

The employment generation in the transition to a green economy: scenarios for Brazil

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Abstract

This study aims to verify if a transition to a green economy can generate more jobs in Brazil. For this, first, an overview is given on the first decade of the 2000's where it is clear that both the GDP of the economy and the industrial GDP showed an upward trend in the period, simultaneously to the improvement recorded in the unemployment rate, to the increasing of industrial energy consumption and the emissions of greenhouse gases. The data associated with the theoretical considerations show that it may be possible to reconcile economic growth with less environmental degradation and generation of jobs, but more from the perspective of relative decoupling than from the absolute decoupling, with greater chances of success through exploration of the gains of technological effect together with the gains of composition effect.

Keywords: green economy, employment generation, resource decoupling,

1. Introduction

Between 2007 and 2009 the world had lived the biggest crisis since the 30's, which, besides its financial character, made the unemployment rocket all over around the planet and exerting many other effects that still can be felt in several economies.

The outbreak of this crisis explained a big fail at the traditional model characterized mainly by the incessant search of unlimited growth, the minimal intrusion of government, by the assumption that agents have rational expectations and maximize their utility in a intertemporal way on perfectly competitive markets, where the different allocations of the economy are targeted based on price movements, making the economy moves toward an optimal balance and stability.

Therefore, it is evident that the adoption of this model has led to recurrent crises such as those related to climate, biodiversity, fuel, water and food, making clear its insufficiency to solve persistent social problems like unemployment, socioeconomic insecurity, diseases and social unrest (UNEP, 2011).

The central cause of this crisis, in turn, has been attributed to misallocation of capital, which in the past two decades has been directed to investments in property, financial assets and fossil fuels, encouraging the rapid accumulation at very high social and environmental costs as the depletion and the degradation of natural resources.

Given this situation, was triggered a series of theoretical revisions which have been receiving renewed attention by academia and governments front the need to rethink what economic theory offers face social problems and the "new" environmental problems exacerbated by the crisis, thus making rise new paths in macroeconomic theory in the face of the disappointment related to traditional economy.

In this context have emerged several studies suggesting new ways to revitalize the economies such as, for example, the work performed by Pollin et al. (2008); GHK Consultancy (2007) and Young (2011). Many of them pointing out good opportunities to create jobs from the investment in activities with a low potential of environmental degradation, making the search for environmental sustainability a new way to face the last global financial crisis.

Simultaneously to the discovery of the potential leverage that more sustainable activities offers, held in June 2012 United Nations Conference on Sustainable Development, also known as Rio + 20, twenty years after the UN Conference on Environment and Development held in Rio de Janeiro in 1992, with the purpose of ensuring a renewed political commitment to sustainable development, to evaluate progress achieved and remaining gaps in the implementation of the outcomes of the major summits on sustainable development and face the new and emerging challenges.

Confirming the importance of having clearer and more active actions by different countries regarding the relationship between economy and environment, this conference will look at two themes: the green economy in the context of sustainable development and eradication of poverty and the institutional framework for sustainable development.

Such inspiration comes from the positioning of the United Nations Environment Programme (UNEP) on the subject, which formulated a proposal for a transition to a green economy, in other words, a transition toward an economy in which “[...] income and employment should be driven by public and private investments that reduce carbon emissions and pollution, enhance energy and resource efficiency, and prevent the loss of biodiversity and ecosystem services.” (UNEP, 2011a, p.16), featuring, therefore, an economy of “[...] low carbon, resource efficient, and socially inclusive [...]” (UNEP, 2011a, p.16).

In other words, the green economy is an attempt to adjust the economic growth with the sustainable development through the decoupling between economic goods and environmental bads, contradicting the argument of ecological economics that there is necessarily a trade-off between economic growth and environmental sustainability.

On the other hand, the decoupling can be achieved by two ways: through the resource decoupling (that “[...] means reducing the rate of use of (primary) resources per unit of economic activity. [...]” (UNEP, 2011b, p.4); and impact decoupling (that “[...] requires increasing economic output while reducing negative environmental impacts.[...]” (UNEP, 2011b, p.4).

Moreover, decoupling can be either absolute, or relative.

With absolute decoupling, [...], resource use declines, irrespective of the growth rate of the economic driver. [...]. Relative decoupling of resources or impacts means that the growth rate of the environmentally relevant parameter (resources used or some measure of environmental impact) is lower than the growth rate of a relevant economic indicator (for example GDP). (UNEP, 2011b, p.5).

In fact, what UNEP’s green economy initiative proposes is a kind of a “tunnel” in the Environmental Kuznets Curve (EKC) in order to accelerate the transition process to an economy more efficient in the use of natural resources, through technological innovation.

Front of the large international discussion about the viability of the effects and pathways for such a transition that, by definition, promises economic growth, environmental sustainability and social inclusion even for developing countries, this study aims determine whether this effort adopted in Brazil can be reflected in net generation of jobs.

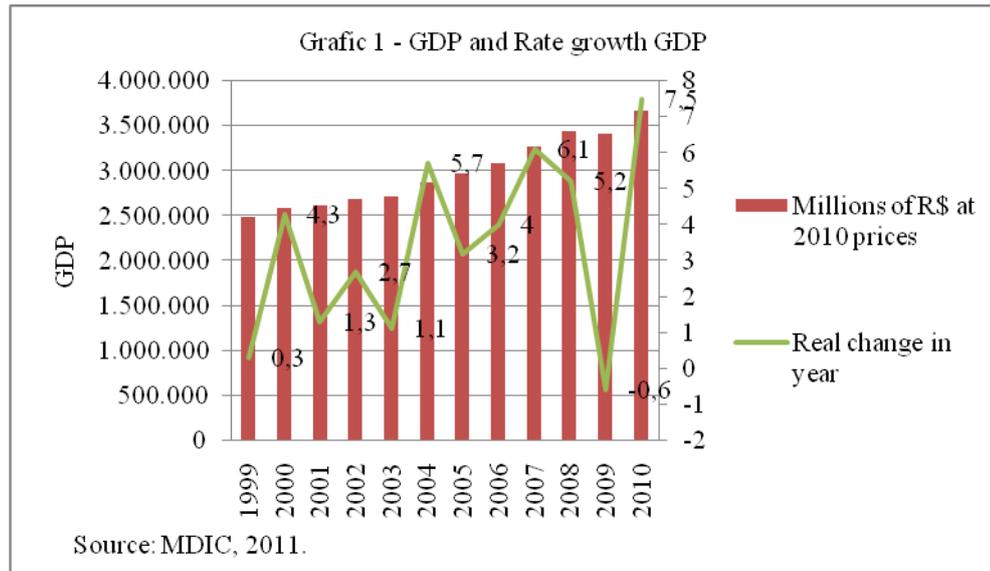
However, the idea of green economy involves many aspects not only economic that produce different effects, making it extremely complex to conduct a study that considers it as a whole. Thus, the present work is devoted to study an instrument of the transition to a green

economy, the resource decoupling, focusing on the energy consumption of the Brazilian industry.

This way, an overview is given on the performance of the Brazilian economy, its labor market and energy market between 2000 and 2010 focused on the energy industry, considering the evolution of its Gross Domestic Product (GDP), the relationship between energy consumption of industry / industrial GDP, jobs in industry and environmental impacts, where it is clear that both the economics's GDP and industrial's GDP showed an upward trend in the period, while was recorded improvement in the unemployment rate, increased energy consumption of the industry, and of emissions of greenhouse gases, in order to extract some hints about the possibility of resource decoupling come "together" of more jobs.

2. Performance of the economy and the Brazilian labor market in the first decade of the 2000's

According to the Ministry of Development, Industry and Foreign Trade (MDIC, 2011) Brazilian real GDP showed an upward trend between 2000 and 2010, registering an average annual growth rate of 3,68% in the period, from R\$2.586.153 million in 2000 to R\$3.674.964 million in 2010, in 2010 prices, been important draw attention to the only decrease (-0,6%) recorded in this indicator in 2009, due to the effects of the global financial crisis, as illustrated in the graph below.



Among the different sectors of the economy, the most responsible for economic growth between 2000 and 2010 was the services sector, responsible for an average of 66,15% in the period of economic performance, with emphasis on administration, public health and education (15,43%), other services (14,63%) and trade (11,28%), followed by industry (27,73%), especially for the processing industry (17,13%), construction (5,07%) and electricity and gas, water, sewage and urban cleaning (3,47%) and agriculture (6,17%). (MDIC, 2011).

As for the fastest growing sectors between 2004 and 2010 were services (4,50%), with emphasis on financial intermediation and insurance (8,99%), trade (5,77%) and information services (4,99%), followed by industry (3,61%), with emphasis on the mining industry (5,69%), construction (4,46%) and production and distribution of electricity, gas and water (4,29%), and finally agriculture (2,89%).

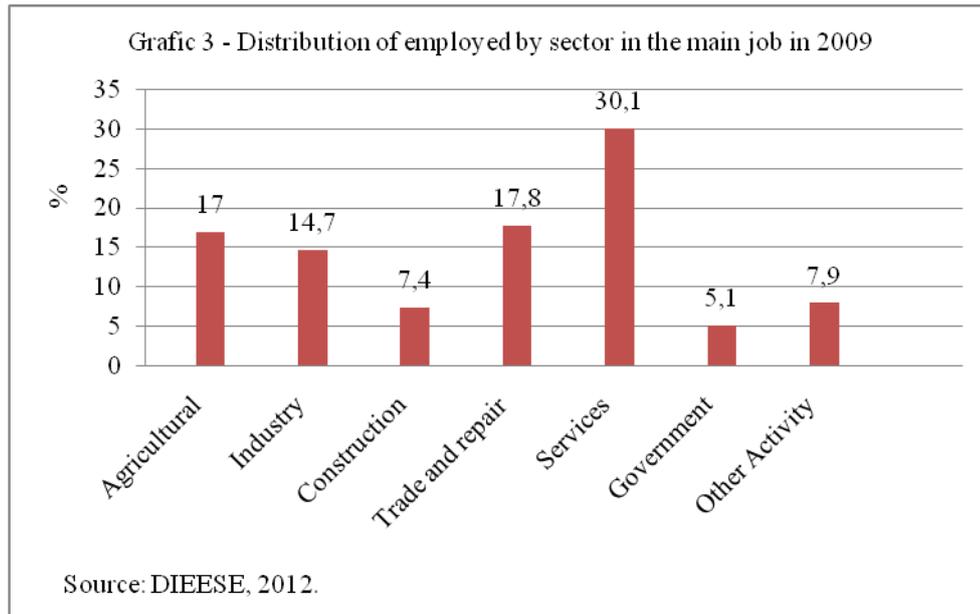
According to the Inter-Union Department of Statistics and Socioeconomic Studies (DIEESE, 2012) the labor market showed a behavior very tied to the economic dynamics of the country in the first decade of the 2000s. As shown in the graph below, after growth in the unemployment rate in 2005 (10,2%), indicators of employment and unemployment began to

show significant improvement, with only off this trajectory in 2009, where due to the effects of the international financial crisis recorded an unemployment rate of 9,1% according to the IPEADATA (2012), the database of the Institute of Applied Economic Research (IPEA), thus making the average annual unemployment rate in the period to stay around 9,4%.



For DIEESE (2012) this result stems from the increase of occupation above the growth of the Economically Active Population (PEA), a portion of the population that is in the labor market in the condition of employed or unemployed, thereby causing a decline in the unemployment rate.

Also according to that institution, in 2009 the Brazilian population was predominantly employed in the service sector (30,1%), with significant shares in the sector of trade and repair (17,8%), agriculture (17,0%) and industry (14,7%), and the remaining 7,4% of the population were engaged in construction and 5,1% in public administration, as illustrated in Figure 3.



However, between 1999 and 2009 two activities had reduced relative participation in total employed population in the country: agriculture, down 7,9 percentage points (p.p), and public administration, a reduction of 4,3 p.p, while the sectors that grew the most in percentage terms, the trade and repairs, 4,5 p.p, services, and industry 3,2 p.p, 2,1 p.p.

Given the data presented, we can see that the Brazilian GDP had an upward trend in the first decade of the 2000s, recording an annual average rate of 3,68% in the period, with the exception of 2009 where there was a decrease of (-0,6%) due to the effects of the global financial crisis.

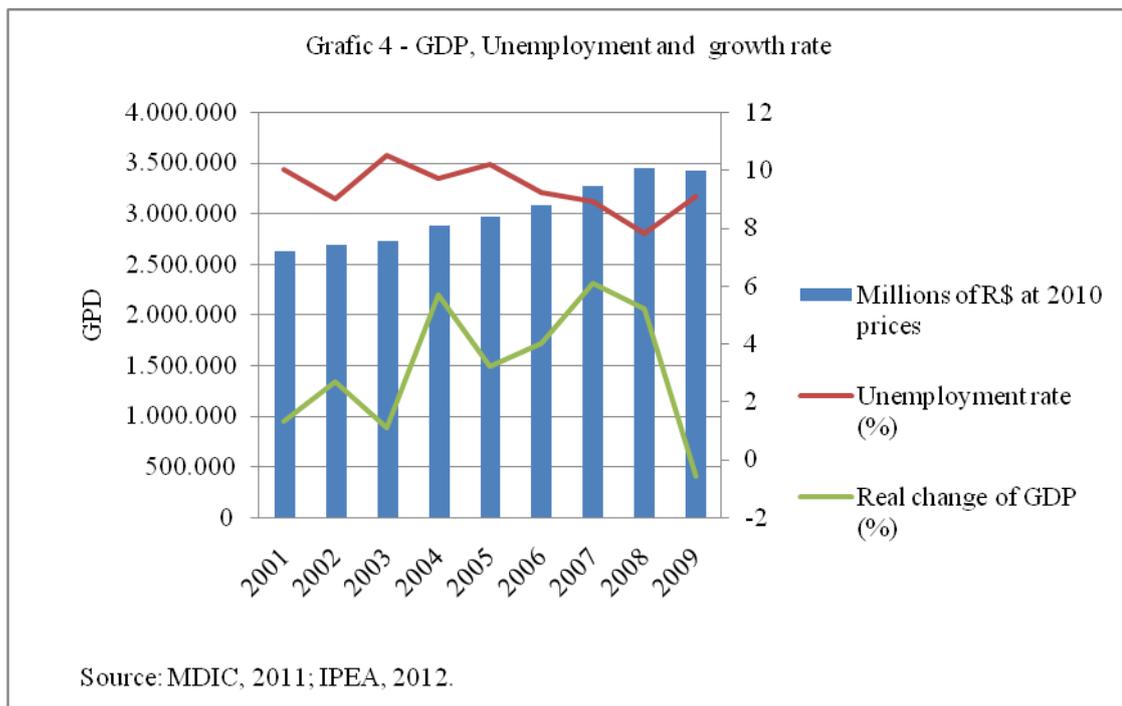
Among the different sectors of the economy, the main responsible for such performance in the period was service, followed by industry and agriculture, and the first two were the highest increase between 2004 and 2010.

As for the labor market, there was improvement in the unemployment rate between 2000 and 2010, with deviation from this trend in 2009 when it recorded higher unemployment than in the preceding year thus showing an annual average rate of 9,4% in the period.

However, when they identify sectors of the Brazilian economy that employ more, the ratio of importance relating to economic growth presented above is reversed, since in Brazil

the order of the main sectors promoters of growth is not necessarily the same as that of the largest employers of manpower. Thus, the sectors that most employed in 2009 were services, followed by agriculture and industry. Yet, between 1999 and 2009 agriculture became less important as this indicator, while services and industry began to employ more over this period.

So it can be seen that the movements of the unemployment rate are closely related to the economic performance, since, as illustrated in the following figure, as GDP grows unemployment reduces, however, not in the same proportion and with some lag, making it clear, therefore, how the labor market is vulnerable to the bad weather of the economic model adopted.



3. Performance of the Brazilian industrial sector in the first decade of the 2000's

Based on the National Energy Balance (BEN, 2011) it can be concluded that the industrial GDP also showed an upward trend between 2002 and 2010, recording a single and strong decrease of -7,22% in 2009, due to the international economic crisis, thus registering an average annual growth of 2,83% in the period.

The most important sub-sector in terms of GDP between 2000 and 2010 were the manufacturing industry, especially for the others category "Mechanical, electrical and communication, transport equipment, wood, furniture, rubber, pharmaceuticals, perfumes, soaps and candles, plastic products, tobacco, construction and miscellaneous" (BEN, 2011, p.120), food and beverage, chemical, metallurgy and textiles "Exclusive clothing, footwear and fabric" (BEN, 2011, p.120), followed by the mining industry.

However, when speaking in terms of GDP growth this relationship is reversed, because between 2002 and 2010 was the mining industry that had the highest performance in the period, registering an average of 5,38% per year, followed by the manufacturing industry that grew on average by 2,72%, where the following activities performed better annual average: chemical (6,98%), non-metallic (6,28%), pulp and paper (6,27%), metallurgy (5,66%) and food and beverages (4,80%).

According to the Ministry of Development, Industry and Foreign Trade (MDIC, 2012) the industrial sector that hired most in 2010 was the manufacturing industry, responsible for 70% of industry jobs, followed by construction, accounting for 23,72% sector employment. In turn, in the manufacturing sector the main responsible for jobs in 2010 were the manufacturing of food products (18,46%), manufacture of garments and accessories (9,40%), manufacture of metal products, except machinery and equipment (7,15%), manufacture of motor vehicles, trailers and bodies (6,70%) and manufacture of rubber and plastic material (6,05%).

On the other hand, the sub-sectors that had fewer employees in 2010 were the manufacture of tobacco products (0,21%), recycling metal (0,46%), manufacture of other transport equipment except motor vehicles (1,24%), manufacture of pharmaceutical chemicals and pharmaceuticals (1,30%), printing and reproduction of recorded (1,63%) and manufacturing of coke, petroleum products and biofuels (1,84%).

Given the data presented, it can be concluded that the industry also showed an increasing GDP between 2002 and 2010, registering an average annual rate of 2,83%, decreasing (-7,22%) only in 2009. The sector with the highest representation in terms of industrial GDP between 2000 and 2010 was the transformation, which in turn was the largest employer in 2010, but remained below regarding the growth of its product, as between 2002 and 2010 it was mining and quarrying mineral that registered more dynamic.

It is important to note, though, that between 1999 and 2009 the industry was one of three sectors that presented higher growth in number of employed persons, and in 2010 the number of employed persons in industry showed strong growth, 3,4%.

With it, the industrial employment ended 2010 with a strong growth, reflecting not only the gradual recovery in manufacturing employment over the year, but also the low base of comparison in terms of adjustments made in the labor market in the industry in 2009, due to the effects of international economic crisis.

4. Performance of the Brazilian energy market and energy industry between 2000 and 2010

As for the Brazilian energy market, their data were collected from BEN, an annual publication of jurisdiction of the Energy Research Company (EPE) under the Ministry of

Mines and Energy (MME) of the Brazilian government, fundamental to the planning activities and monitoring national energy sector.

For such institution the production of energy concerns "Primary Energy obtained from Mineral Resources, Plants and Animals (LFG), Water, Geothermal Reservoirs, Sun, Wind, Tide (...)" (EPE, 2011, p. 178).

In its turn, primary energy concerns "energy products provided by nature in its direct form, such as oil, natural gas, coal, vegetable and animal residues, solar, wind, etc." (EPE, 2011, p.177).

Between 2000 and 2010 the primary energy production increased from 153.334.000 tons of oil equivalent (toe) to 253.553 million toe, representing an annual average growth of 5,19%. The production of renewable and nonrenewable energy showed similar average growth in the period, 5,31% and 5,11% respectively, being responsible for similar proportions of energy production, around 52,72%, especially for oil, and 47,28%, respectively, where the sugar cane products is gaining importance at the expense of hydropower and wood.

The gross internal offer of energy comprises the "Amount of Energy that is available to the country to be subjected to the transformation processes and, or final consumption." (EPE, 2011, p.178), already considered import and export, and between 2000 and 2010 rose from 190.615.000 toe to 268.754.000 toe, registering an annual average growth rate of 3,55%, highlighting the growing share of renewable energy, responsible for an average of 43,89% of domestic supply gross, from 41,0% in 2000 to 45,5% in 2010 mainly due to sugarcane derivatives, while the non-renewable energy corresponds on average by 56,11%, where oil has increased participation.

For its part, the final energy consumption grew 3,47% per year on average between 2000 and 2010 from 171.949.000 toe to 240.949.000 toe, been the petroleum products mainly responsible for such consumption, as represented 43,84% of the average final energy

consumption in the period, followed by electricity, accounting for 16,24% and sugarcane bagasse (11,05%), been important to emphasize that this last is showing a growth in the proportion of final consumption by source of energy, from 7,8% in 2000 to 12,9% in 2010.

The main consumer of energy in Brazil is the industrial sector, so the choice of it for the present work, responsible for an average of 36,65% of total final energy consumption in the period analyzed, followed by the transportation sector which accounted for 27,35% of total consumption.

Clearly, therefore, that between 2000 and 2010 there was an expansion of the energy market in Brazil, which is characterized by the strong participation of renewable sources, which highlights the growing presence of sugarcane bagasse.

The final energy consumption by industry, in turn, grew 3,54% on average per year between 2000 and 2010, considering that between sources of energy consumed by this sector electricity represents the largest proportion been responsible on average by 20,33% between 2000 and 2010, followed by sugar cane bagasse which represented 18,11% of consumption in the same period, becoming the most important energy source for industry in the years 2009 and 2010.

This result is due to the high rates of growth in consumption of sugar cane bagasse by Brazilian industry, which recorded annual average rate of 8,80% in the period, while the annual growth average of 3,36% of electricity consumption.

Considering the results presented, it can be seen that the movement of growth prevailed during the past eleven years, considering production, the supply and consumption of energy in Brazil following the GDP which, in turn, grew on average 3,86% per year between 2001 and 2010.

So, it became clear that oil plays an important role in the Brazilian energy market as it is largely responsible for the production, supply and consumption of energy in the country.

But on the other hand, according to the Portal Brasil (2012) it possesses the most renewable energy matrix in the industrialized world with 47,28%, on average from 2000 to 2010, of its production from sources such as water, biomass and ethanol, in addition to wind and solar, considering that hydroelectric plants are responsible for generating over 75% of electricity, in contrast to a world energy grid composed of 13% from renewable sources in the case of industrialized countries, falling to 6% among developing nations.

On the other hand, it is important to highlight the strong growth of supply and consumption that the bagasse has presented setting up as the main source of energy consumed by industry in 2009 and 2010, making energy a renewable energy source more and more important for the Brazilian economy.

Became evident, also, the effects of the crisis in the national energy market, which is configured in one-off effects in 2009 but already with a strong recovery in 2010. For example, the renewable energy production fell by -1,67%, the gross domestic supply fell by -5,79%, the final energy consumption fell by -2,30% and final energy consumption by industry reduced -7,18%, which following the fall of -7,22% in the industrial GDP showed a strong negative effect caused by the crisis in the industrial sector.

EPE (2011) also presents other interesting indicators relating to GDP, sectorial GDP, internal offer of energy, energy consumption, resident population, among others. But as the aim of this paper is to explore the possible effects of a higher efficiency of energy consumption it will be presented only the data that illustrate this relationship.

So, dividing the final energy consumption of the industrial sector by its GDP in each year of the period analyzed, there is a kind of efficiency indicator. Between 2001 and 2010 this indicator increased on average 1,02% per year, and the final consumption average of energy industry annually grew more than the GDP of this sector, 3,54% vs. 2,83%.

Largely on the period under review the final energy consumption in industry showed the highest annual growth rates than the industrial GDP in the same period, which, in turn, may indicate a loss of efficiency in energy use by the Brazilian industry. However, it is necessary a more detailed study to explore the different Subcategories in order to extract more precise information about this first indication.

5. The emissions of Greenhouse Gases in Brazil and in the industry

The Ministry of Science and Technology (MCT) published in 2010 the Second National Communication of Brazil to the United Nations Framework Convention on Climate Change (UNFCCC). This Convention, in turn, is an international treaty resulting from the UN Conference on Environment and Development, considered one of the more balanced multilateral instruments, universal and relevant today with the goal of stabilizing concentrations of greenhouse gases (GHG) emissions in the atmosphere at levels that avoid dangerous interference with the climate system.

Brazil, as a signatory, will take voluntary actions to mitigate GHG emissions, with a view to reducing by 36,1% and 38,9% of its projected emissions by 2020 based on 2005 figures present at the Second Brazilian Inventory of Anthropogenic Emissions, those produced as a result of human actions, by sources and removals by sinks of GHGs not controlled by the Montreal Protocol in addition to developing and periodically update national inventories.

Considered that, according to the MCT (2010), in 2005 the total net anthropogenic emissions of GHG were estimated at 1.703.451.000 tons (Gg), where the main responsible was the issue of carbon dioxide (CO₂), representing 96,15% of the total followed by methane

(CH₄) (1,06%), thus contributing to the result upward between 1990 and 2005, where the total emissions of CO₂, CH₄ and nitrous oxide (N₂O) rose 65%, 37 % and 45% respectively.

Among the sectors surveyed, the Change of Land Use and Forestry was largely responsible for launching the main gas emitted CO₂ in 2005 with the participation of 76,8%, followed by power sector (19,2%) and industrial processes (4,0%).

As this study focuses on the industrial sector, it is important to understand their role regarding the emissions of GHG. Thus, according to the MCT (2010), CO₂ emissions from this sector grew 44,6% between 1990 and 2005, from 45.265 Gg in this early period, to 65.474 Gg in the end of it.

The main subsector responsible for CO₂ emissions from industrial processes in 2005 was the pig iron and steel (58%), while major industrial processes that generate CO₂ emissions in Brazil are steel, cement production, the production of lime, production of aluminum and production of ammonia, and the N₂O occur mainly in the production of adipic acid.

Given the evidences, it can be concluded that the main gas emitted by the industries surveyed in Brazil is CO₂, which, in turn, had the highest growth rate among the three main greenhouse gases between 1990 and 2005.

It was clear also that the industry is not a major emitter of greenhouse gases when compared to other sectors surveyed, once occupied the third place of importance in 2005, after the Land Use Change and Forestry followed the energy sector.

6. Method

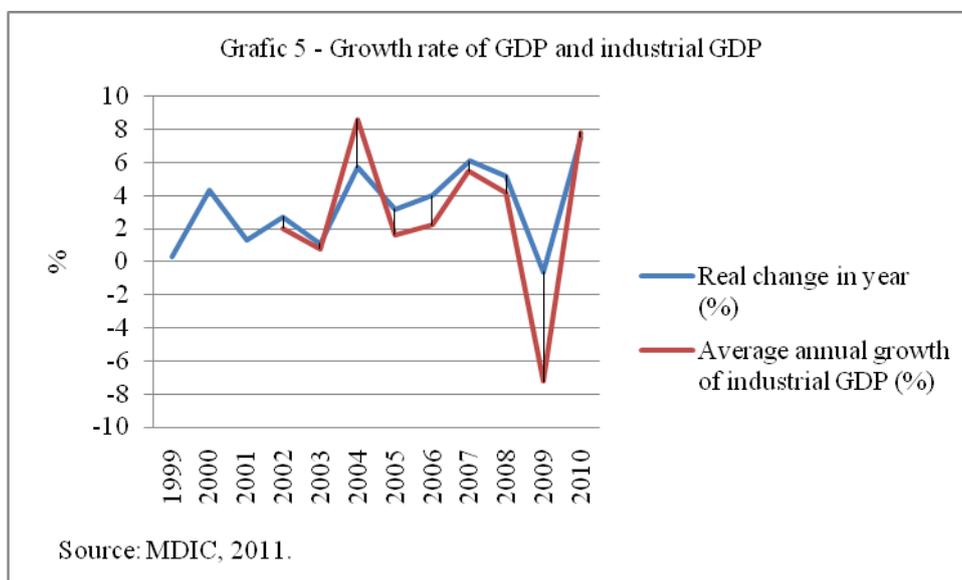
This work was based on a literature research about the relationship between economic growth and environmental degradation, exploring new perspectives on alternatives to

revitalize the economies against the background of international financial crisis, which consider the effects on the environment.

Moreover, it was done a data collection based on some Brazilian official sources in order to draw an overview of the performance of the economy, labor market, industry, industrial energy consumption and GHG emissions in the first decade of the 2000's.

7. Results

As illustrated by Figure 5, both the GDP of the economy and the industry's GDP showed an upward trend between 2002 and 2010, and in most of the period, growth rates were higher in first than in the second. However, when there was a crisis in 2009, was the industrial sector that fell stronger.

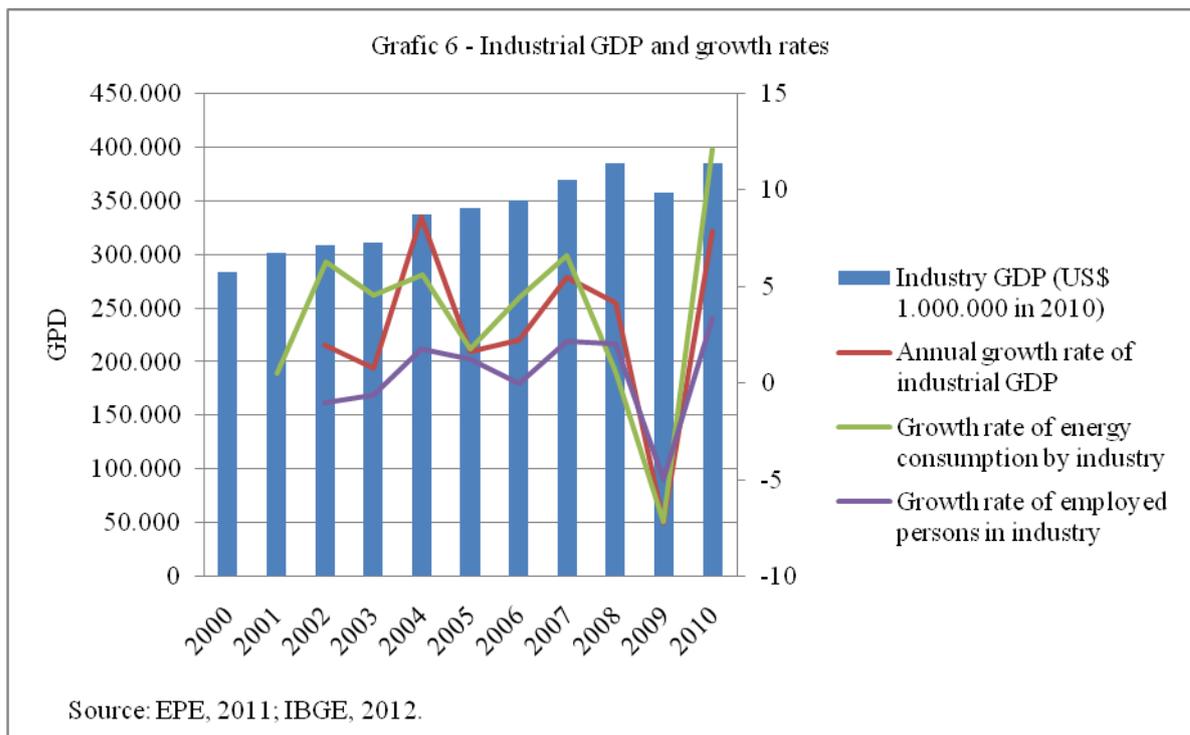


As the representative to the GDP, the industrial sector came in second place between 2000 and 2010, after the services sector, which occupied the first place, followed by agriculture. It was in this order which also gave the highest growth rates of their respective

productions between 2004 and 2010. However, this order is reversed when looking at the sectors that employed in 2009, where the service was the main contributor, followed by agriculture and industry.

The unemployment rate of the Brazilian economy had improved between 2000 and 2009, with a downward trend since 2005, interrupted in 2009 when it recorded 9,1%, after reaching 7,8% in 2008 according to IPEA (2012).

The GDP of the industrial sector, its energy consumption and the personnel employed in the sector showed similar movements over the first decade of the 2000's, as illustrated by Figure 6, registering an upward trend in the period, falling only in 2009 due to the effects of the international financial crisis that braked economies in general.



The main responsible for the industrial GDP between 2000 and 2010 were the manufacturing industry, which in turn was the most used industrial subsector in 2010, while the mining sub-sector was that grew the most between 2002 and 2010.

As for energy consumption, the industry was the main responsible sector, electricity is the main source of this type of consumption between 2000 and 2010, followed by sugarcane bagasse.

It was seen also which the CO₂ was the main one responsible for 2005 (96,15%), an increase of 65% between 1990 and 2005, followed by CH₄ (37%) and N₂O (4,0%).

It was also clear that the Land Use Change and Forestry was primarily responsible for CO₂ emissions in 2005, followed by the energy sector and industrial processes. In turn, the CO₂ emissions by industrial processes between 1990 and 2005 grew 44,6%, where the sub-sector of pig iron and steel was the largely responsible in 2005, especially also for steel, cement production, lime production, aluminum production and ammonia production.

8. Discussion

Although the present study is not sufficient to conclude whether there was causation between the different growth rates presented, it was clear that the economic growth of Brazilian industry is strongly linked to the growth of energy consumption, the growth of employees and also the growth of GHG emissions, pointing out the major challenges to be faced by the proposed mismatch between economic growth, natural resource use and environmental degradation, especially in absolute terms, when it is expected that economic growth is accompanied by total reduction in the use of natural resources and environmental impacts.

Perhaps what can be expected is more a relative improvement, one that reduces the amount of natural resources and environmental impacts per unit of output made possible by technological and organizational innovations, but that, however, often lead to higher levels of degradation environment through the scale effect, and are subject to a maximum level of

efficiency, where, again, the paradigm of growth will appear, because beyond this peak, only a reduction in growth will be able to reduce environmental degradation.

With the data presented so far, it is possible to expect some effects resulting from improvement efficiency in energy consumption by industry. Firstly, if the industry come to depend less energy, due to some technological innovation, this may reduce the dynamism of the energy sector causing a drop in the number of employees. On the other hand, greater efficiency in energy consumption can cheapen their prices and stimulate demand, creating new jobs, and increase the capacity of the energy sector providing an even greater production.

In order to assess the net result of these different effects on employment in Brazil, this study integrates a work based on the hybrid input-output. However, the first hints on reconciling economic growth with less environmental degradation and a greater number of jobs, by resource decoupling, as provided by the ideology of the green economy, have already been launched.

9. Conclusion

In the first decade of the 2000's, there was growth of GDP of the Brazilian economy, as well as industrial GDP, which in turn has caused demand for energy and employees increase, making clear, therefore, the strong relationship between them, despite they are in different proportions and with some lag.

Given the purpose proposed, ie, to check whether a technological innovation that allows a resource decoupling, where Brazilian industry could produce the same product unit with less energy, thereby reducing the level of degradation at the same time as it promotes an economic growth with more jobs, it can be expected that the relative gains from decoupling are much more accessible than those of absolute decoupling.

Considering that in front of the large ratio between the growth rates of industrial GDP, energy consumption, number of employees in industry and GHG emissions, the decoupling needs to be large enough to break this trend, setting up, therefore, in an excessive technological optimism, since besides the technological development itself, should be considered commercial and political relations that often impede its transfer among different countries.

Furthermore, the effects on job creation will depend on the resource consequences of decoupling, for example, lower prices, and not necessarily the technological innovation itself, which is usually sparing manpower.

On the other hand such result will largely depend on the orientation of economic policy that, if it up, committed to the goal of reconciling economic growth with less environmental degradation and net generation of jobs, should prioritize sectors with low potential for degradation and major absorbers of manpower, associating the gains of technological effect with the gains of the composition effect.

Acknowledgments

I would like to show my gratitude to Professor Luciana Togeiro de Almeida, who introduced me to the fascinating world of environmental economics, ecological economics in particular, always helping me with enthusiasm in this work. I am also grateful to Coordination of Improvement of Higher Education Personnel (CAPES) for financial support during my master, without which I would not be able to devote myself exclusively to a stricto sensu work.

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