

**The  
Role of  
Human Capital  
in Cuban Economic  
Development, 1959-1999**

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## Abstract

*One of the great achievements of the Cuban Revolution is its sustained commitment to investment in human capital. This historical development is discussed in this paper. However, because of slow population growth and an ageing population, Cuba will in the near future be confronted by a rather unusual problem in the Latin American context: shortage of labour, which will put pressure on the need for increasing productivity growth, which can only be based on industrial upgrading, reintegration into the global economy, technological rejuvenation and a highly skilled labour force. In the 1990s, however, there was a serious under-utilisation of the human capital stock. A condition for resumed long-term sustained growth in Cuba is the mobilisation and efficient utilisation of apparently large untapped reserves of highly qualified manpower.*

## 1. Introduction

One of Cuba's assets is its human capital, important for industrial upgrading and for Cuba's opportunities and possibilities for linking up to regional and global networks in an era of rapid globalisation. Human capital development coupled with impressive physical investment rates were pivotal to the high growth rates recorded in the Cuban economy between 1970 and 1985.

But sustained long-term growth is at stake. After 1985 the economy started stagnating, and after 1989 it declined rapidly, primarily as a result of the demise of the Soviet Union of the inertia of an over-centralized command economy. In spite of slow to moderate economic recovery after 1993 domestic investment rates are still lagging behind, and perhaps the most worrying fact is that human capital formation has come to a practical standstill. Enrolment rates have fallen dramatically during the last decade. The paper discusses this new Cuban dilemma and the consequences for long-term growth.<sup>1</sup>

The poor performance of the Cuban economy after 1989 (and, in fact, the economy started stagnating already after 1985) is eroding the 'growth with equity' model of the past (see e.g. Mesa-Lago 1981; Brundenius 1984 and Rodríguez-Carriazo 1987). However, surprisingly many social indicators are still impressive. Thus, the infant mortality rate continues to go down (6.4 per thousand in 1999) and life expectancy to rise (76 years in 1999), in sharp contrast to the performance of the former allies in Eastern Europe, especially in the former Soviet Union (see e.g. Zecchini 1997; Milanovic 1998 and Fabienke 2000: p.105).

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<sup>1</sup> An earlier version of this paper was presented to the Latin American Studies Association XXII International Congress, Miami, 16-18 March, 2000. The paper also draws on a recent study discussing the policy implications of different long term growth scenarios for the Cuban economy (Brundenius-Monreal: 2000).

## 2. Economic Performance and the Role of Capital Accumulation after 1959

The collapse of the Soviet Union had disastrous repercussions on the Cuban economy. However, after a protracted and deep decline the Cuban economy slowly started to recover in 1994, and it has since then grown at an average rate of 4% per year. This is, it is true, a higher rate of economic recovery than in most countries in the former 'socialist camp'<sup>2</sup>, and could also be considered an achievement, in view of the many obstacles faced by Cuba (not least the continuing U.S. embargo). However, with such a rate it will take another five to six years before Cuba has recovered its GDP levels of 1985<sup>3</sup>.

However, long-lasting economic setbacks are not unique in Latin America Cuba. Many other Latin American countries have also been lagging behind during the last two decades. Long-lasting stagnation is by no means exceptional within a Latin American perspective. Latin American GDP per capita (excluding Cuba) increased only by 2.6% between 1981 and 1997, that is at a rate of 0.2 % per year. In the same period per capita GDP decreased at an average rate of -0.9% in Argentina, of -0.5% in Peru, of -0.6 in Mexico, while only slightly increasing in Brazil by 0.4% per year, and in Costa Rica by 0.5% Table 1).

A closer look at Cuban economic performance since 1959 shows that the economy grew at a rather satisfactory rate until the mid-1980s, not always smooth but over a 25 year period it can no doubt be claimed that it was impressive, also in comparison with the rest of Latin America. Table 2 highlights the Cuban economic performance since 1962 and Figure 1 illustrates the development of GDP and Gross Investments since 1959.<sup>4</sup>As already mentioned the slowing down of the Cuban economy started already in the second half of the 1980s, or it rather showed signs of stagnation, suggesting that the model of accumulation was being exhausted. That is why the Cuban economy probably would have entered a long period of crisis even without the effects of the collapse of the Soviet Union and the rest of the 'socialist camp'. However, the demise of the old 'socialist division of labour' precipitated the crisis, making it more profound and making recovery more difficult. As a consequence Cuba has

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<sup>2</sup> See e.g. Zecchini (1997) and (Milanovic 1998). In Russia, for instance, economic recovery started modestly only in 1999 after a protracted and deep depression (that, incidentally, was both considerably longer and deeper than the depression in the United States in the 1930s) (Brundenius 1999: Table 2b).

<sup>3</sup> It is, of course, not only a question of recovering the earlier peak level but recovering it with a dramatically changed structure of production. Thus, the current restructuring process implies *inter alia* the opening up of new production lines and the development of new economic activities (such as tourism), which have effects on both export and import structures. These issues are beyond the scope of this paper but are discussed at length in, for instance, Pastor-Zimbalist (1995), Ritter (1998), Mesa-Lago (1998 and 2000), Brundenius-Monreal (2000), Monreal (2000), Romero (2000), and Miranda (2000).

<sup>4</sup> The time series are based on official data for the period 1985-99. For the period 1975-85 time series constructed by Brundenius-Zimbalist (1989) have been used. The period 1959-75 data have been derived from a report by JCP (1977). For alternative growth rate estimates for the period 1985-96, see Mesa-Lago (1998), for the period 1960-81, see Pérez-López (1987).

been obliged to switch to a modified model, clearly more market-oriented, with reforms being introduced at a slow and cautious (too slow and cautious according to many) pace.

**Table 1. Annual Growth Rates of Gross Domestic Product and Gross Domestic Product Per Capita in Selected Latin American Countries, 1970-99 (1990 prices)**

	<i>Gross Domestic Product</i>			<i>Gross Domestic Product per Capita</i>		
	<i>1970/80</i>	<i>1980/90</i>	<i>1990/99</i>	<i>1970/80</i>	<i>1980/90</i>	<i>1990/99</i>
Argentina	2.6	-0.9	4.1	1.0	-2.4	3.1
Brazil	8.7	2.3	1.5	6.1	0.3	0.2
Chile	2.5	3.4	5.8	0.8	1.7	5.2
Colombia	5.6	3.8	2.7	3.3	1.7	1.0
Costa Rica	5.1	2.2	4.2	2.7	-0.7	1.9
Cuba	5.1	1.8	-2.1	3.9	0.8	-2.9
Mexico	6.6	2.3	3.0	3.5	0.1	1.3
Peru	4.0	-0.6	3.6	1.2	-2.8	2.0
Venezuela	4.0	0.7	2.1	0.5	-1.9	0.1
Latin America*	6.0	1.6	2.6	3.3	-0.4	1.1

\* Excl. Cuba

*Sources:* For Cuba see Table 2; for all other countries: data for 1970-97 from IDB (1999: Appendix Tables B1 & B2); data updated until 1999 based on growth rates presented in ECLAC (2000: Appendix Tables A1 & A2)

However, it is quite clear that even the current modified model of accumulation is not viable in the long run. It is still dominated by state owned industries, with low productivity growth, often as a result of obsolete machinery and equipment, and an over-dimensioned labour force. As shown in the Table 2 and Figure 1, physical investments are lagging behind and this is a very ominous sign. Studies of long lasting protraction in other 'transition' economies show that, if growth rates are to pick up steam, and be sustained for a longer period, it is the investments that have to lead the way (Brundenius 1999: Figures 2a and 2b).

As shown in Table 2 the Cuban investment rates are extremely low, even if they have started climbing upwards lately. By 1993 the gross investment rate had dived to 5.4% (compared with a rate of 26.8% in 1990). It has been estimated that, if depreciation is deducted (at a fixed annual sum of 2 578 million pesos), the result would be a negative net investment rate since 1992 with a bottom low of -13.2 % of GDP in 1993 (Ritter 1998: Table 3). If this type of calculation holds, the net investment rate was still negative in 1999 (or, -6.4%). This would mean that by now (2000) the total Cuban capital stock is considerably smaller than ten years ago. ECLAC has estimated that the Cuban overall capital-output ratio was 5.5 in 1989, or considerably higher than the Latin American average (ECLAC 1997: p. 68). This was the result of the massive investments in machinery and buildings during the 1980s, but could also be seen as a measure of an inefficient utilisation of capital.

**Table 2. Indicators of Cuban Economic Performance, Selected Years, 1962-99 (constant 1981 pesos)**

	GDP (million)	GDP/capita	GI (million)	GI/GDP (%)	Occupied Civ. Labour Force*	Y/L**
1999	15 669	1 358	1 582	10.1	3 781	4 144
1998	14 754	1 329	1 479	10.0	3 754	3 930
1997	14 572	1 318	1 382	9.4	3 705	3 933
1996	14 218	1 292	1 172	8.2	3 627	3 920
1995	13 185	1 201	954	7.2	3 591	3 672
1994	12 868	1 174	705	5.5	3 840	3 351
1993	12 777	1 168	692	5.4	3 815	3 349
1992	15 010	1 381	1 147	7.6	3 826	3 923
1991	16 976	1 573	2 752	16.2	3 888	4 366
1990	19 008	1 777	5 085	26.8	3 814	4 984
1989	19 585	1 841	4 511	23.0	3 724	5 259
1985	20 703	1 966	4 307	20.8	3 400	6 089
1980	15 947	1 645	2 739	17.2	2 964	5 380
1970	9 677	1 125	669	6.9	2 409	4 017
1962	6 488	887	572	8.8	1 823	3 559

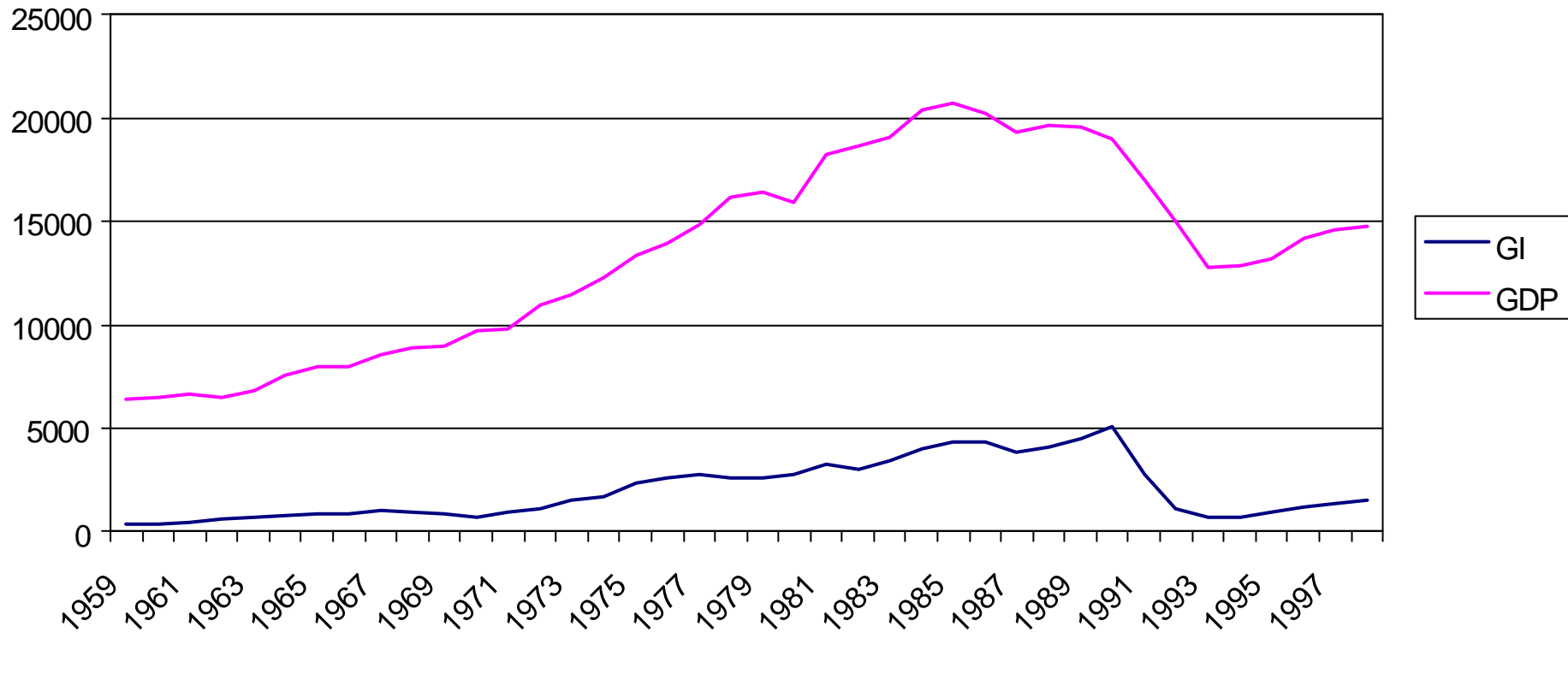
\* Thousand persons

\*\*Y/L= GDP/Occupied Civilian Labour Force, which is a proxy for labour productivity (assuming that hours worked per worker remain constant over time)

Sources: Series calculated by the author based on JCP (1977); Zimbalist & Brundenius (1989: Table 4A.1); Rodríguez (1990:Table 14); CEE (1990); CEPAL (1997); ONE (1998);ONE (1999) and CEPAL (2000)

There are several reasons for the low levels of investment. One reason is the collapse of trade with the former allies in the socialist bloc. Although Cuba increased its capital goods production at an impressive rate after the revolution (especially after 1975), the demand for investment goods grew even more rapidly. The result was that by the mid-1980s, the import ratio for capital goods was still about 70% of total domestic demand for such goods, or about the same as at the beginning of the 1960s (Brundenius 1987:Table 8). It has been estimated that capital goods today cover about 50% of Cuban total demand for investment goods (Brundenius-Monreal 2000: Table 8.3). This means that a higher share of the burden is now on falling domestic productive capacity. However, it is difficult to increase domestic production of investment goods under present circumstances, with practically all of the producing facilities located in state owned companies with obsolete machinery and equipment. These investment goods were to a large extent imported from the socialist bloc in the 'good old days', as a rule under favourable agreements, although the technology was often inappropriate and the quality was far from the desired one (see e.g. Fernández Font 1995: p. 24 and Fernández Font 1999:pp. 176-177).

**Figure 1**  
**Gross Domestic Product and Gross Investments, 1959-98 (constant prices)**



### 3. An Extensive Growth Model with Slow Productivity Growth

Like other socialist models of accumulation the Cuban model has been based on so-called extensive growth. That is, economic growth has primarily been the result of a more or less proportional expansion of output with the expansion of factor inputs, i.e. capital and labour (see e.g. Ofer 1987 and Kornai 1992, pp. 180-86). In other words, the economy is growing at the same rate as the expansion of factor inputs. A more efficient use of the factors of production results in intensive growth. In the West the extensive growth model is often referred to as a factor growth model, while the intensive growth model is equivalent to factor productivity growth in the Western terminology.

A look at Table 3 reveals that Cuba has largely followed an extensive growth trajectory. Between 1962 and 1999 Cuban GDP grew at a rate of 2.4% per annum, while gross investments increased at an average rate of 2.8%. Labour inputs increased at a rate of 2.0%, that is, slightly below GDP growth, but labour productivity grew very slowly, or at 0.4%. On the other hand, labour productivity increased rather rapidly in the 'golden period of growth' (1970-85), or at an average rate of 2.8%, so the picture is perhaps not so clear-cut. What is clear, however, is that the period after 1985 shows clear symptoms of the exhaustion of the extensive growth model. In the period 1985-90 the economy started stagnating in spite of continuing increase of both capital and labour inputs, with a declining labour productivity as a result.

Madrid-Aris has in two interesting papers (1997 and 1998) analysed the growth components of the Cuban economy between 1963 and 1988. He arrives at the conclusion that Cuba's growth in this period "was almost entirely the result of capital accumulation rather than productivity gains" (Madris-Aris, 1998: p. 477). This conclusion is based on an attempt to estimate the growth of the so-called total factor productivity (TFP) in Cuba after the revolution.<sup>5</sup> His exercise shows that labour input contributed with 28% to the overall growth of the economy (1963-88) while capital input explained no less than 70% of the growth, and thus the residual TFP accounted for a tiny 2% of the growth. During the period analysed TFP grew at a very modest rate of 0.2% per annum.

Many economists in both East and West, e.g. Kornai (1992) and Krugman (1994), have pointed at slow TFP growth in Soviet type economies as being an inherent weakness in the system. However, Krugman goes one step further by suggesting that also the East Asian

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<sup>5</sup> TFP is a residual in a Solow (and or Cobb-Douglas) type aggregate production function, a residual that is often used as a proxy for technical progress.

miracle economies are plagued by the same weakness and thus are ‘myths’ (Krugman 1994) which, of course, complicates the conclusions, at least from an ideological standpoint.<sup>6</sup>

**Table 3. Cuban Annual Growth Rates: Selected Indicators and Periods, 1962-99**

Periods	GDP	GDP/capita	Gross Investments	Occupied Civ. Labour Force	Y/L*
1994-99	4.0	3.3	17.6	-0.3	4.3
1990-94	-9.3	-9.8	-39.0	-0.2	-9.4
1985-90	-1.7	-2.0	3.5	4.1	-3.9
1970-85	5.2	3.8	13.2	2.3	2.8
1962-70	5.2	3.0	2.0	3.6	1.5
1962-99	2.4	1.2	2.8	2.0	0.4

\* Y/L= GDP/Occupied Civilian Labour Force (see Table 5)

Source: Table 2

At any rate, it is quite clear that the present investment levels in Cuba are quite insufficient. For a new economic boom to occur, sustained investment levels of 20-25 % of GDP will be necessary. Another problem, is the slow productivity growth and this goes for both capital and labour productivity, in other words also for total factor productivity (TFP) growth. Productivity growth has always been rather low in Cuba, with the exception for the 1970s when also massive investments were made. The strange thing is nonetheless that the investment rate continued to rise during the whole 1980s, but labour productivity declined at a rate of 0.8% in the same period and the decline continued during the whole decade of the 1990s.

#### **4. A Major Dilemma: Low Productivity Growth with Declining Labour Force Participation**

Cuba’s problem in a nutshell: low productivity growth with a labour force that is growing slowly as a result of an ageing population, with a stagnating (and by the end of last decade

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<sup>6</sup> Krugman’s analysis is, however, not unproblematic. He uses, inter alia, as ‘evidence’ calculations of TFP made by Young (1994). Young has estimated TFP growth in the period 1970-85 for 66 countries. His conclusion is that the ‘miracle economies’ (Hong Kong, Taiwan, South Korea and Singapore) get high rankings in terms of overall growth but that the rankings drastically deteriorate if TFP growth is considered. However, the strange thing is that Young’s own results show that, following his own methodology, the TFP growth of advanced economies still rank far behind Taiwan and South Korea. United States, that one would expect to be one of the leaders of TFP growth is at the 57<sup>th</sup> place (out of 66!) with a TFP growth rate of only 0.4% per year (Young 1994:Table 3), or just about the same as Cuba in approximately the same period! (Madrid-Aris 1998:Table 6). So either there are some flaws with the calculations or the conclusions have to be modified.

even shrinking working age population<sup>7</sup>. Thus, a growing segment of the non-active population (those below 15 and those above 65) will be dependent on the output (and hence productivity) of a shrinking segment of the economically active population<sup>8</sup>. But in spite of slow population growth and a declining population of working age, labour force participation rates have also declined in the 1990s. Labour force participation rates<sup>9</sup> thus went down from around 75% at the end of the 1980s to 67.6% in 1994 and were only slowly recovering at the end of the last decade (Table 4).

Although international comparisons are somewhat tricky (see note 9), it is clear that the Cuban labour force participation rates are about average for men and above average for women. According to the ILO (1999), the labour participation rate was 75.0% for men and 36.1% for women in Chile (1998), 81.6% for men and 38.5% for women in Costa Rica (1998), and 86.5 % for men and 41.4% for women in the Dominican Republic (1998). In a developed country like Denmark it was 83.1% for men and 73.2% for women (1998).

The crude labour force participation rates estimated for Cuba in Table 4 are, however, only part of the picture. The fact that people do not participate in the labour force does not necessarily mean that they are idle, or 'inactive'. They can, for instance, be studying, or in the case of women they can be on maternity leave. Especially student enrolments complicate the picture in the case of Cuba since so much emphasis has been on education since the revolution. At one point in time, in the 1980s, it was said that one third of all Cubans were enrolled as students at some level of education (including adult education). In tables 5 and 6 and Figure 2 some characteristics of the working age population (WAP) are illustrated by type of activity. The economically active population (EAP) consists of those occupied (officially registered) in the civilian labour force (whether state or non-state), those unemployed (officially registered), those in the non-civilian labour force (primarily the armed forces and the security forces). The estimate of 'inactives' is a residual, after subtracting the EAP and students (above 17) from the WAP.

Although the accuracy of the estimates can be discussed (thus unemployment figures and the non civilian labour force are in many cases estimates, especially before 1981), they do suggest a clear trend: there is an increasing number of 'inactive' people of working age after 1989 (Table 6). In 1989 the inactivity rate was only 10.4% of the WAP. By 1994 this share had

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<sup>7</sup> The population 65+ is expected to increase its share of the total population from 9.8% in 1998 (ONE 2000: Table II.2) to 10.4% in 2005, to 11.6% in 2010 and to 13% in 2015 (CEDEM: Table VI.1)

<sup>8</sup> For an expansion of this argument see León (1999).

<sup>9</sup> Labour force is defined here as the occupied civilian labour force as % of the working age population (which in Cuba is 17-54 years of age for women and 17-59 years of age for men. This complicates international comparisons where country data as a rule refer to EAP (economically active population, which includes unemployed) in relation to the population over 15 years of age.

increased to 24.3% but has since then gone down slightly. This is also the conclusion that ECLAC draws a recent study of the Cuban economy (CEPAL 2000: Table V.2). ECLAC uses the term *desempleo equivalente* ('equivalent unemployment'), as a measure of 'real' unemployment, which, according to their estimates, increased from 7.9% in 1989 to 35.2% in 1993, but then fell slowly to 25.1% in 1998.

**Table 4 . Labour Force Participation Rates by Sex, 1970, 1981 and 1989-98**

	<i>Total*</i>	<i>Male*</i>	<i>Female*</i>
1998	70.2	85.0	54.3
1997	69.3	84.0	51.2
1996	67.9	82.3	52.4
1995	68.1	81.9	53.3
1994	67.6	81.9	52.3
1993	69.2	84.2	53.1
1992	70.8	87.0	53.4
1991	73.0	90.3	54.5
1990	74.1	85.1	58.1
1989	75.3	89.3	60.3
1988	75.3	89.9	59.5
1981	70.4	93.7	45.4
1970	63.0	96.1	24.0

\* EAP as % of working age population (see also note 9)

Sources: Elaborated by the author from data in CEE (1982), JCP (1975), CEE (1990), ONE (1998), ONE (1999:1) ONE (1999:2), ONE 2000) and CEE (1986)

**Table 5. Characteristics of the Economically Active Population (Labour Force), 1970, 1981, 1989, 1994 and 1998**

	1970		1981		1989		1994		1998	
	(000)	%	(000)	%	(000)	%	(000)	%	(000)	%
Occup. Civ. LF*	2 409	91.5	3 068	84.8	3 724	78.8	3 840	85.4	3 754	80.8
State	2 064	78.4	2 824	78.1	3 527	74.6	3 135	69.7	2 816	60.6
Non-State	345	13.1	244	6.7	197	4.2	705	15.7	938	20.2
Unemployed	34	1.3	122	3.4	372	7.9	301	6.7	307	6.6
Non-Civ. LF**	190	7.2	428	11.8	632	13.4	355	7.9	585	12.6
Total LF***	2 633	100.0	3 618	100.0	4 728	100.0	4 496	100.0	4 646	100.0

\* Occupied Civilian Labour Force

\*\* Non-Civilian Labour Force

\*\*\* Labour Force=Economically Active Population

Source: see Appendix Table 1

**Table 6. Characteristics of the Working Age Population, 1970, 1981, 1989, 1994 and 1998**

	1970		1981		1989		1994		1998	
	(000)	%	(000)	%	(000)	%	(000)	%	(000)	%
In Labour Force	2 633	63.0	3 618	70.4	4 728	75.3	4 496	67.6	4 646	70.2
Students	193	4.6	700	13.6	898	14.3	534	8.0	522	7.9
Inactive	1 360	32.5	822	16.0	655	10.4	1 616	24.3	1 453	21.9
Work.Age Population	4 180	100.0	5 140	100.0	6 281	100.0	6 646	100.0	6 621	100.0

Source: see Appendix Table 1

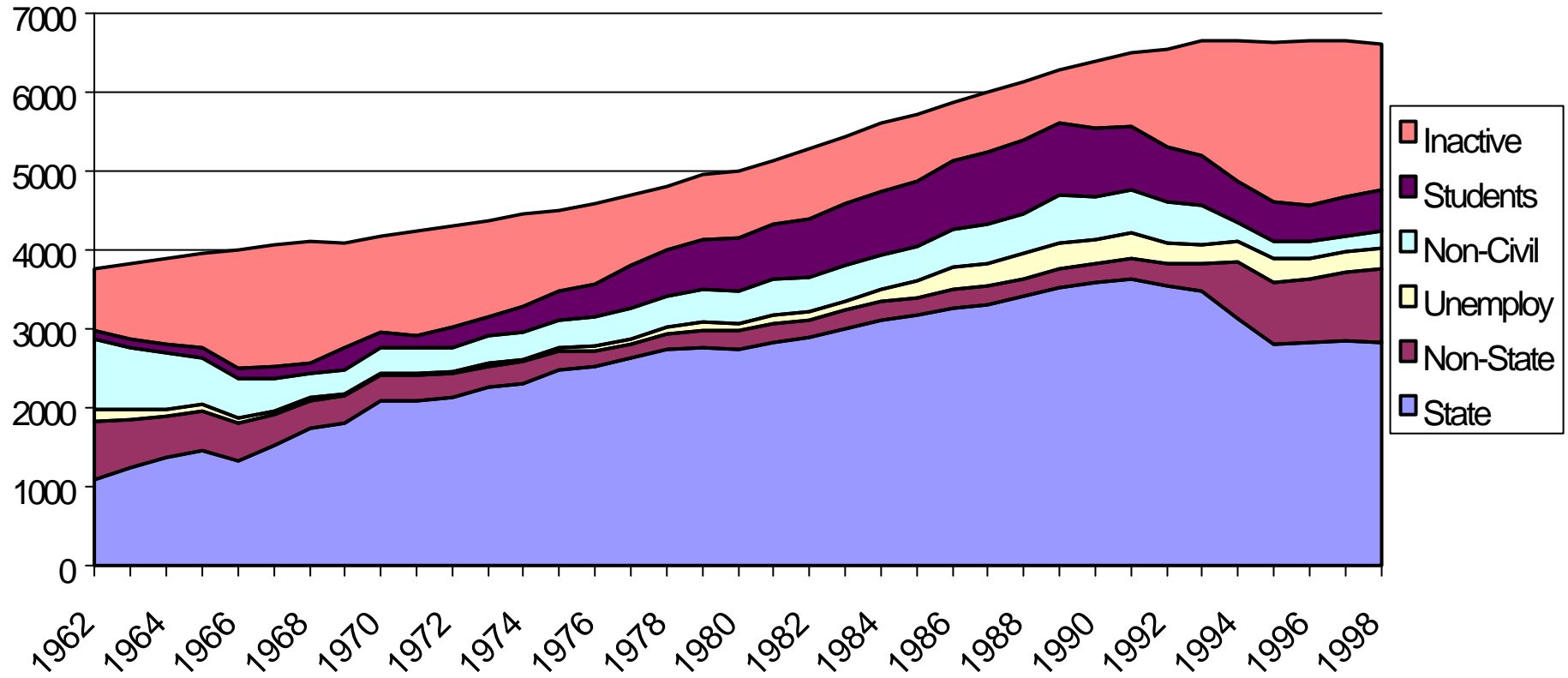
## 5. How Inactive is the 'Inactive' Working Age Population?

If it is clear that the 'inactive' WAP has increased substantially in the last decade in statistical terms, it is not so clear how 'inactive' they actually are. Or in other words: what do they do when they are 'inactive' ? First of all it should be stressed that the economically active population in Cuba only comprises those who are legally registered. Thus the 'informal economy'<sup>10</sup>, is not recorded in Cuban statistics. It is true that there is also an embryo of a legal private small-scale sector in Cuba that is slowly growing, especially after 1994 when it was legalized to exercise many professions on an individual basis, that is as self-employed (*a cuenta propia*). Thus, it is not allowed to hire labourers, except family members to assist in some trades, like private restaurants (*paladares*).

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<sup>10</sup> For a discussion of the existence or not of an 'informal economy' in Cuba, see e.g. Perez-López (1995), Mesa-Lago (1998) and Fabienke (2000).

Figure 2  
Distribution of Working Age Population by Type of Activity



However, there is still no significant private sector, in the narrow sense, in Cuba. Non-state activities have increased since 1994 (see Table 5) but primarily as a result of the transformation of state farms into cooperatives<sup>11</sup>. In 1998 the private sector consisted of 305 000 private farmers (an increase from 188 000 in 1989) and 113 000 self-employed (registered with licenses), an increase from only 25 000 in 1989 (CEPAL 2000:Table A.48). This means that the private sector increased from 4.5% of the occupied civilian labour force in 1989 to 11.1% in 1998. But considering that the percentage share was 9.0% in 1995, the growth of the private sector is very slow, and the share of self-employment actually has decreased, from 3.8% in 1995 to 3.0% in 1998.

The main reason for the slow growth of registered self-employment has no doubt to do with barriers of entry and disincentives to do private business in Cuba. The taxes<sup>12</sup> imposed are prohibitive for many who are discouraged to continue, and this is no doubt one of the main reasons for the slow growth of the sector. The question then is to what extent those who leave the legal self-employment sector continue doing the same business, but doing so unregistered, unlicensed and thus illegally. There are, however, unfortunately no data (at least not official ones) that could shed some light on this important issue. It is clear though that as long as the government insists on setting up barriers and creating disincentives rather than incentives to this group of people, the illegal ‘informal sector’ is bound to continue growing, and so will the problem.

## 6. The Inactivity of the Young: A Critical Contemporary Phenomenon

One reason for the increasing inactivity of the working age population is not only the lack of employment opportunities in the state sector. It is also reflected in the general decline of student enrolments, especially at universities. It is thus of interest to take a closer look at people who are in their twenties, that is, between 20-29. Table 7 shows some activity/inactivity characteristics of this age group, with estimates of how many of these young people are in the labour force, how many are students and how many are ‘inactive’, that is, those who apparently are outside the *formal* labour force and who are not students.

The inactivity rates of the 20-29 age group are considerably higher than those of the working population at large, and more important, they have continued to grow in spite of the economic recovery that started after 1994. It is also noteworthy that the inactivity rates of the young are

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<sup>11</sup> For an analysis of the impact of the transformation of state farms into cooperatives, see e.g. Deere (1997).

<sup>12</sup> The taxes are as a rule flat rates (*cuotas fijas*) that affect the self-employed in a rather arbitrary way with little or no relation to actual income. There are no doubt many who benefit from this system but there are at least as many who simply cannot survive economically with such a tax system.

increasing in spite of a decreasing population in this cohort! While the inactivity rates for the whole working age population increased from 10.4% in 1989 to 24.3% in 1994, they have actually declined slightly since then (see Appendix Table 1). In contrast, the inactivity rates of the 20-29 cohort increased from 27.3% in 1988 to 35.2% in 1996, then decreased slightly to 34.0% in 1997 but just to jump to a new record level of 38.8% in 1998. Now one would perhaps expect that it is mainly young women who are abandoning work or studies, in view of their lower labour force participation rates in general (cf. Table 4), but this is apparently not the case. The large increase in inactivity rate of this age group between 1997 and 1998 is entirely explained by increasing male inactivity. The women actually increase their activity rates between the same years. The increasing inactivity rates among the young might be symptoms of frustration and disenchantment about the future. If this is so there should be a cause of concern for the government.

**Table 7. Characteristics of the 20-29 Age Cohort, 1988, 1996, 1997 and 1998 (thousand)**

	1988	1996	1997	1998
<i>Total Age Cohort</i>	2203.4	2122.2	2051.2	1971.4
In Labour Force*	1351.9	1264.5	1249.1	1103.7
Students	250.6	111.6	104.6	102.6
Inactive	600.9	746.1	697.5	765.1
Inactive/Total	27.3%	35.2%	34.0%	38.8%
<i>Males</i>	1112.2	1071.7	1035.3	995.0
In Labour Force*	797.6	776.6	794.1	676.5
Students	107.6	44.5	41.2	38.8
Inactive	207.0	196.6	200.0	297.7
Inactive/Total	18.6%	18.3%	19.3%	28.1%
<i>Females</i>	1091.2	1050.5	1015.9	976.4
In Labour Force*	554.3	487.9	455.0	567.1
Students	143.0	67.1	63.4	63.8
Inactive	393.9	495.5	497.5	485.4
Inactive/Total	36.1%	47.2%	49.0%	49.7%

\* Economically active population (includes unemployed and non-civilian labour force)

Sources: Same as Appendix table 1

## 7. Rise and Fall of University Enrolments

The Cuban government has mobilized a lot of resources to education since the revolution: first, in a total mobilisation to eradicate illiteracy in 1961, then in a massive effort to provide primary education to all and then gradually upgrading the population to secondary and higher levels. In the 1970s secondary enrolments skyrocketed which led to a consecutive boom of university enrolments in the 1980s. Table 8 below illustrates this impressive effort by the Cuban government in the field of education. Primary level enrolments have stabilised around one million, not because enrolment rates are going down, but because nativity rates are going

down. Secondary enrolments have also dropped somewhat in the 1990s but this also has primarily to do with declining numbers in the corresponding age cohort.

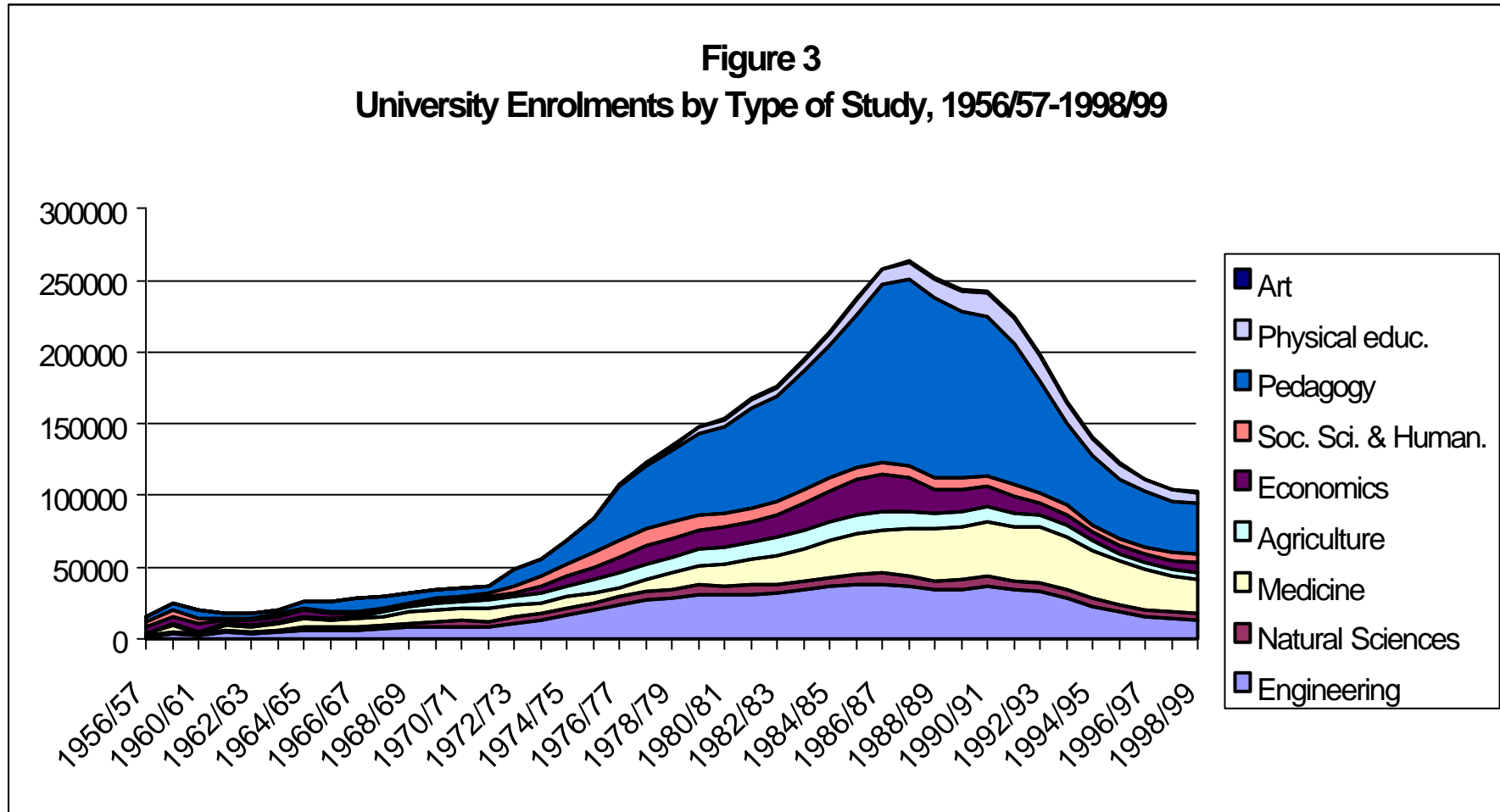
**Table 8. Student Enrolments by Level of Education, Selected Years**

	<i>Primary (000)</i>	<i>Secondary (000)</i>	<i>Tertiary (000)</i>
1998/99	1015.9	811.3	102.6
1989/90	885.6	1073.1	243.1
1979/80	1550.3	1127.6	147.9
1970/71	1530.4	272.5	35.1
1956/57	740.5	99.4	15.6

*Sources:* Based on time series data supplied by ONE (Oficina Nacional de Estadísticas), Havana

But as seen in the table there has been a dramatic decline in university enrolments and this decline cannot be explained only by a decreasing population in the cohort. University students in Cuba are usually between 20-24 years. If we look at university enrolments in relation to this age group we find that enrolment rates increased from 6.7% in 1972/73 to 20.8% in 1989/90, then dropped to 17.3% in 1992/93 and to 12.4% in 1998/99. The decline of university enrolments is quite noteworthy (see Figure 3), with enrolments in 1998/99 just reaching 42% of the peak level in 1989/90. It is not clear to what extent young people opt not to continue university education because of bleak job opportunities, or for other reasons. It is claimed, however, that one reason for the decline is that the Ministry of Higher Education only admits students to the extent that the state can guarantee employment after completion of studies. If this is so, there should perhaps be even more reason for concern. Instead of continuing a rather uncertain university career, it seems that many young people today deliberately choose not only to choose not to enter university, but also that many refrain from joining the legal labour market. This could be a worrying indicator. However, as already mentioned, being 'inactive' in this sense does not necessarily mean that these young people are just lying on their backs doing nothing. It is, on the contrary, quite likely that many of them are very active in 'wheeling and dealing' activities that are today considered illegal, as has been discussed above.

**Figure 3**  
**University Enrolments by Type of Study, 1956/57-1998/99**



The enrolment drop at universities is, however, a fact and the decline is particularly sharp in pedagogy (teacher preparation) but this is perhaps understandable since pedagogy actually accounted for almost half of all university enrolments at its peak at the end of the 1980s. This dramatic decline might have to do with a deliberate policy of the government to cut down teacher training. Thus, the training of *primary* school teachers<sup>13</sup> actually stopped altogether in 1997/98, although temporarily one might assume (ONE 2000:Table XV.8).

However, in spite of the decline in teacher training, the high pupil-teacher ratios have so far been maintained at both in primary and secondary schools. As a matter of fact, the Cuban pupil-teacher ratios were still in 1995 among the lowest in the world, equalling countries like Denmark and Sweden, and lower than countries like Canada and the United States (UNESCO 1998: table 7).

Pupil teacher ratios are one measure of the quality of education. But it is far from the only indicator. As a result of the crisis the situation for teachers has become critical. They are facing problems 'in terms of low morale, shortages of materials and the inability of the state wage to cover the escalating costs of household survival' (Pearson 1997: p. 695). It is quite evident that the difficult situation of the teachers, and the lack of incentives, affect the morale of the teachers and might hence jeopardize the quality of the education.

**Table 9. University Enrolments by Area of Study, 1956/57, 1969/70, 1979/80, 1989/90 and 1998/99**

	1956/57		1969/70		1979/80		1989/90		1998/99	
		%		%		%		%		%
Engineering	1668	10.7	8103	23.5	31013	31.0	34867	14.3	13020	12.7
Natural Sciences	1176	7.5	3420	9.9	6464	4.4	6399	2.6	4087	4.0
Medicine	328	2.1	7977	23.1	13052	8.8	37306	15.3	24341	23.7
Agriculture	571	3.7	5324	15.4	12036	8.1	10254	4.2	4680	4.6
Economics	4546	29.1	1328	3.8	13253	9.0	15773	6.5	7399	7.2
Social Sciences	3597	23.0	2199	6.4	10216	6.9	7958	3.3	5781	5.6
Pedagogy	3723	23.9	6159	17.8	57389	38.8	115529	47.5	35068	34.2
Phys. Education	-	-	-	-	3827	2.6	14052	5.8	7464	7.3
Art	-	-	-	-	627	0.4	909	0.4	758	0.7
TOTAL	15609	100.0	34520	100.0	147877	100.0	243057	100.0	102598	100.0

Sources: Same as table 8

<sup>13</sup> The training of primary school teachers does not take place at the university level.

## 8. An Estimate of Human Capital Stock in Cuba

In this section of the paper an attempt is made to estimate the stock of human capital in Cuba and its development over time. Comparisons with some OECD countries and some developing countries are also made. The most commonly used measure of a country's endowment with human capital is educational attainment (see e.g. OECD 1998). Educational attainment in turn is as a rule measured in two ways. The most straightforward one is in terms of the percentage of the population that has completed various levels of education, from primary to secondary to tertiary. The population is usually the working age population (or adult population) or the labour force population. Another common measure is to estimate the average years of schooling of the population.

An advantage of this measure is that it gives an estimate of the stock of human capital in a specific country at a specific point in time. It should, however, be emphasised that this measure is just a proxy and it is slightly biased since it unrealistically assumes that one additional year of educational adds one homogeneous unit of human capital to the stock, irrespective if this additional year comes from a primary school child or from a university student. But even so, the measure gives a reasonably good picture of the human capital endowment of a country.

Table 10 shows estimates of the educational attainment levels of the Cuban labour force<sup>14</sup> by sex, in 1978, 1986 and 1997. Several interesting observations can be made. The number of people with university degree has grown from 3.9% of the labour force in 1978 to 13.7% in 1998, 20 years later, which is quite an achievement. The number of people having completed at least upper secondary schools (includes vocational schools and preparatory education for university) has also increased fast in Cuba. By 1998 no less than 83% of the working population had completed at least lower secondary education. In the case of women the percentage was as high as 89%. The women are also ahead if we consider those having finished at least upper secondary education and those with university degree. The Cuban educational attainment levels are higher than those in other Latin American countries, and are no doubt among the highest in the Third World (World Bank 2000).

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<sup>14</sup> The data are estimates by the author based on official data on educational attainment of the *occupied civilian labour force* (that is, including the non-state civilian sector) for 1998, while the 1978 and 1986 figures only refer to the occupied *state* labour force.

**Table 10. Educational Attainment of the Cuban Labour Force\*, by Sex and Level of Education, 1978, 1986 and 1998**

	<i>TOTAL (000)</i>	<i>With university education</i>	<i>With at least upper secondary</i>	<i>With at least lower secondary</i>
<i>1978</i>				
<i>Total</i>	2 540.8	3.9%	20.2%	46.4%
<i>Male</i>	1 778.7	3.5%	16.8%	40.8%
<i>Female</i>	762.1	4.9%	27.9%	58.1%
<i>1986</i>				
<i>Total</i>	3 317.6	8.9%	38.7%	76.5%
<i>Male</i>	2 056.4	7.4%	34.1%	73.5%
<i>Female</i>	1 261.2	11.5%	46.3%	81.5%
<i>1998</i>				
<i>Total</i>	3 753.6	13.7%	52.7%	82.8%
<i>Male</i>	2 354.8	11.2%	45.4%	79.2%
<i>Female</i>	1 398.8	17.9%	65.0%	88.8%

\* Occupied civilian labour force; 1978 and 1986 data refer to the state sector only

Sources: Elaborated by the author from data in CEE (1990); ONE (1998)

We now turn to the estimate of human capital formation (Table 11)<sup>15</sup>. It should be stressed that these estimates for Cuba only relate to the labour force. There are no figures of educational attainment for the whole population for recent years. It is clear, however, that the educational attainment levels for those in the labour force are somewhat higher than for those who are outside the labour force.<sup>16</sup> The human capital stock has increased at an impressive rate in Cuba after the Revolution, and especially between 1978 and 1986, when it increased at a rate of 4.6% per annum. In the case of women, the increase was even more impressive, an annual rate of growth of 7.4%, compared to 3.1% for men. After 1986 there has, however, been a slowdown. In the period 1986 to 1998 the growth rate declined to 1.3% for men and to only 1.0% for women.

But even so, the rate of growth of human capital formation is impressive in Cuba, also when compared to a 'tiger economy' like Taiwan. While the labour force in Taiwan increased at a rate of 2.8% per year between 1980 and 1986, it is estimated<sup>17</sup> that the human capital stock of

<sup>15</sup> The human capital stock is estimated by multiplying the labour force with the average years of schooling. The average years of schooling is arrived at by assigning a number (year of schooling) to each level of education: 6 to primary education; 9 to lower secondary, 12 to upper secondary; and 16 to university education.

<sup>16</sup> There appears to be only one source in Cuba that gives educational attainment levels for both the adult population and the occupied labour force, and that is a demographic survey from 1979, quoted in Brundenius (1984: Table A1.7). These data reveal the following differences: *total adult population* (above 14): with university education or equivalent, 3.3%; with upper secondary education or more: 18.7%; and with lower secondary education or more, 41.4%; *occupied labour force*: with university education, 4.5%; with upper secondary education or more, 21.6%; and with lower secondary education or more, 48.4%.

<sup>17</sup> Calculated by the author, using the same methodology as above (see note 15), from data in Statistical Yearbook of the Republic of China, 1996 (Executive Yuan 1996: Table 28).

the labour force increased by 5.0% annually in the same period. These growth estimates are quite similar to the Cuban ones in approximately the same period. Between 1986 and 1995 the growth of the labour force in Taiwan slowed down to 1.8% per annum, and the growth of human capital formation to 3.5%. In other words, there was, like in the Cuban case in the same period, a clear trend of declining growth rates, but the drop was not as sharp in Taiwan as in the Cuban case. Taken over the whole period, 1980-95, the rate of growth of the labour force and of the human capital stock in Taiwan, were 2.2% and 4.1%, respectively. The corresponding growth rates in Cuba, 1978-98, were 1.2 and 2.6%, respectively.

**Table 11. Estimate of Human Capital Stock and Growth Rates in Cuba, 1978, 1986 and 1998**

	<i>Total</i>	<i>Men</i>	<i>Women</i>
<i>1978</i>			
Aver. Years Schooling	8.1	7.9	8.8
Labour Force	2934	2054	880
Human Capital Stock	23.8	16.2	7.7
<i>1986</i>			
Aver. Years Schooling	9.8	9.5	10.3
Labour Force	3493	2166	1327
Human Capital Stock	34.2	20.6	13.7
<i>1998</i>			
Aver. Years Schooling	10.6	10.2	11.3
Labour Force	3754	2355	1399
Human Capital Stock	39.7	24.0	15.5
<i>Growth Rates</i>			
<i>1978-86</i>			
Labour Force	2.2	0.7	5.2
Human Capital Stock	4.6	3.1	7.4
<i>1986-98</i>			
Labour Force	0.6	0.7	0.4
Human Capital Stock	1.2	1.3	1.0
<i>1978-98</i>			
Labour Force	1.2	0.7	2.4
Human Capital Stock	2.6	2.0	3.6

\*million years of schooling

Sources: same as Table 10

## 9. Is there a Brain Drain Problem in Cuba?

Brain drain is a serious problem for many developing countries that invest heavily in education, and one would suspect that this would also be a major threat in the Cuban case. It is well known that hundreds of thousands of Cubans have left the island since the Revolution, especially for the United States, but this has also been the case of Mexicans, Salvadorians, Haitians and Puerto Ricans. So in this case Cuba is far from unique.

The question is, however, whether those who have left Cuba, especially in the last decade, can be considered part of a brain drain or not. Is the share of highly educated people over-represented in the migrating population? Perhaps surprisingly, this does not seem to be the case. According to the latest United States Survey of the Foreign Born Population (U.S. Census Bureau 1997), there was a total of 991 000 residents of Cuban origin in the United States in 1996. Of these 772 000 were born in Cuba. 105 000 of these had arrived to the United States after 1990.<sup>18</sup> A closer look at the characteristics of those latter shows that 73% were of working age (18-64), of which 8.0% had university degree and 17.0% had completed senior high school. That is, only 25% of those arriving in the United States after 1990 had attained upper secondary level or more. This should be compared with the corresponding attainment levels of the Cuban labour force shown in 1998 (cf. Table 10) that are considerably higher (13.7% having university degree and 53% having at least upper secondary level).

In other words, it was not primarily the highly qualified people who were leaving the island in the nineties. It is difficult to speculate about the reasons why this is so. One reason could be that it has been more difficult for university trained people to emigrate. In any case external brain drain does not seem to pose a big problem, relatively speaking. A rough estimate shows that out of a total stock of approximately 500 000 university graduates in Cuba at the beginning of the nineties, less than 10 thousand emigrated during the following six years, that is, the total stock was reduced by less than 2% due to brain drain. However, if one considers the decline in university enrolments the situation might rapidly worsen in the future. Between 1991/92 and 1997/98 the number of students who graduated from Cuban universities fell from 38 000 to 19 000, or by half (ONE 2000: Table XV.10). If an average of 2 000 Cubans with university degree leave the country yearly, then this will no doubt imply a brain drain in the coming years. That is, if the trend is not reversed, both with respect to migration and enrolments.

But if external brain drain does not seem to be an immediate problem, there is another brain drain that is already a serious problem, the internal brain drain. There is a great number of

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<sup>18</sup> According to Cuban sources (ONE 2000), 120 103 Cubans emigrated between 1990 and 1996 which would mean that about 15 000 emigrated to other destinations than the United States, a reasonable assumption.

Cubans, especially young people, who work in professions other than those they were trained for. In Cuba there are highly educated people (even medical doctors, researchers and other professionals) who either ‘moonlight’ (for instance as taxi drivers), or entirely leave their original employment to dedicate themselves to other types of better-remunerated ‘services’ (often related to the booming tourism industry). This will, if the trend continues, amount to a huge waste of misallocated resources.

## 10. Has Cuba Overinvested in Human Capital?

Has Cuba overinvested in human capital in the past? It is quite clear that Cuba has, in relation to GDP per capita, a much higher density of highly qualified labour than the world average (see Table 12). Cuba had at the end of the 1990s an educational attainment level of its labour force that almost equalled many OECD countries, and was equal or higher than in ‘emerging’ economies like Taiwan and Chile, countries with considerably higher GDP per capita (measured in US\$PPP). But this does not necessarily mean that Cuba has overinvested in human capital formation, and for two major reasons.

First of all, even if it is true, as shown in this article, that large parts of the disposable educated labour force actually has not been utilised efficiently lately in Cuba, slow population growth, coupled with the ageing of the Cuban population, means that there is likely to be a *shortage* of highly qualified labour in the near future. Between 1996 and 2000 the working age population (WAP) has actually *declined* (from 6 642 000 to 6 618 000), and is expected to grow by only 0.4% per annum until 2005, and then continue at the same rate for at least another five years (CEDEM 1995: Table VI.1). This means that a large number of highly educated Cubans will leave the labour force in the coming ten years, and this will put pressure on universities and also for a more efficient utilisation of the labour force. The only short-term solution to increase the working age population in the coming years would be to increase the retirement age to 65 for both men and women (from today 55 for women and 60 for men). To retire at the age of 65 is quite common in many countries (for instance in most OECD countries), but it might be too drastic a change with financial implications in Cuba, and it might not be so popular either among Cubans about to retire.

Second, Revolutionary Cuba has traditionally been ‘internationalist’, in the sense that thousands of skilled young Cubans have volunteered to go to poor areas of the world, assisting with rescue teams in national disasters (like the earthquakes in Peru and Nicaragua, the hurricanes Georges and Mitch in Central America and the recent landslides in Venezuela), or assisting in social development work. Between 1963 and 1999 not less than 41 400 physicians, nurses and other medical personnel, 32 400 teachers, 45 400 construction workers and 19 600 other qualified workers, that is, altogether 138 800 Cubans, have given assistance in other developing countries (Figueras 2000). The number of physicians and nurses sent out

by Cuba surpasses by a wide margin the number sent out by the WHO in the same period. It should be stressed that this assistance has been free of charge, to be seen as an act of solidarity by Cuba (Figueras 2000). At the same time Cuba has been very generous in offering scholarships (especially to young people in Africa) for higher studies in Cuba. Between 1961 and 1999, 15 496 foreign students graduated from Cuban universities, of which 10 888 from Africa alone (Figueras 2000). Especially medicine studies have a high reputation in Cuba, and in 1999 it was decided to set up a Latin American School of Medicine (Escuela Latinoamericana de Ciencias Médicas)<sup>19</sup>.

**Table 12. International Comparison of Educational Attainment and GDP per capita Around 1995-98**

	<i>Highest Completed Level of Education</i>		<i>Average Number of Years of Schooling of Labour Force</i>	<i>GDP per capita (US\$PPP) 1998</i>
	<i>With Upper Secondary Education or more</i>	<i>With University Education or Equivalent</i>		
United States*	86%	33%	13.5	29 605
Denmark*	62%	20%	12.4	24 214
Sweden*	75%	28%	12.1	20 659
United Kingdom*	76%	21%	12.1	20 336
Russia** (1997)	53%	20%	11.9	6 460
Cuba*** (1998)	53%	14%	10.6	3 967
Taiwan** (1995)	54%	9%	9.9	15 752
Chile**** (1992)	43%	18%	9.3	8 787
China** (1997)	16%	3.5%	7.5	3 105
Brazil** (1997)	n.a.	n.a.	6.0	6 625

\* Data refer to population aged 25-64 in 1995

\*\* Data refer to occupied labour force

\*\*\* Data refer to occupied civilian labour force

\*\*\*\* Data refer to economically active population

Sources: OECD countries: OECD 1998 (Table A 2.1); Russia: Goskomstat 1998 (Table 7.15); Cuba: ONE 2000 (Table V.10); Taiwan: Executive Yuan (1996: Table 28); Chile: INE 1992 (Table 9); China: SSB 1998 (Table 5-31); Brazil: IBGE 1999 (p. 76); GDP figures are taken from UNDP (2000: Appendix Table 1) except the figure for Taiwan which is updated from Maddison (1995: Table D-1e)

Far from drawing the conclusion that Cuba has overinvested in human capital, it is on the contrary suggested that Cuba make better use of this 'comparative advantage'. Cuba could

<sup>19</sup> 1 800 students from 15 countries in Latin America started a two year course in September 1999, at newly constructed premises in Baracoa (outside Havana). After the initial two years the students will be allocated to other medical faculties all over Cuba, according to speciality. The Cuban government offers scholarships, covering tuition fee, board and lodging to all the students. The participating Latin American governments only take care of the travel fares of their respective students (CEPAL 2000: p. 283).

easily develop regional centres for the training of young people, considering its large stock of teaching staff and educational institutions. The creation of centres like the regional medical school mentioned is a case in point.

## 11. Concluding Remarks

No doubt Cuban economic growth must speed up in the coming years, or else Cuba risks to linger behind other countries in Latin America in the future. Industrial upgrading is a must and the only way of doing this is through linking up to global and regional networks. In order to do this the investment rate must radically increase. Cuba has a great comparative advantage in having a highly qualified labour force. But, as has been shown in this paper, this human capital can rapidly be eroded, and Cuba could fast be facing an insoluble dilemma: continuing low productivity growth, persistent low investment rates and with zero growth in human capital formation leading, to zero or slow economic growth. Zero growth of human capital formation could occur for two reasons: the low population growth and the ageing of the Cuban population coupled with stagnation, or even further decline, of enrolment rates at the university level.

However, the situation could be redressed in two ways: First, by giving incentives for young people to continue with higher studies (that is that they can be assured of meaningful employment after graduation); second, that those 'inactive' with high skills are mobilized and given incentives and thus motivated to come back to the labour force, or rather to (re)integrate into the formal labour force. In this context there should also open up opportunities for young graduates to set up their own businesses if they so want, not only as tolerated 'fence breaking'<sup>20</sup>, but with pro-active government support, eliminating disincentives, and instead creating incentives like credit institutions and legal frameworks with clear 'rules of the game'. Finally, it is of utmost importance that the teaching base in Cuba remains intact, that it not become eroded, but instead that it be expanded, in order to ensure the maintenance of the quality of education. This can only be accomplished if teachers are motivated and feel committed in their jobs.

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<sup>20</sup> This is an expression that originally comes from the private sector development experience in China and Vietnam, where the governments have been forced to tolerate (and finally accept) 'faits accomplis'.

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## Appendix

**Table 1. Working Age Population and Inactive Population, 1962, 1970, 1981 and 1989-98 (thousand)**

	Working Age Population	Inactive Population	Inactive as % of WAP
1998	6621	1453	21.9
1997	6648	1543	23.2
1996	6651	1669	25.1
1995	6642	1618	24.4
1994	6646	1616	24.3
1993	6645	1421	21.4
1992	6549	1204	18.4
1991	6490	934	14.4
1990	6399	779	12.2
1989	6281	655	10.4
1988	6140	605	9.9
1981	5140	815	15.9
1970	4180	1360	32.5
1962	3757	1265	33.7

*Source:* Elaborated by the author from data in JCP (1975), CEE (1982), CEE (1986), CEE (1990), ONE (1998), ONE (1999:1) ONE (1999:2), and ONE (2000)