Pay Inequality in Cuba during the Special Period

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Abstract: This paper analyzes the evolution of pay inequality in Cuba from the early 1990s through 2004 during what was known as the "Special Period in Times of Peace" and after. We measured pay inequality across sectors and regions using the between-groups component of Theil's T statistic, and we mapped the changing components of that statistic in order to provide a compact summary of structural change in Cuba. This method has helped us to observe the transition of the Cuban economy from one based fundamentally on sugar to one based largely on services, especially tourism, but also others with greater growth potential, such as information technology, pharmaceuticals, and biotechnology. Regionally, we have observed that a main dividing line between "winners" and "losers" is the presence of tourism and that the recent increase of regional pay inequality is associated primarily with the relative position of Havana's city and the province of Matanzas.

NB: Unless otherwise noted all quotations are translations by the authors.

I. Introduction

This paper analyzes the evolution of pay inequality in Cuba from the early 1990s through 2004, covering what was known as the "Special Period in Times of Peace." After the late 1980s Cuba's main macroeconomic indicators began to decline, but the worst of the crisis would occur after the fall of the Soviet Union and, specifically, with the disintegration of the Council of Mutual Economic Aid (CMEA).

Cuba's case is particularly interesting because it followed a different path than other socialist countries after the fall of the Soviet Union. Unlike other countries, two things are notably specific to Cuba's case. First, Cuba never transitioned to a free market but rather chose to maintain its socialist model. Even though the Cuban revolution embraced a political and social project that had been severely affected by the fall of the Soviet Union, Cuba's government has not abandoned the objective of constructing a more just and equal society within the framework of a socialist economy. Second, the maintenance of the status quo in political terms is remarkable given the severity of the economic crisis.

To analyze the evolution of pay inequality we have used the between-groups component of Theil's T statistic (henceforth Theil's T). Galbraith and Kum (2005) show that Theil's T measured across sectors is a robust instrument for estimating more traditional measures of inequality, such as Gini coefficients of household income. With the between-groups component of Theil's T we have calculated not only the general trend in pay inequality but also the contribution of each economic sector and region to this general trend. The advantage of working with Theil's T is that a stack bar graph can demonstrate clearly the relative changes in the different economic sectors and regions, showing us the "winners" and "losers" –those regions or sectors that contributed more or less to pay inequality- over time.

Using Theil's T we were able to immediately identify Cuba's inter-sectoral dynamics, which demonstrated that the service sector led the economic recovery, followed by the manufacturing sector. We also observed the transition of the Cuban economy from one based fundamentally on the export of sugar to one based on services. Export data reveal a gradual but constant decrease in sugar exports; production data reveal a constant reduction in sugar output. A boom in tourism, along with expansion of social services, accounts for the large contribution of the service sector to the Cuban economy during the study period.

For four years leading up to 1999, the "Theil element" for the social services sector was negative, indicating that the average wage in the sector was less than the average wage

in the overall economy. National policy during the Special Period was to maintain or increase salaries in the social services sector, and since 1999, wages in social services have on average exceeded the national average wage. The government's payment of above-average salaries for social service workers, particularly in health care and education, demonstrated its commitment to providing universal and free social services – a fact that generally serves to decrease overall inequality in ways that are, of course, not captured by income statistics, and notwithstanding increases in the measured inequality of pay.

In the manufacturing sector, we observe that during the worst part of the crisis period (1990-93) manufacturing wages fell below national averages. However, in 1994 this trend reversed, and this sector has enjoyed above-average wages ever since. The manufacturing sector was greatly affected by the fall of the Soviet Union due to the lack of value-added chains within the Cuban productive system. And as a result, fifteen years after the crisis, the country's industrial production had fallen by half. This decrease in production was associated with the disappearance of entire subsectors of Cuba's manufacturing economy; only the most competitive sectors, such as tobacco, metals (nickel) and chemicals survived and, in turn, increased their share in total production. The importance of these subsectors explains the above-average position of manufacturing wages in general. While the number of people employed in manufacturing decreased, the relative compensation of those that remained in manufacturing increased.

Finally, the regional analysis illustrates that almost all eastern provinces have below-average incomes during the study period. Historically, these provinces have been the least developed region of the country. There are two explanations for the weakness of the eastern provinces: a) the region does not have important tourist attractions and therefore, no tourist industry (with the exception of Santiago de Cuba), and b) sugar production has been the main economic activity. Consequently, this region has been particularly affected by the economic changes of the 1990s, resulting in even lower relative wages. Conversely, those provinces that have major tourist industries have enjoyed above average wages and continue to do so.

II. Data

Economic data for Cuba are published annually by the National Statistical Institute (Organismo Nacional de Estadística -ONE-). These contain information about the wages of State employees, by economic sector and region. The data are of high quality, but limited: the lack of information about non-state employees precludes an analysis that

captures the changes in pay inequality in their totality. One of the salient transformations during the period of study was the steady increase of sources of employment by agents other than the State, such as the private sector and cooperatives. This phenomenon was reflected in a reduction of state participation in total employment from 90 percent in 1990 to 73 percent in 2000. As Togores (2002) e Izquierdo, Oberto, Gonzalez (2004) point out, one of the main reasons behind this change was that the new (non-State) sectors yielded higher incomes. For this reason, the exclusion of these workers in the data tends to underestimate overall inequality, and to understate the magnitude of increasing inequality. Nevertheless, the data we are able to observe give, we believe, a credible picture of the direction and also of the general structural character of the changes. Given the still-largely-socialist character of the Cuban economy, the limitations on these data are in many ways less severe than in other developing countries, where large informal sectors escape the statisticians.

III. Evolution of the Cuban Economy 1991 – 2005

Throughout the twentieth century, Cuba was hit by periodic economic and institutional crises characterized by external shocks that drastically modified Cuba's participation in the international economic arena such as the Great Depression, the Second World War, and the Revolution followed by the U.S. embargo on trade. Throughout the nineteen eighties, Cuba's economy declined, and this process only accelerated with the fall of the Soviet Union in 1991.

The fall of the Soviet Union brought an end to the Council of Mutual Economic Aid (CMEA), which until then had provided an institutional framework for international economic relations among the socialist countries. The disintegration of the CMEA was almost a deadly blow to the socialist accumulation model then-existing in Cuba, which was outward oriented and subsidy-dependent. Even though at the end of the eighties there was a slowdown in economic growth (due to the widespread stagnation of the European socialist countries who were the main commercial partners of Cuba) the existing particular commercial agreements with CMEA member countries allowed Cuba to mask the severity of its economic situation. However, this crisis brought to light the structural problems in the productive system of the country, such as the specialization of exports in a few primary commodities, sub-utilization of economic resources, low levels of productivity and efficiency, and elements of deviation in the management and labor spheres, among others (U-Echeverria, 2002).

Table 1 – External Shock in Cuba 1990- 1993 in Numbers
85% of the external markets of the country disappeared
In 1993 exports reduced to 21% of the levels present in 1990
In 1993 imports reduced to 27% of the levels present in 1990
Worsening in the Terms of Trade by 50%
Null Access to External Financing

Source: ONE (2004)

Figure 1 shows the effects of the external shock on the Cuban economy in the early nineties. In a three year period GDP contracted by 35 percent, gross capital formation decreased by 70 percent, while total consumption was reduced by about 25 percent. It is remarkable that by 2004 all economic indexes included in Figure 1 returned to the levels present at the end of the eighties with the exception of gross capital formation, which still remains extremely depressed. This phenomenon can be explained by Cuba's high degree of dependence for supplies and capital from the CMEA. For example, by 1989 three quarters of the country's imports where concentrated in three groups: fuel (34 percent), machinery and equipment (32 percent) and raw materials and commodities (10 percent) (ONE, 2004), and nearly 75 percent of new investment equipment was being imported (Quiñones, 2002). Given this high degree of dependence, the disappearance of the commercial block paralyzed and made obsolete most of the industrial capacity installed in the country, forcing a deep restructuring in the Cuban productive system, as will be discussed later in this paper.

Figure 1: External Shock Effects over the Cuban Economy
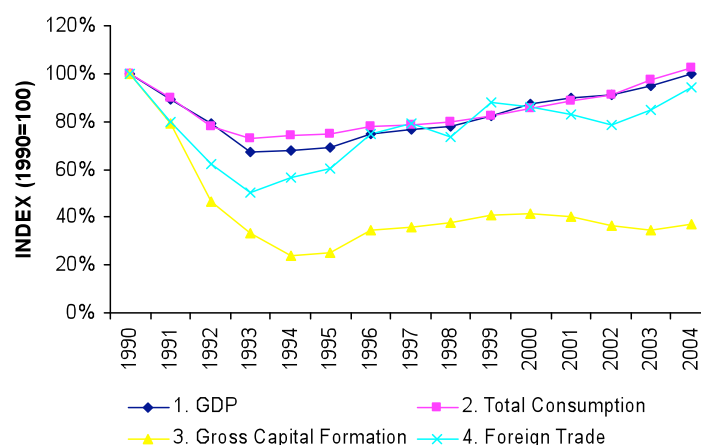
Source: ONE (1996); ONE (2000); ONE (2004)

In the middle of this harsh internal and external environment, Cuba's government implemented a survival strategy that had the least social cost. This economic emergency program adopted in 1991 was called "Special Period in Times of Peace." The core objective of this program was to cushion the effects of the crisis on the population, so as to reorient the economic performance of the country to a course appropriate to the new environment, in such a way that the country could quickly insert itself in the global capitalist market without abandoning the achievements of the Cuban social model, "The transformations that took place respond to the principles of the Cuban socialist model… one important feature has been the gradual and cautious approach taken, carrying out in several cases process of consult and information with the population, that in time responded to the need of maintaining social consensus in a period when the political and economical aggressions of US government heightened," (U-Echeverria, 2002).

IV. Economic Reforms

Table 2 shows a brief list of the main reform measures implemented in Cuba throughout the nineties. The reform had two main objectives; the first one was to cope with the external shock through a reorientation of international economic relations. The main measures taken to achieve this goal were: a) openness to foreign capital, b) creation of mixed enterprises and c) legalization of the possession of foreign currency.   The second reform objective was the reduction of the deep fiscal gap that emerged as a consequence of the government reaction to the crisis, over which revenue declined 23 percent in 1993 compared to 1990, raising the fiscal deficit to an unsustainable 33 percent of the GDP the same year. This growth of the deficit was a direct consequence of the measures taken by the government to face the crisis: the government's policy was to maintain stable levels of expenditures and wages in the face of the paralysis of the productive system of the country. Consequently, this policy generated strong internal imbalances because the rapid increase in the monetary base did not have an increase in production as a counterbalance; supply was inadequate to the available aggregate demand. (Perez, 2000). The main measure taken to cut the fiscal deficit was the reduction in the subsidy for losses granted to state enterprises. In the worst moment of the crisis these had accounted for nearly 35 percent of GDP and almost 50 percent of the fiscal expenditures at the beginning of the nineties (ONE, 2004).

The reforms managed to halt the decline of GDP and set the stage for the long recovery that continues even today, during which the country has seen radical changes in its economic structure, particularly a direct transition from agriculture to services.

Table 2 – Summary of the main measures of the process of reform in Cuba

De-monopolization	1992	Constitutional Reform:
		Demonopolization of the institutional and state monopoly over foreign trade
De-regulation	1992	Constitutional Reform:
		Recognition of mixed and other forms of property
	1993	Legalization of the possession of foreign currency
		Creation of a retail trade chain in foreign currency
		Self employment Law
	1994	Laws pertaining to agricultural markets
		Law on the creation of industrial and craftsmanship Products
	1995	Foreign investment Laws
		Opening of Currency Exchange Houses
	1996	Laws to create duty-free zones
		Modification of Law on Custom Duties
	1997	Reordering and revival of the internal consumption markets
Decentralization	1993	Creation of the Basic Units of Cooperative Production in agriculture
		Creation of new business forms
	1994	Reorganization of the organs of central administration
	1995	Changes in the process of territorial and enterprise planning
	1997	Law on organization of the banking system
Other Measures	1994	Rise in prices of non essential products
		Elimination of free services not relevant to the existent social policy in the country
		Tax Reform
		Introduction of the Cuban Convertible Peso (CUC)

Source: Cuba's Economic Structure (2002)

V. Sector Analysis

The implementation of reforms to deal with the economic downturn at the beginning of the 1990s produced a change in the dynamics of Cuba's economic sectors. As a result, the service sector experienced growth, while the agricultural sector and some subsectors of manufacturing suffered. On the agricultural side, sugar is no longer Cuba's main export product. In 1990, sugar played a vital role in the country's economy representing 80 percent of the country's exports. However, by 2004, it only represented 13 percent of the total exports. Meanwhile, the manufacturing sector also suffered a collapse; the volume of physical production in 1993 was only 60 percent of the level of production at the end of the 1980s. Finally, seizing upon the island's potential to develop its tourism industry, the service sector flourished. During this period, tourism became the main source of foreign currency in Cuba, and by 1996 it generated nearly 50 percent of the foreign currency that the country earned that year (ONE, 2004).

Agriculture and Manufacturing Sectors

Figure 2 shows the trends of selected agriculture and manufacturing subsectors throughout the last 15 years.

Figure 2: Physical Volume Index by Industrial Branch
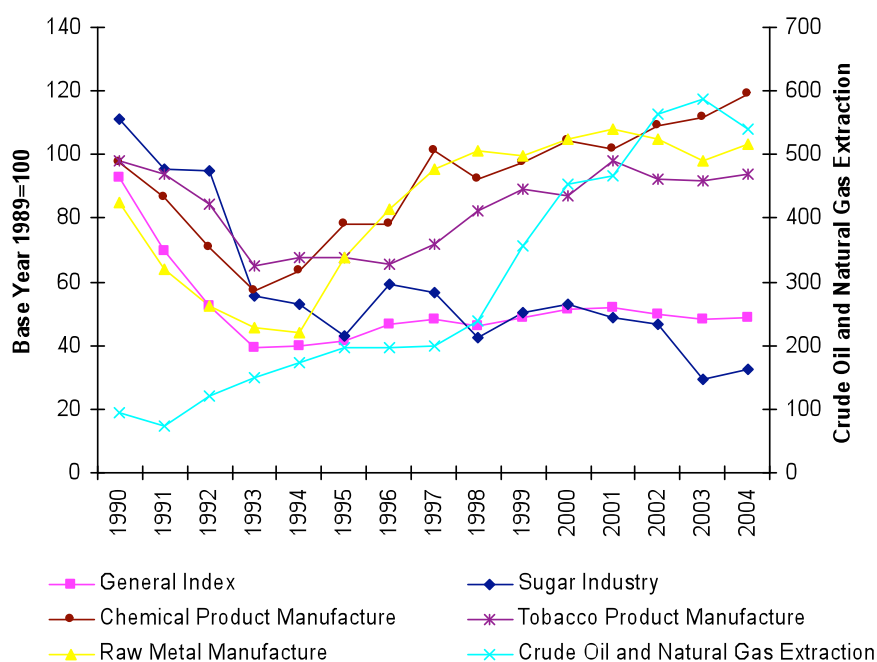
Source: ONE (2004).　　*Right Scale: Only for crude oil and natural gas extraction

The general index of physical volume shows that only a few manufacturing subsectors have been able to return to levels of production similar to those present before the crisis.[1] Within this group, the following subsectors stand out as having benefited from the participation of foreign capital: petroleum extraction (in which production has increased five fold during the last 15 years) and manufacturing of raw metals and chemical products. This positive trend demonstrates the effects of the openness policy undertaken in the early nineties, which had encouraged the increase of foreign capital investment and the transfer of know-how to Cuba's productive system.[2] On the other hand, most of the remaining subsectors disappeared, due to a high dependence on supplies and technology from socialist European countries.

Table 3 highlights a key distinction between "winner" and "loser" sectors: those sectors that had the ability to produce in an efficient and competitive way for international markets. A paradigmatic case is that of the sugar industry, which had been an intricate and even dominant part of Cuban history for more than 300 years. As a result of the crisis, the Cuban government was forced to close more than 100 sugar mills in 2002,[3] based on efficiency and cost-benefit criteria due to low prices in the international markets (caused by the high degree of protection and massive subsidies granted by the US and the EU to their own producers) and the lack of preferential quotas.

Table 3 – Exports by Group of Products 1990 – 2004 (Pesos-Millions)				
	1990	%	2004	%
Total	5,414.9	100	2,180.5	100
Sugar Industry Products	4,337.5	80.10	271.5	12.45
Mining Products	398.2	7.35	1,062.1	48.71
Tobacco Industry Products	114.4	2.11	217.0	9.95
Fishing Industry	101.9	1.88	89.1	4.09
Agricultural Products	183.9	3.40	32.8	1.50
Other Products	279.0	5.15	508.0	23.30

Source: ONE (2004)

Other subsectors of the manufacturing sector that bear witness to the importance of links with international markets, illustrated in table 3, are the mining and tobacco

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[1] Such an index is far from being an ideal indicator of the transformations that took place within the productive structure of the country, because it works on the assumption of the homogeneity of the goods produced, and in this way ignores the performance of value added, and changing productivity of work.
[2] See Perez (2000) on the characteristics and impact of FDI in Cuba throughout the nineties.
[3] For the sugarcane harvest of 2006 only 40 sugar mills were officially working in all of the country.

industries that increased their share in the country's exports by 41 percent and 7 percent respectively during the period of study. Furthermore, both sectors have returned to levels of production similar to those present before the crisis with a greater value added as it can be inferred from the rise in the value of exports.

Services Sector

Within the service sector, the tourism subsector is remarkable because its contribution of income is based on foreign currency receipts, which have increased by 400 percent during the last 15 years, reaching 2 billion dollars per year by 2003 (Figure 3). Cuba has experienced a spectacular rise in tourism from 200 thousand visitors per year in 1990 to 2 million in 2004 (ONE, 2004).

Figure 3: Tourism Foreign Currency Income of Cuba
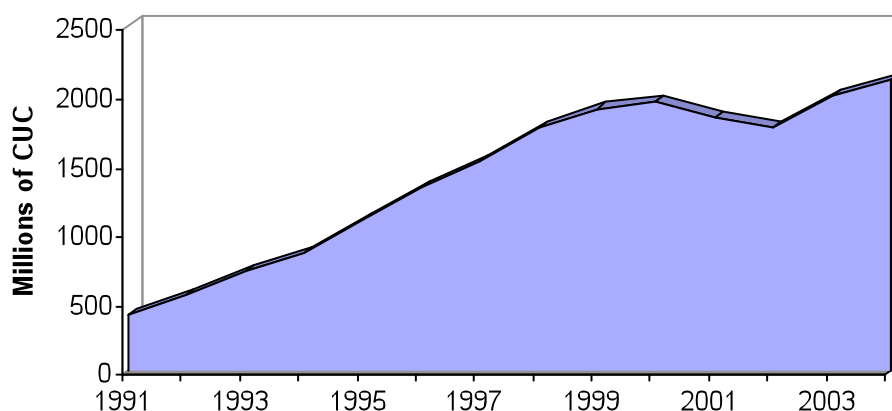
Source: ONE (2004)
Note: Exchange Rate (1991 – 2004) 1 CUC=1 USD

In the tourism sector, as in many others, the participation of foreign capital made it possible for the country to achieve greater efficiency. Foreign capital allowed an increase in the number of visitors received because it not only increased the number of rooms available, but also transferred management skills through hotel management contracts and the creation of mixed enterprises in hotels and non-hotelier installations (Perez, 2000).

Currently, in addition to the tourism industry, other important subsectors within the service sector are affecting Cuba's economy. Other subsectors that have a high value added potential such as biotechnology, pharmaceutical and medical services and subsectors related to information technologies have increased in importance. The incursion of the

country in such dynamic sectors has been made possible by the achievements of the Cuban revolution in terms of human capital, professional and scientific development of the population throughout the last 40 years, among them rates of schooling near 100 percent at the national level and an average of nearly 20,000 university students have graduated between 1994 and 2004 (ONE 2004). Despite the difficulties set out by the blockade and the lack of resources, Cuba has achieved important results in the field of biotechnological and pharmaceutical investigation, some of which have garnered international recognition.[4] These achievements are made possible by the provision of social services including large investments made to the educational system and the provision of health services which accounted for 26 percent of the country's GDP in 2004 within the framework of "The Battle of Ideas."[5]

Figure 4 is a brief summary of the analysis presented in this section of the paper. It shows the composition of Cuba's economic activity in 2004, in which services represented 57 percent of the GDP, the agricultural sector (primary) slightly less than 10 percent, and the manufacturing sector represented at 35 percent. Given the high degree of performance of some subsectors within the service sector, such as tourism, communal and social services among others, it can be expected that the service sector will continue to rise and be a key player in Cuba's economic future.

Figure 4: GDP by Economic Activity
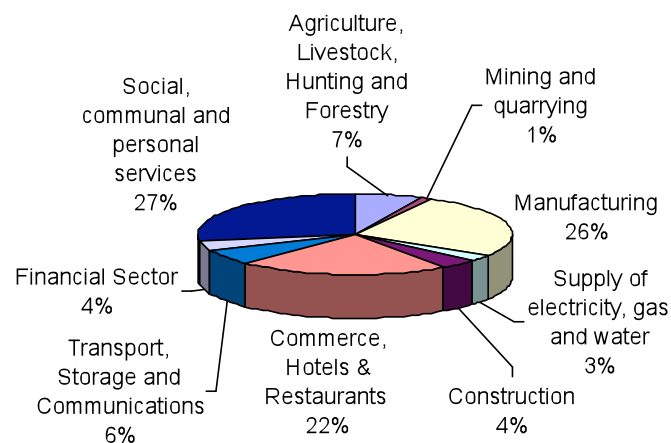
Source: ONE (2004)

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[4] See Cabrera (2002) for more information on the condition and achievements of the biotechnological branch in Cuba.

[5] Group of government programs initiated in 1999 designed to strengthen the political ideological formation of the Cuban population in the middle of the struggle for the return of Elian Gonzales to the island.

## VI. **Pay Inequality by Sector and Region**

This section evaluates the change in pay inequality in Cuba after the fall of the Soviet Union. The between-groups component of Theil's T is used to calculate the general trend in pay inequality as well as to determine the contribution of each sector and region to inequality overall. This method enables us to obtain a complete representation of the relative changes in wages and employment in different sectors employed by the State, and to highlight the "winners" and "losers" during the Special Period. During this period, several sectors switch from being above average to below average in their relative pay, and vice versa; these changes result in switches in their "contribution to inequality" from positive to negative values. These fluctuations were partly brought about by the crisis and partly by reforms implemented during the Special Period.[6]

Our analysis confirms existing measurements that show the increase of inequality in Cuba during the 1990s (Figure 5). More importantly, our method allows us to study the factors behind the increase in pay inequality. We observe in particular that the rise in inequality is explained by different rates of growth of wages in each sector, not by decreasing wages in specific sectors. With the new economic model, those sectors that were oriented towards the international economy benefited most as a result of the changes brought about by the collapse of the Soviet Union.[7] Even those sectors not involved in this international environment (such as social services) experienced growth in wages due to governmental policies.

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[6] The changes in each sector have two principal explanations: a) as a direct consequence of what happened in that sector or b) as an indirect consequence of the changes that happen in key sectors (such as a boom in oil prices increasing employment and wages in that sector) that wind up altering the relative position of the rest of the economic sectors.

[7] When we talk about a change in the economic model we are not referring to the passage from a socialist economy to a capitalist one. The new model is highly planned as it used to be but several aspects of the market economy have been introduced as explained in the section on Economic Reform.

Figure 5: General Trend of Pay Inequality by Economic Sector
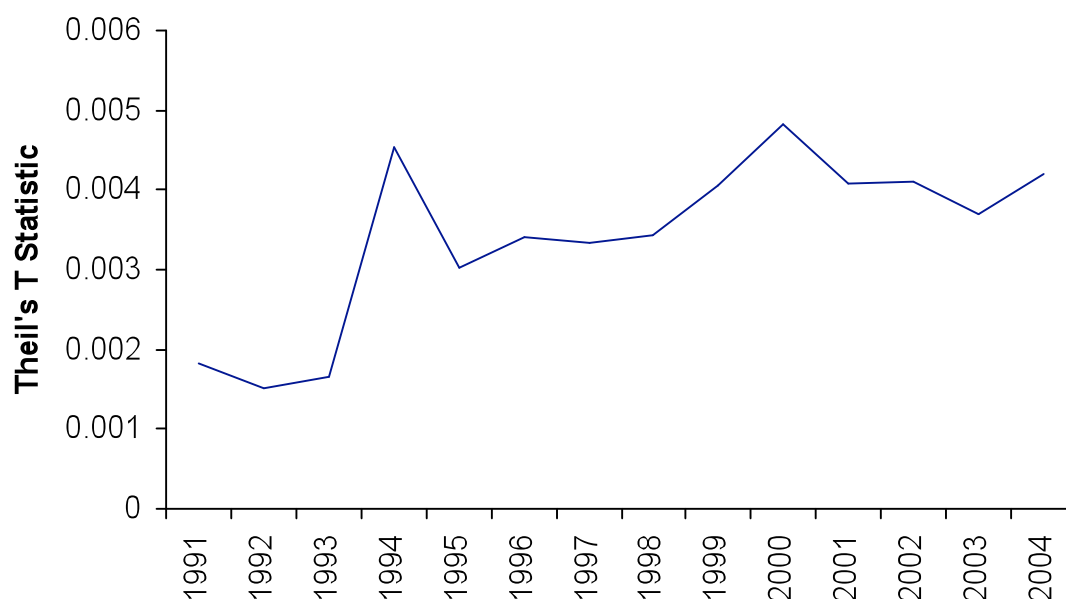
Source: Authors' calculations based on ONE data

General Trend of Inequality

As mentioned earlier, Figure 5 shows the upward trend in inequality during the Special Period starting in 1993. Until then, wages were paid within a very narrow range: between 1991 and 1993, in eight out of nine sectors wages ranged between 180 and 200 Cuban pesos per month. The only exception to this trend was in the commerce, hotels and restaurants sector which had (and continue to have) the lowest average wage in the economy.

As seen in Figure 5, there is a jump in inequality between 1993 and 1994, which is explained by a growing gap in the difference between the sector with the highest average wage (mining) and that with the lowest average wage (commerce, hotels, and restaurants). In the case of the mining sector, the average wage increased 13 percent between 1993 and 1994. Meanwhile, the average wage of the commerce, hotels and restaurants sector decreased 9 percent during the same period. By 1994, the average wage of the mining sector was 60 percent higher than that of the commerce, hotels and restaurants sector. The following year, there was an abrupt fall in the Theil levels due to the recovery of wages in the commerce, hotels and restaurants sector, which increased by 14 percent between 1994 and 1995. In contrast, the average wage in the mining sector only increased by 1 percent during this period.

Between 1995 and 2000, Theil level increased. During this time, average wages increased in all the sectors although different sectors experienced different rates of growth, thus increasing pay inequality.   The winning sectors with the highest average wages were construction, mining and finance. Even the commerce, hotels, and restaurants sector experienced a large increase in average wage, increasing by 16 percent between 1995 and 2000. These trends show the effects of Cuba's economic recovery that began in 1994. In 2000, Theil levels reached their highest level. The difference between this increase and the situation in 1994 is that by 2000, the construction sector had become the highest average wage sector, instead of mining. Since construction is substantially larger than mining, this change implied a substantial increase in inequality overall.

In the fourth stage, between 2000 and 2003, there is a downward trend in Theil levels. During this period, wages in all sectors continued increasing, maintaining the gap between the highest and lowest average wages. Reduction in Theil levels is explained by a decrease in employment levels in the manufacturing and construction sectors, two sectors with relatively high wages. The number of people employed decreased by 14 percent in the manufacturing sector and by 18 percent in construction.

Finally, in the last stage, between 2003 and 2004, Theil levels rise again. Once again, the average wage of the mining sector exceeded that of the construction sector. There was a general upward trend because five out of the eight sectors that were already relatively high-wage increased their contributions: mining; agriculture; manufacturing; transportation, storage, and communication; and electricity, gas, and water. In absolute terms, the social services sector's contribution remained the same but the direction of the contribution changed from positive 0.0028 to a negative 0.0028. The change is not explained by a decrease in the average wage of the social service sector but rather by an improvement in the average wage of some other sectors (including: manufacturing; agriculture; transportation, storage, and communications). That year, the social service sector had the lowest average wage with the exception of the commerce, hotels and restaurants sector.

VII. Contribution by Economic Sector

This section analyzes the contribution to inequality by the following economic sectors: social services; three sectors related to the international market (mining, manufacturing, and agricultural); and two sectors related to tourism.

Figure 6: Contribution to Pay Inequality by Economic Sector
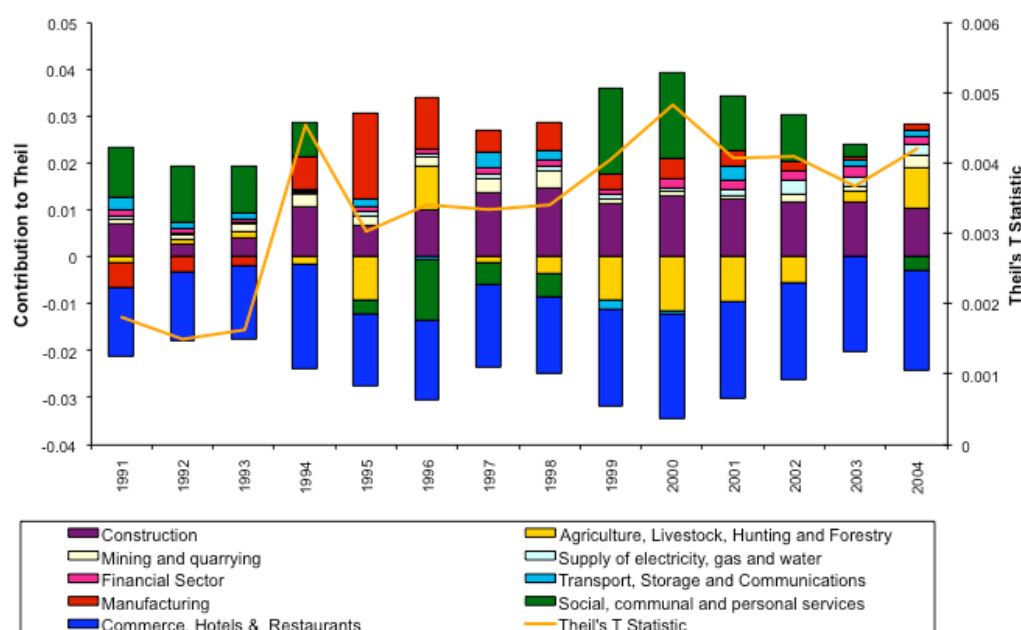
Source: Authors' calculations based on ONE data

Communal and Personal Services

During the Special Period, the government implemented policies to sustain the provision of social services such as education and health care through this time of economic crisis (Barbeira, de Souza Brigs and Uriarte, 2004). This sector is of key importance to Cuba's economy. Table 4 shows that in 2004 (when GDP reached similar levels as in 1990) the participation of the social services sector was 27 percent in comparison to 20 percent in 1990. This is very high by Latin American standards.

Table 4: Social, Communal and Personal Services as a percentage of the GDP

|	1990	1993	1996	1999	2002	2003	2004
Social, Communal and Personal Services	3815.7 (20%)	3747.8 (29%)	3610.6 (25%)	3789.5 (24%)	4266.8 (25%)	4558.7 (25%)	5072.7 (27%)

Source: Authors' calculations based on ONE data

Figure 6 shows that the social service sector's contribution to pay inequality changed during the Special Period, going through four stages. In the first stage (between 1991 and 1994), the contribution of this sector was positive. During the second stage (1995 – 1998), this trend was reversed to a negative contribution. In the third stage (1999 –

2003), the contribution once again became positive. Finally, in the last stage (2003 – 2004), the contribution was negative.

To understand these changes it is necessary to examine not only what happened to wages and employment in the social services sector but also to study wages and employment in other sectors. Figure 7 shows stable wages between 1991 and 1996. After that, wages increased, reaching their highest levels in 2004.

Figure 7: Wages by Economic Sector
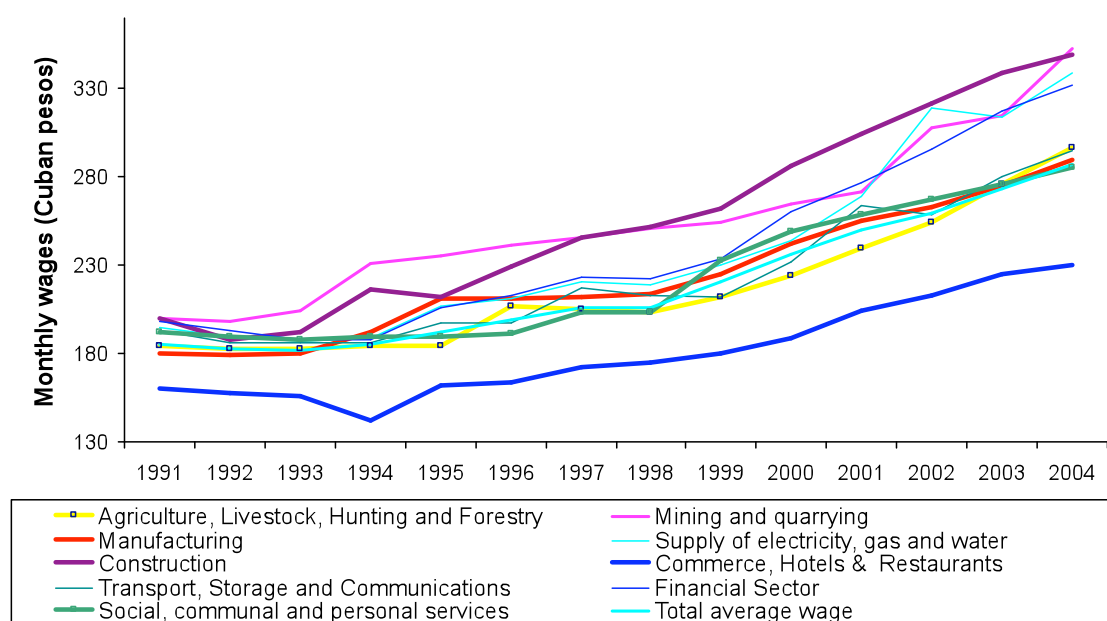
Source: Authors' calculations based on ONE data

Two important conclusions can be made regarding the level of employment in the social services sector. First, as shown in Figure 8, this sector employed the highest number of people in the economy. Second (with the exception of 1994) the number of people employed in this sector increased throughout the entire period of study.

Figure 8: Level of Employment by Economic Sector
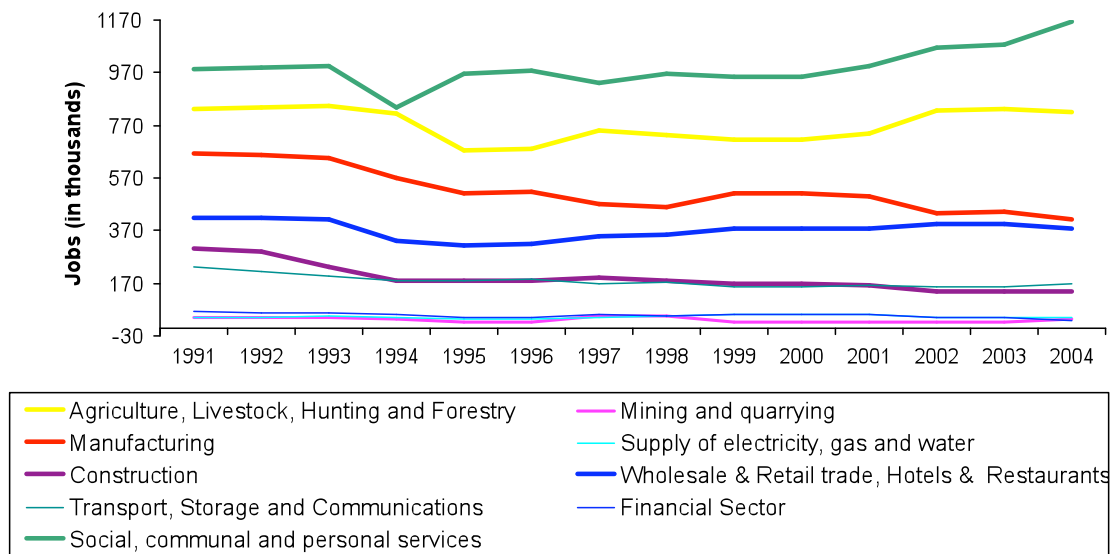
Source: Authors' calculations based on ONE data

Since both the level of wages and employment increased in this sector, to understand the changes in the contribution of the social services sector it is necessary to analyze the changes in the relative position of the social services sector. Until Cuba's economy recovery (starting in 1994), wages in all sectors remained stable. During that time (between 1991 and 1994), the average wage of the social services sector was higher than the average wage of the following sectors: transportation, storage and communications; finance; agriculture; manufacturing; and commerce, hotels, and restaurants. This trend was reversed starting in 1994 because the recovery of some sectors brought increases to the wages of those sectors (such as the manufacturing and the finance sectors). For this reason, beginning in 1995, the wages of the social services sector were below all other sectors except for the commerce, hotels, and restaurants sector. This trend continued until 1998 when there was a recovery in wages in the social services sector. Figure 9 shows an increase in education and health care spending beginning in 1998. Between 1998 and 2004, the spending in these sectors as a percentage of GDP increased from 10.23 percent to 18.96 percent in education and 9.12 percent to 11 percent in health care (Table 1, Appendix). This increase in spending resulted in higher average wages of the social services sector; exceeding the average wage received in the following sectors: agriculture; manufacturing; transportation, storage and communications; and commerce, hotels and restaurants.

Figure 9: Current Spending Composition
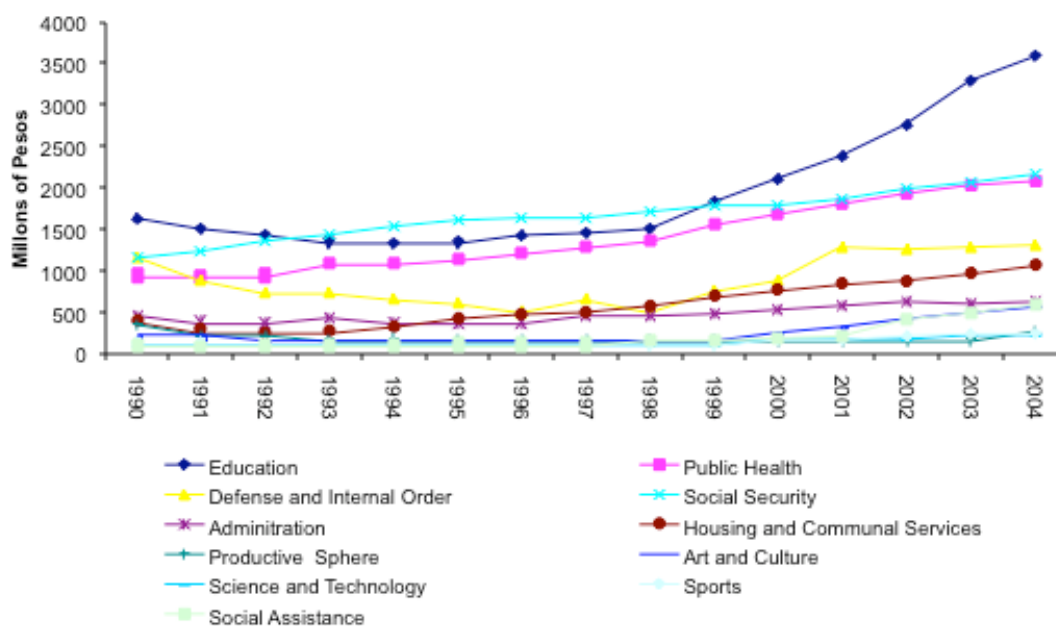
Source: Authors' calculations based on ONE data.

Finally, Figure 7 shows that between 2003 and 2004, the average wage in social services fell below the national average. This change took place even though there was an improvement in the wages of all sectors. However, this increase was uneven and the average wage of some sectors grew more than the average wage of others. The winning sectors with the highest average wage increase were agriculture; manufacturing; and transportation, storage and communications. Therefore, the situation in 2004 was similar to that observed between 1995 and 1998 where average wages in the social services sector were only higher than those in the commerce, hotels, and restaurants sector.

It is important to note that policies to maintain and increase wages in time of crisis had various effects on Cuba's economy. The most obvious of these effects was the increase in fiscal deficit during the Special Period (Figure 1, Appendix). At a time when the government did not have the necessary financial resources, the deficit was financed with an increase in the money supply without the sale of bonds or tax increases to counteract effects of this policy in the liquidity levels at the beginning of the nineties (Figure 2, Appendix).

Even though the inflationary tendencies were not felt in the formal economy due to the control and regulation of prices by the State, they were reflected in the informal

economy that was not subjected to such regulations. In the informal market, where basic goods were traded, the prices increased dramatically relative to income.

Mining Sector

The mining sector (specifically nickel extraction) was negatively affected by the crisis just like other sectors were affected, but in 1994 it began a remarkable recovery. This sector's contribution to GDP increased from 91.6 to 223.9 million pesos, resulting in a 144 percent from 1991 to 2004. Figure 10 shows that nickel industrial production, the most important component of this sector, grew from 34,000 tons in 1991 to 76,000 tons in 2004.
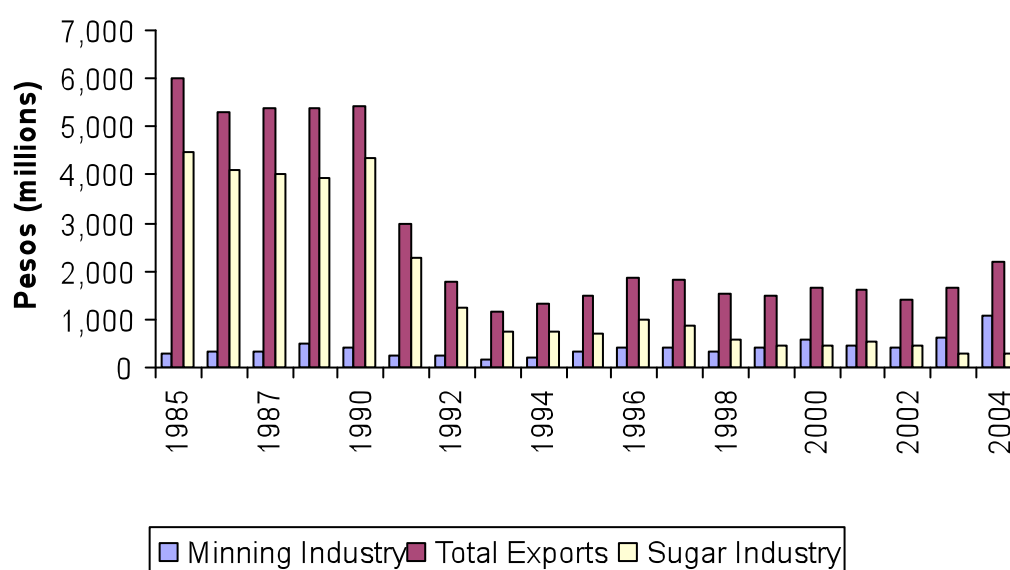
Figure 10: Nickel Industrial Production
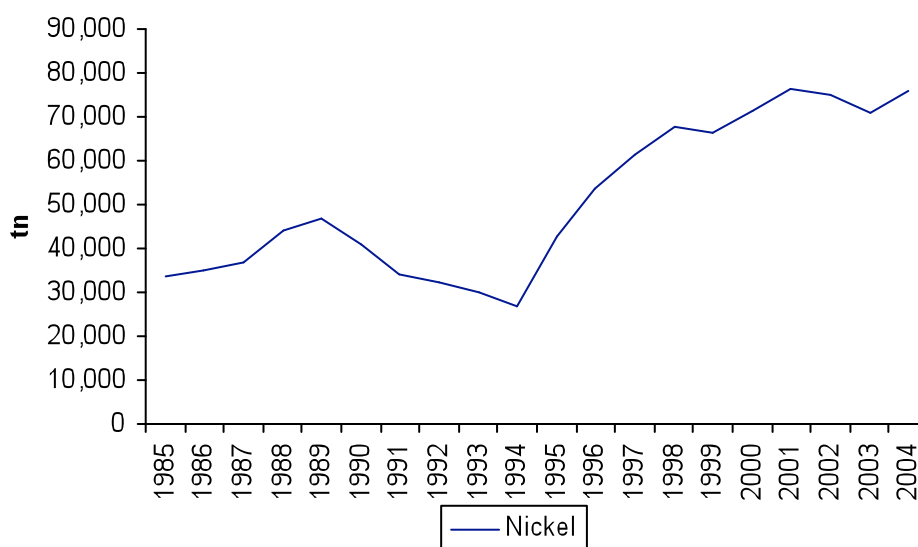
Source: Authors' calculations based on ONE data

As Figure 11 shows, the value of nickel exports exceeded the value of exports in the sugar industry.

Figure 11: Exports by group products

Source: Authors' calculations based on ONE data

The improvement of the mining sector is reflected in Figure 6 because the sector contributed positively to pay inequality. This positive contribution was due to the mining sector having one of the highest wages in the total economy during the Special Period.[8] It is important to highlight that although the contribution was positive, it was not greatly significant because this sector employed the least amount of people in the economy.

Manufacturing Sector

The manufacturing sector is the second largest contributor to GDP (alter the social services sector). In 2004, this sector contributed 25.2 percent of GDP, similar to what it contributed at the beginning of the nineties (Table 5). There is an important relationship between the sector's contribution to pay inequality and the sector's contribution to GDP.

Figure 6 shows the two distinct stages that the manufacturing sector went through in relation to its contribution to pay inequality. During the first stage (1991-1993), the contribution of this sector was negative and the aggregate value of the sector's contribution to GDP shrunk by 33 percent. During this first stage, the contribution to pay inequality was negative due to decreasing wages but because the average wage in the sector was lower than the average wage in other sectors (with the exception of the commerce, hotels, and restaurants sector).

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[8] The mining sector had the highest wage between 1991 and 1998 and it had the second highest wage between 1999 and 2003. The sector once again had the highest average wage in 2004.

During the second stage (1994-2004), the sector recovered and the contribution to pay inequality shifted in a positive a direction due to the recovery of wages beginning in 1994 (Figure 7). However, even though the contribution was positive, the contribution decreased throughout the period because restructuring during the Special Period resulted in a reduction in the level of employment.

Table 5: Manufacturing Sector as a percentage of the GDP

	1990	1993	1996	1999	2002	2003	2004
Manufacturing Sector	4640.2 (24.4%)	3103.6 (24.3%)	3835.4 (27%)	4594.9 (29.3%)	4772.4 (27.5%)	4677.8 (26%)	4793.9 (25.2%)

Figure 12: Employment and wage level in the manufacturing sector
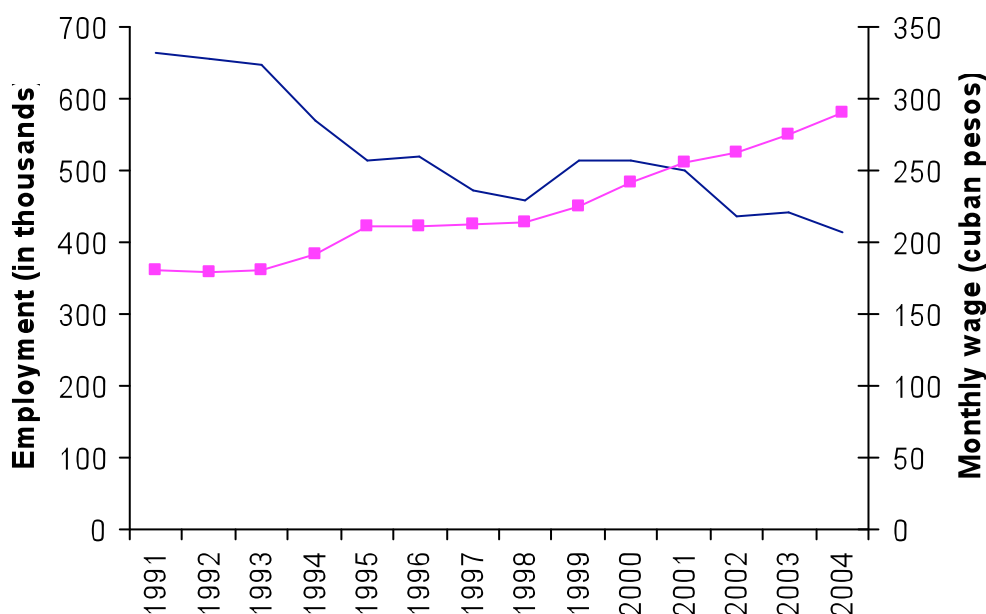
Source: Authors' calculations based on ONE data

It is evident that the main criterion differentiating the winning and losing manufacturing sub-sectors was the ability to adapt to a new economic environment, benefiting from Cuba's competitive advantage. Therefore, tradable goods performed better than non-tradable goods.

Among the losing subsectors is the sugar industry because of the reduction in demand and low prices in the international market. On the other hand, the influx of investment allowed for the recovery of industries such as tobacco, mining (nickel), steel, and light industries that make products for the tourism sector (The Economist, 2005).

This change in the structure of the manufacturing sector is also observed in the composition of exports. While there was a reduction in the value of sugar exports, there was an increase in the value of nickel and tobacco exports. Furthermore, the value of pharmaceutical and biotechnological exports increased due to governmental investment (The Economist, 2005, p. 35).

Agriculture Sector

As table 6 shows, from 1990 – 2004 there was a reduction in the agriculture sector's contribution to GDP from 9.2 percent to 6.67 percent. As explained in the previous section, the main reason for this decrease was the shrinking of the sugar industry. In 2004, the sector's contribution to GDP was significantly below the contribution of the following sectors: social services (26.71 percent); manufacturing (25.24 percent); commerce, hotels, and restaurants (21.6 percent).

Table 6: Agriculture as a percentage of the GDP

	1990	1993	1996	1999	2002	2003	2004
Agriculture	1756.3 (9.2%)	924.9 (7.2%)	1075.4 (7.6%)	1122.9 (7.17%)	1232.3 (7.1%)	1261.8 (7%)	1264.4 (6.67%)

Unlike other sectors that recovered after the crisis and were back to their previous GDP levels in 2004, the agriculture sector did not enjoy such a recovery. Instead, the GDP level of this sector had been decreasing along with the sector's importance.

The deterioration of the agriculture sector was particularly affected by the disintegration of Cuba's commercial relations with CMEA countries. This not only had short term consequences in terms of the immediate reduction of trade but also long term influences, exposing the sector's structural deficiencies.

The sector suffered its worst hit during the period between 1990 and 1994. Although the economy began to recover in 1994, the agriculture sector did not begin to recover until the following year. During the first years, the agriculture sector was particularly affected because it was dependent on imported inputs.

From 1972, the year in which Cuba became part of the CMEA, until the CMEA's collapse in 1991, the trade relationships that Cuba established with other CMEA countries were extremely favorable to Cuba's economy. CMEA countries paid a preferential price for sugar which allowed Cuba to import oil and other inputs for the productive system. The disintegration of the CMEA resulted in a decrease in the demand for Cuban products.

This provoked a sharp decline in the availability of foreign currency which in turn decreased Cuba's purchasing power to buy oil, fertilizers, pesticides and agricultural machinery. The immediate effect of this situation was a fall in the productivity and production of the agriculture sector due to the shrinking of land area harvested and diminished crop yield which was itself a result of a lack of fertilizers and pesticides.

Since the mid 1990s, there were some improvements in the sector due to the implementation of government reforms and the increase in foreign resources. Figure 6 shows the increase in the sector's contribution to pay in equality in 1995 and 1996. This situation was reversed in 1997 and 1998 because the harvest was damaged by natural disasters (CEPAL, 2000). The two main governmental reforms were the restructuring of labor organization (the change from big state enterprises to two small cooperatives, UBPC (Basic Cooperatives production Units) and CPA (Agricultural Production Cooperatives) and the creation of free agricultural markets. This improved the sector's productivity and also altered the wage structure because wage levels varied depending on the type of employer (state, cooperatives, or private producers), main agricultural activity (sugar, tobacco, citrus), and the destination of production (export, subsidized distribution, or sale in free market) (CEPAL, 2000).

Finally, during the years 2003-2004, the sector underwent a remarkable shift: its contribution to pay inequality increased and became positive (Figure 6). This positive trend is explained by improvements in the average wage of the sector that was higher than the average wage in the social services and manufacturing sectors (Figure 7)

Commerce, Hotels, and Restaurants and Construction Sectors

Two sectors that are inextricably linked to the wellbeing of the tourism sector are the commerce, hotels, and restaurants sector as well as the construction sector. The commerce, hotels, and restaurants sector began its expansion in 1998 due to an increase in the number of people employed by the sector. The recorded Theil contribution was negative because the average wage received in this sector was below the average wage of the whole economy. Yet, the workers in this sector held a privileged position because their wages were complemented by perks (such as tips) they received from the tourists they served. Lastly, the positive contribution of the construction sector to pay inequality during the entire period of study is related to the economic boom of the tourism sector.

VIII. Regional Analysis

Cuba is made up 15 regions, 13 provinces, the city of Havana, and the Island of Youth. Our analysis shows an upward trend in pay inequality levels among these regions (Figure 13). This growth was not linear. The increase and decrease in pay inequality were associated with the situation in two regions: the city of Havana and the province of Matanzas. Figure 13 shows how the general trend was marked by fluctuations in the contributions of these two regions. The figure also shows the winning and losing regions. Winning regions with positive contributions included the city of Havana, the provinces of Matanzas, Ciego de Avila, and Cienfuegos. On the other hand, regions that had negative contributions were Santiago de Cuba, Guantanamo, Pinar del Rio, and Granma. The level of employment and wages reveal two opposite patterns. While the level of employment decreased by 14 percent between 1991 and 2001, wages increased in all the regions during the same time period (Figure 3 and 4, Appendix). The regional analysis broadly confirms the pattern observed at the sector level. And the analysis reveals the country's division between east and west in terms of economic development and also shows how this division impacted employment and wages in these two areas of the country.

Figure 13: Pay Inequality for Region (General trend and Contribution)
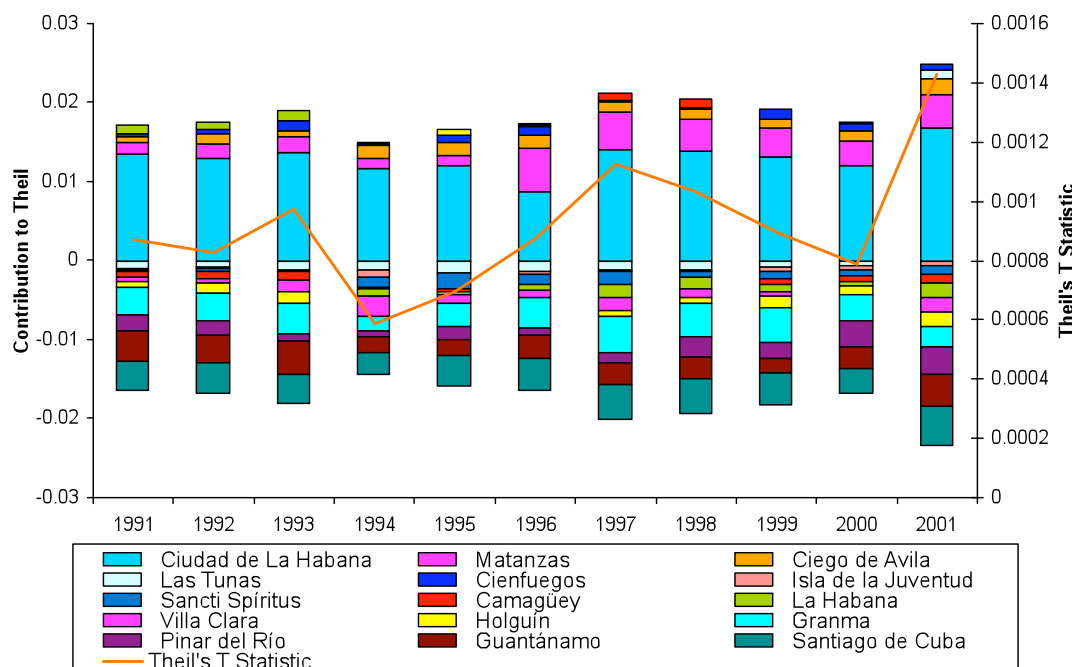
Source: Authors' calculations based on ONE data

Figure 3 (see appendix) shows the provinces with the highest average wages. These provinces were the most dynamic in economic terms. All of these provinces have

important tourist attractions such as the city of Havana, Varadero (Matanzas), Cayo Coco and Cayo Guillermo (Ciego de Ávila) and Cienfuegos. Furthermore, since 1996, the province of Matanzas had the highest average wage in all of the economy. In addition to tourism, this province has oil wells. Conversely, almost all the eastern provinces of the country (Guantánamo, Santiago de Cuba, Granma, Holguín, Las Tunas), and Pinar del Río (located in the west) were below average wages during the entire period of study. The only exception was the eastern province of Holguín, which rose above average between 1994 and 1997. The low-wage status of almost all the eastern provinces reflects their underdevelopment. The concentration of economic activity in this region is centered around the cultivation of sugar cane. With the exception of Santiago de Cuba, the region does not have a significant tourism subsector. This situation was aggravated with the economic crisis and this was reflected in wage levels in comparison to other parts of the country.

IX. Conclusion

The 1990s have been characterized by a rising trend in inequality at a global scale. Cuba, as this investigation shows, has not been left unaffected by this phenomenon. Nevertheless, given the special characteristics of the Cuban model it is important to highlight the particular features of the situation.

First, in Cuba the state is the main source of employment and determiner of wages. Thus, the evolution and changes in pay inequality are the direct and clear consequences of changes in economic policy that the country has implemented during the period of study, in which the process of opening to the entry of foreign investment stands out. This is in direct contrast with the experiences of other countries with market-based economies, in which the State plays an important but not central role in determining wages and employment. In this sense the efforts made by the Cuban authorities to slow down the rising trend in pay inequality in the nineties are remarkable, especially considering the narrow range of policy alternatives available during the economic crisis.

Second, the existence of strong social security networks guarantees basic levels of equity within the country. Cubans benefit from a wide range of public services, including but not limited to universal and free access to medical and health services and education up to and through higher education. Because of the existence of this strong network, Cubans who have been hurt by changes in the economic structure, mainly workers related to the

production of non tradable goods and services,[9] have been able to cope with reductions in their income.

A third policy that may have significant effects on pay inequality in Cuba is the recently implemented exclusion of the dollar from the financial and monetary system. During the Special Period, the Cuban government decided to allow the entry of US dollars into the economy to satisfy its need for foreign currency. This policy led to the commercialization of a series of basic goods in a currency to which much of the population had little access. Given that salaries remained in Cuban pesos, this policy had a negative effect on consumption.[10] In this sense it is key to continue the application of measures to simplify the Cuban financial and monetary system, mainly by eliminating the dual-currency system, which will allow for improvements in levels of consumption by breaking down the barriers associated with the strong currency (dollar/convertible peso)/weak currency (peso) divide.

A final element to highlight is the adoption in 2005 of an across-the-board raise in wages and an increase in retirement pensions.[11] The policy's objective is to reduce the degree of dispersion in wages among the different economic sectors. While data are not yet available to evaluate the effectiveness of these measures, the policy provides a subject for future investigation.

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[9] We could even investigate the employees of the state sector as a whole, as they have been affected by the changes in the economic structure of the country brought about by the rise of self employment. See Pérez, Oberto and González (2003)

[10] Currently the established Exchange rate between the CUC (Cuban Currency), currency issued by the Central Bank of Cuba that replaced the dollar, and the Cuban peso its 1=24 although in the worst moment of the crisis it reach 1=160.

[11] The lack of official data related to such changes precludes their inclusion in the present investigation.

Appendix

Table 1: Spending in Education and Health Care as a percentage of current fiscal spending

	1990	1993	1996	1999	2000	2001	2002	2003	2004
Education	8.52%	10.84%	10.00%	11.67%	12.65%	13.89%	15.85%	18.30%	18.96%
Health Care	4.93%	8.43%	8.37%	9.91%	10.17%	10.54%	11.08%	11.25%	11.00%

Source: Authors' calculations based on ONE data
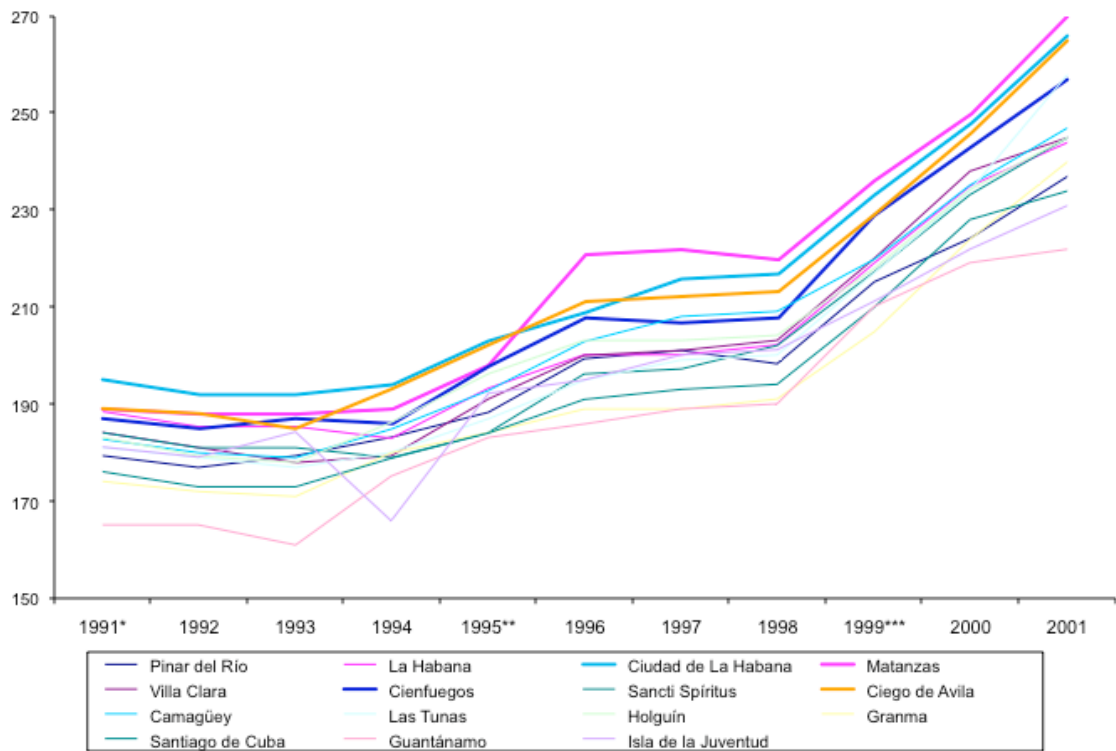
Figure A1: Total Income and Spending

Source: Authors' calculations based on ONE data
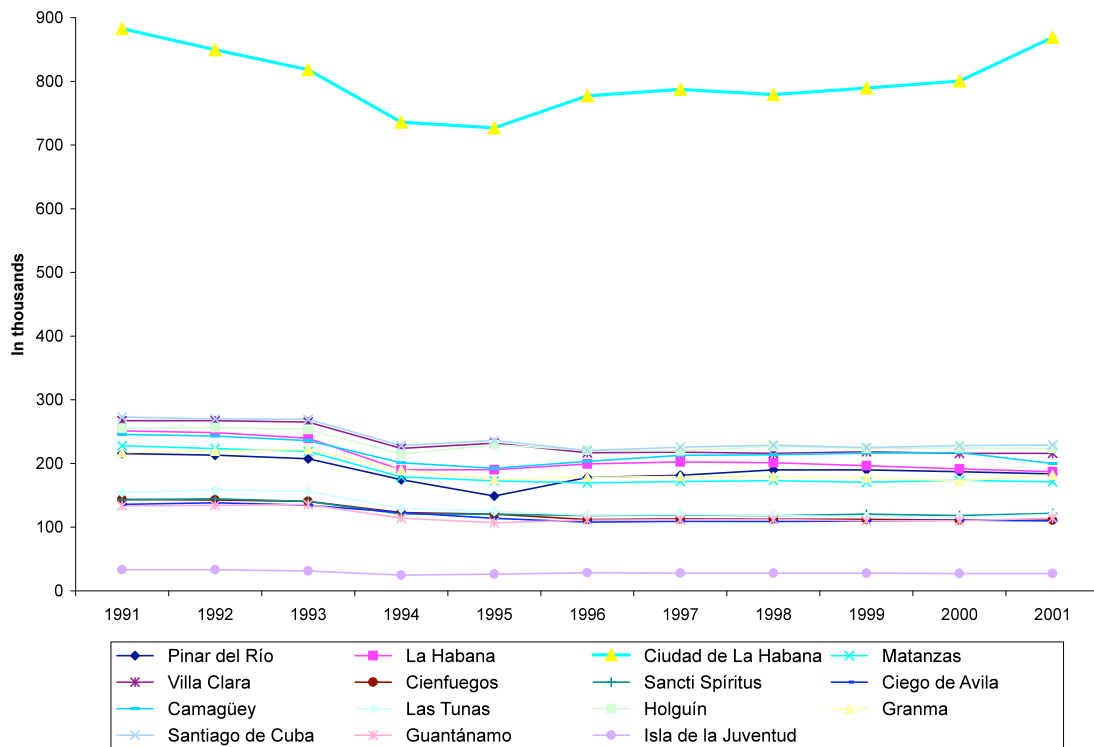
Figure A2: Total Liquidity
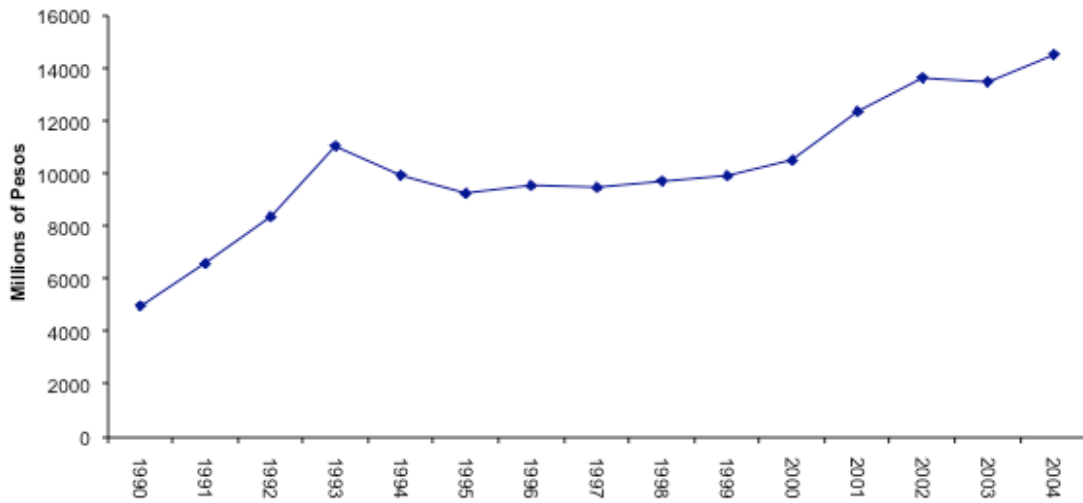
Source: Authors' calculations based on ONE data

Figure A3: Averages Wages by Region

Source: Authors' calculations based on ONE data

Figure A4: Level of Employment by Region

Source: Authors' calculations based on ONE data

References

Barbeira Lorena, De Souza Brigs Xavier and Uriarte Miren, The End of Egalitarianism? Economic Inequality and the Future of Social Policy in Cuba in The Cuban Economy at the Start of the Twenty-First Century, Edited by Jorge Dominguez, Omar Everleny Perez Villanueva and Lorena Barberia. Harvard University, David Rockefeller Center for Latin American Studies, London, England, 2004.

Cabrera J, Industria Biotecnológica y Medico Farmacéutica en Cuba en Estructura Económica de Cuba, Tomo I, Editorial Félix Varela, La Habana, 2002.

CEPAL. La Economía Cubana. Reformas Estructurales y desempeño en los noventa. Fondo de Cultura Económica, México, 2000.

CIEM-PNUD, Investigación sobre el Desarrollo Humano y Equidad en Cuba 1999, Editorial Caguayo, La Habana, 2000.

Colectivo de Autores, Estructura Económica de Cuba, Tomo I, Editorial Félix Varela, La Habana, 2002.

Ferriol A. and Therborn G., Política Social: El Mundo Contemporáneo y Las Experiencias de Cuba y Suecia, ASDI-INIE, La Habana, 2005.

Galbraith, James K and Hyunsub, Kum. 2005. "Estimating the Inequality of Household Incomes: Toward a Dense and Consistent Global Data Set," Review of Income and Wealth, 51 (1): 115-143.

González L, El Sistema Salarial: Criterios, INIE, La Habana, 2005.

Izquierdo Victoria, Oberto Fabian, Gonzalez Mayelin, Los trabajadores por cuenta propia en cuba, Revista Cuba Siglo XXI, No XLVII - November 2004.

ONE, Anuario Estadístico de Cuba, Varias Ediciones, La Habana.

Pérez O, Estabilización Macroeconómica, CEEC, La Habana, 2000.

Pérez V., Oberto F. y González M., Los Trabajadores por Cuenta Propia en Cuba, INIE, La Habana, 2003.

Piñeda Bañuelos, Gilberto J, Las reformas económicas en Cuba: de un Modelo de Planificación Centralizado a la Planificación Descentralizada, 1959-2000, Universidad Autónoma de Baja California Sur, México, 2001.

Togores Viviana, Cuba: Efectos Sociales de la Crisis y el Ajuste Económico de los Noventas, Revista Cuba Siglo XXI, N° XIII. January 2002.

The Economist Intelligence Unit, The Economist, 2005.

U-Echeverria, Antecedentes Macroeconómicos en Estructura Económica de Cuba, Tomo I, Editorial Félix Varela, La Habana, 2002.

Quiñones N, El Entorno Externo de la Economía Cubana, INIE, La Habana, 2002.