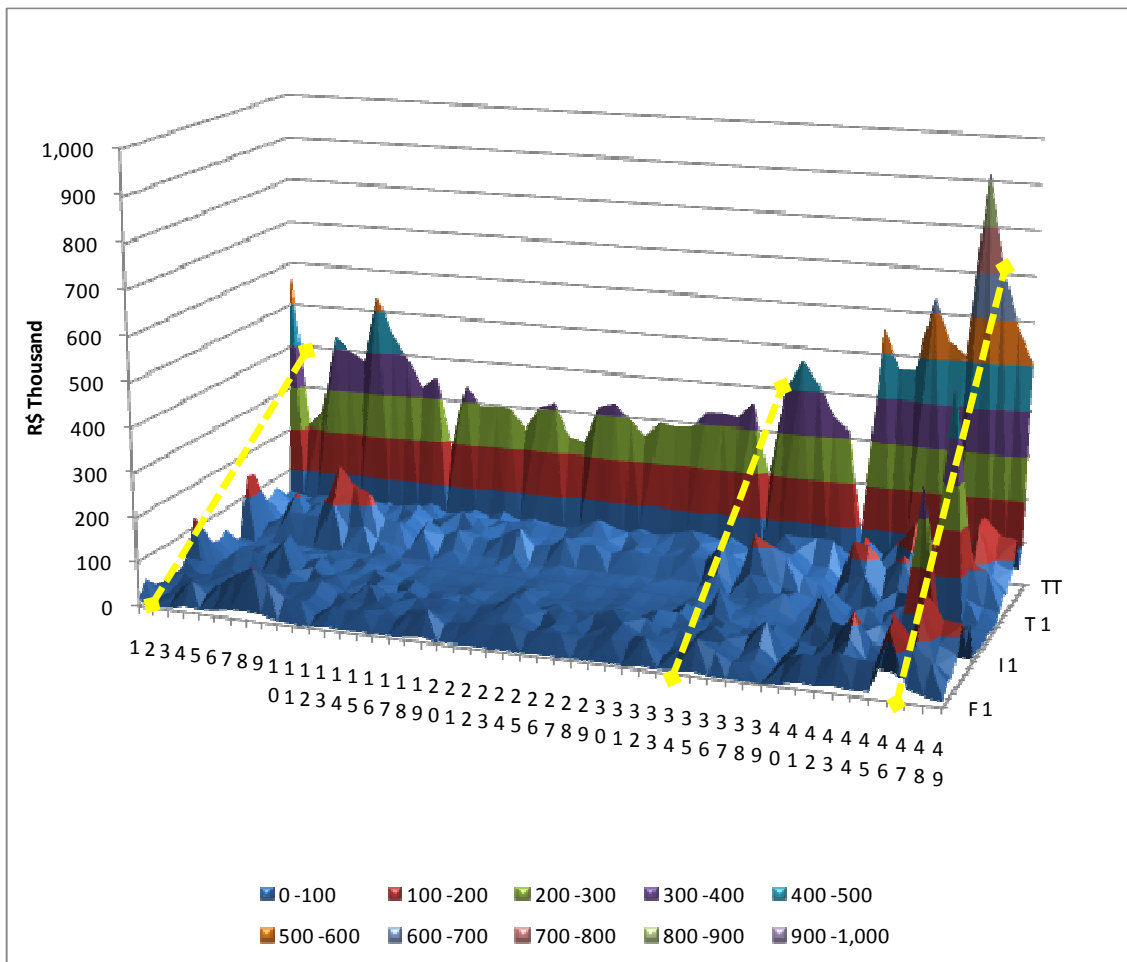
Source: Model Results

**Figure 15 – Average Share of the Number of Occupied Persons in the Formal and Informal Sectors Resulting from the Impact of an Increase of R\$ 1 Million in of Production in each Economic Sector – Aggregated Results – Brazil 2006**



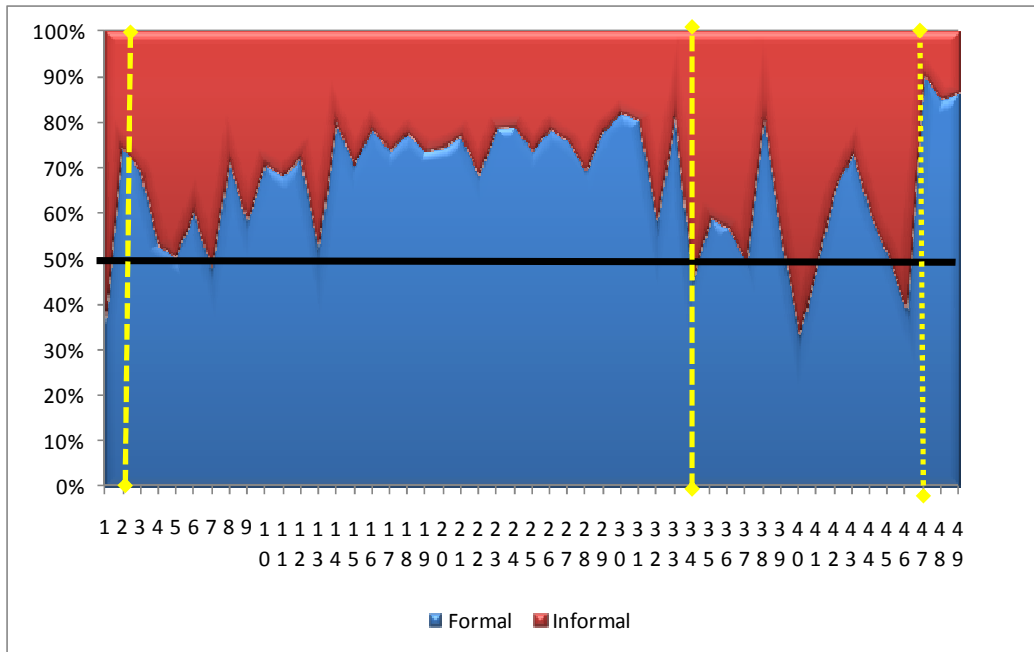
Source: Model Results

**Figure 16 – Impact of an Increase of R\$ 1 Million in of Production in each Economic Sector over Income (Formal, Informal and Total) – Brazil 2006**



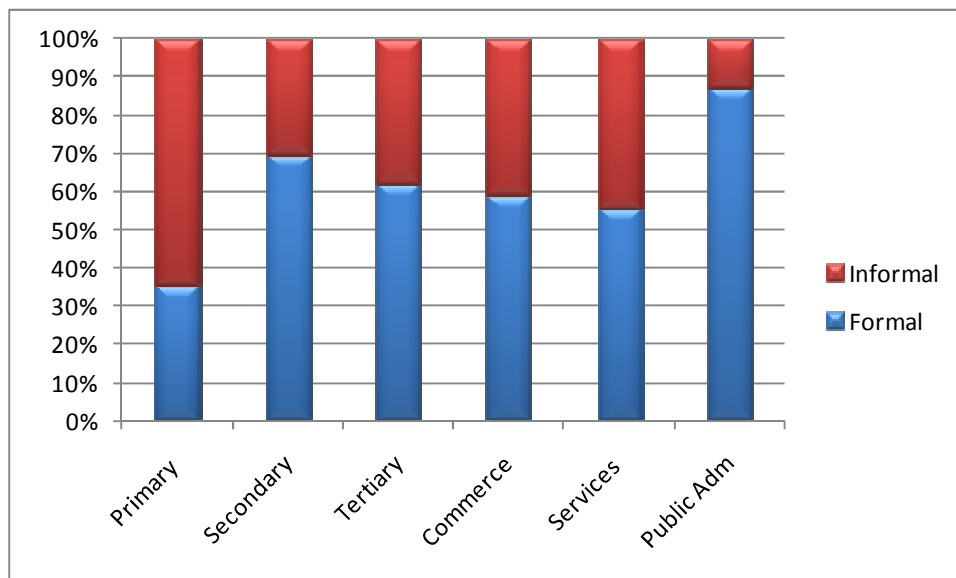
Source: Model Results

**Figure 17 – Share of the Income in the Formal and Informal Sectors Resulting from the Impact of an Increase of R\$ 1 Million in of Production in each Economic Sector – Brazil 2006**



Source: Model Results

**Figure 18 – Average Share of the Income in the Formal and Informal Sectors Resulting from the Impact of an Increase of R\$ 1 Million in of Production in each Economic Sector – Aggregated Results – Brazil 2006**



Source: Model Results

## 5. Final Comments

This paper using data from the System of National Accounts and the National Survey of Households, both from IBGE, on one hand, and on the other hand using the Leontief model, it was able to show the importance of roles played by the tertiary sector and the informal sector in the Brazilian economy.

The results overall not only show the importance of the Tertiary sector for the Brazilian economy in terms of employment (around 61% of the occupied persons), and income generation (around 67% of the economy Value Added), but also shows the high share of the informal sector in the Brazilian economy (around 58% of the occupied persons and 34% of the income). The combination of these facts reflects in an economy with low wages and salaries and a high concentration of income, and as also showed above, with a productive structure that has a tendency to concentrate income and thus helping to keep the present status of income concentration in the Brazilian economy.

In the late years, the Lula government has done a series of social policies that have helped improve the income distribution in the Brazilian economy. However, while these policies are welcomed, they don't deal with the main problem stressed in this paper, which is the necessity to increase the income of the labor force and to change the tendency that the productive structure of Brazilian economy has to concentrate income. This can only be achieved through economic and social policies direct mainly to improve the quality of labor force and the technical bases of the economy.

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