THE DESCENT OF CUBA

John Devereux[1]

This year Cuba celebrates the sixtieth anniversary of the Cuban Revolution. To mark the occasion, I provide new estimates of Cuban income per capita from 1959 onwards.[2] My goal is to place the revolutionary economy in broad comparative perspective.[3] The picture which emerges is a depressing one, as Cuba has declined relative to other countries. A century ago, Cuba was a middle-income economy with an income per capita that was eighty percent of Western Europe. The Great Depression set in motion Cuba's long relative decline. By 1959, Cuba had slipped relative to Europe, but it remained a middle-income economy with living standards above Spain and close to Italy.

After the revolution, GDP per capita falls below pre-revolutionary levels for most of the 1960s. The closer alliance with the Soviet Union after 1970 brought massive aid. Even so, GDP per capita was just 25% higher in the peak year of 1985 as compared to 1957. The collapse of the Soviet Union wiped out the income gains of the 1970s and 1980s and the resulting drop in Cuban income reduced GDP per capita to below its 1957 levels bringing Cubans close to starvation. Cuba's recovery from the Soviet collapse is slow compared to Eastern Europe and gathers pace only with Venezuelan aid after 2002.

Overall, income per capita for 2017 is 40% above 1957. This is one of the slowest growth rates in the world economy over the period. Output per worker is at 1957 levels as the rise in labor force participation means that output per worker grew more slowly than income per capita. Even the small income gains are now in peril with the Venezuelan crisis.

To summarize, a century ago Cubans enjoyed, by the standards of the time, advanced living standards. Since then, Cuba has fallen in the world income distribution. By the late 1950s, income per capita was 50% of Western Europe. As best we can tell, income per capita for recent years is about twenty percent of Western Europe. Part of the Cuban problem is that it depends on foreign aid. The reliance on the kindness of allies has left Cuba acutely vulnerable to "sudden stops," which occurred after the fall of the Soviet Union and, more recently, the Venezuelan crisis. While the descent of Cuba begins in the 1920s, the revolution did nothing to slow or reverse Cuban decline, rather it accelerated it.

BEFORE THE REVOLUTION

Our story begins in the mid 1920s. By then, Cuba had overcome the collapse of sugar prices and the devastating bank failures of the early 1920s. Hopes were high that Cuba would resume its march towards Western European affluence, see Speck (2005). To

1. I thank my discussant Luis Locay and the members of ASCE for helpful comments. I am especially grateful to Jorge Sanguinnetty for sharing his knowledge of Cuba and to Jorge Pérez-López for supplying most of the data on which this paper is based.

2. This paper presents preliminary results derived from a longer paper (Devereux (2019)) which provides technical details.

3. A balanced picture of revolutionary Cuba requires broader measures of development covering education, income, health as well as economic and political freedoms. I do not consider broad measures in this paper.

show Cuba's relatively advanced position in the 1920s, the second column of Table 1 compares purchasing power parity-adjusted 1925 Cuban GDP per capita to the U.S., the Southern Cone and to four middle-income European countries—Spain, Italy, Finland and Ireland. The 1925 estimates are projections from a 1955 base year comparison described later and are in 1955 prices.

Table 1. Cuban Income Per Capita in Comparative Perspective (Western Europe = 100)

	1925	1955	2011
Finland	47	67	95
Ireland	69	67	95
Italy	55	55	86
Spain	53	42	90
Cuba	79	52	19
Argentina	70	59	47
Chile	53	44	54
Uruguay	52	65	47
U.S.	166	191	132

Note: *1925*. The estimates are projections from the 1955 comparisons described below using GDP per capita from the latest edition of the Maddison Project. *1955*. The 1955 comparisons for Cuba are from Ward and Devereux (2012) and comparisons for other countries are from Devereux (2019). The 1955 comparisons are Fisher Ideal Indices with a US base. *2011*. All estimates are from the International Comparison Program (ICP) except for GDP per capita for Cuba which is from the UN Human Development Report. The 2011 ICP comparisons are a multilateral generalization of the Fisher Ideal Index called the Elteto Koves and Szulc (EKS) index. I use GDP for all countries except for Ireland and Cuba, where I use GNI for 2011. I also assume that Argentina equals Uruguay for 2011.

I measure income per capita relative to a population weighted average of the UK, Germany and France, which I term Western Europe. Western Europe is the more apt comparison given the large income lead enjoyed by the U.S. over all economies.

The 1920s are the high-water mark for Cuba. Indeed, the 1925 comparisons show Cuban GDP per capita at 80% of Western Europe. Cuba is above Spain and Italy with a small lead over Ireland. For this year, Cuba is richer than the Southern Cone.

To show what happened after 1925, Figure 1 tracks GDP per capita from 1925 to 1958 using the Cuban GDP series from Ward and Devereux (2012). For convenience, I set 1925 equal to one hundred.[4]

Cuba is devastated by the Great Depression. By 1933, GDP per capita is down to 62% of 1929, with the collapse in the world sugar market and increased U.S. protectionism.[5] Figure 1 shows that the Cuban recovery after the Great Depression is glacially slow. Indeed, it is not until 1949 that Cuba permanently regains its 1929 GDP per capita. Growth begins again in the 1950s and income per capita grows by 14% to 1958.[6]

Slow growth after 1925 lowers relative Cuban income per capita. This is clear from the second column in Table 1 which gives relative income per capita for 1955. The estimates are Fisher Ideal Indices. Cuba has slipped relative to 1925 and is down to 50% of Western Europe. Income per capita is below Finland and Ireland in Europe and it is below Argentina and Uruguay in the Southern Cone. In contrast, income per capita is above Spain and it equals Italy, so Cuba remains a middle-income economy—barely.

THE REVOLUTION AND AFTER

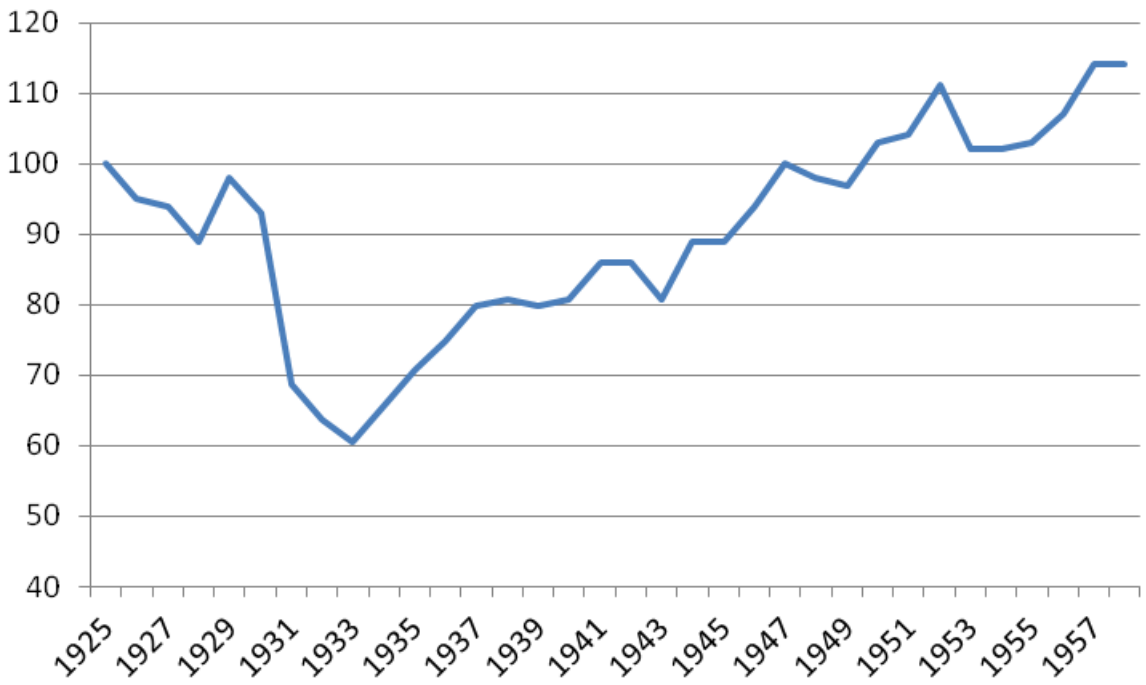
Fidel Castro assumed control in 1959 of a middle-income market economy with efficient manufacturing, retail/wholesale and transportation sectors, see U.S. Department of Commerce (1956). Though sugar was highly regulated, Cuba had preferential access to the U.S. market and a long tradition of excellence, see Dye (1998). Over the next decade, the economy

4. Ward and Devereux (2012) construct GDP drawing on the Pérez-López (1977) industrial production index which begins in 1930. Their estimates for 1925 to 1929 rest on sectoral indices with lower coverage than Pérez-López.

5. Dye and Sicotte (2004) outline the effects of U.S. sugar policies during the Great Depression on the Cuban economy.

6. One strand of the literature sees 1950s Cuba as stagnant—socially and economically. On the one hand, Thomas (1998) provides such an account, see also Pérez (1988). To be sure, Cuba depended on sugar and GDP growth was slow during the 1950s. On the other hand, the evidence suggests considerable investment in infrastructure and by the end of the decade Cuba possessed a large and reasonably diversified manufacturing sector.

Figure 1. GDP per capita 1925–1958 (1925 = 100)



Source: Ward and Devereux (2012).

morphed into a command economy. The process ends in 1968 with the "revolutionary offensive." By then private enterprise had ceased outside some small producers in agriculture. Relations with the Soviet Union improved in the 1970s and the resulting increase in Soviet aid leads to a rise in living standards. Cuban prosperity lasts to 1990 when the demise of Soviet communism ends Soviet aid and the Cuban economy implodes during the "special period."

I divide the revolutionary economy into two periods: 1959 to 1989, the heyday of the planned economy, and 1990 to date which covers the fall and gradual rise of Cuba after the Soviet collapse.

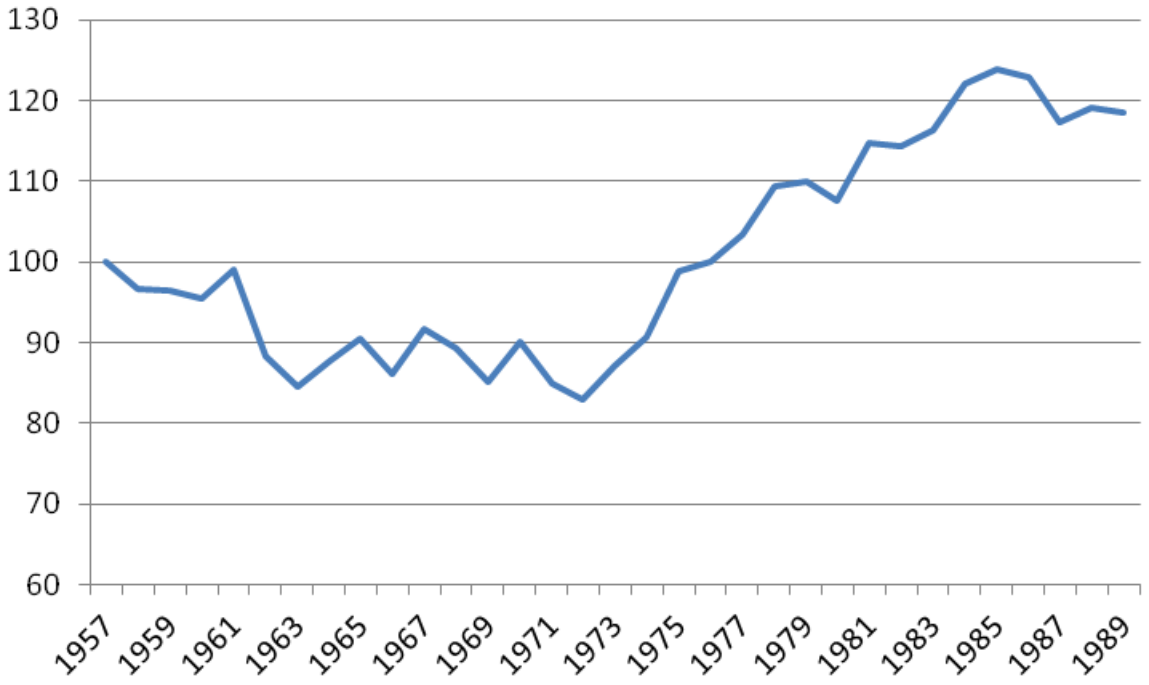
The Planned Economy: 1960–1989

The official Cuban national accounts along western lines start with 1985. For earlier years, Cuba used the Soviet Bloc MPS (Material Product System), which is deficient in many respects. To fill the gap, I construct a new GDP series from 1957 to 1985. Throughout, I use the output side GDP measure developed by Nutter (1962), Moorsteen and Powell (1966) and Kaplan (1969) for the Soviet Union. In brief, I construct sectoral output indices and I then aggregate to form GDP. I build a 1957 benchmark using information from formerly classified CIA reports, (CIA 1968, 1970, 1972) released after the Cold War. Next, I construct sectoral indices using data on physical quantities. For 1957 to 1965, I take the quantity data from the CIA reports and Brundenius (1984). For 1965 to 1982, I rely on the painstaking work of Pérez-López (1987). For 1982 to 1985, I use CIA sources along with Locay and Roberts (2012).

Figure 2 provides my series for GDP per capita from 1957 to 1989.[7] The estimates are in 1957 prices.

7. Bergson (1961) remains the classic discussion of national income measures for a planned economy while Sanguinnetty (2019) provides some cautionary notes for Cuba. As Sanguinnetty points out, rationing has existed for the lifetime of the revolution which was not the case for the Soviet Union and Eastern Europe. Moreover, Cuban rationing is particularly stringent and often consumers did not have access to even the rationed quantities.

Figure 2. GDP per capita, 1957–1989 (1957 = 100)



Source: See Devereux (2019) for sources and methods.

Cuban GDP per capita holds up for the first two years of the revolution.[8] It drops in 1961 with the U.S. trade embargo, collectivization, the exodus of managers and skilled workers, and the general chaos associated with Cuba's move to a planned economy. By 1963, GDP per capita is 15% below 1957 despite the large receipts of Soviet aid documented in the next section. GDP declines again in 1971 with the failure of the ten-million-ton sugar harvest. But Cuba recovers with the massive Soviet aid of the 1970s and the move to orthodox Soviet style planning. By 1985, GDP per capita is 25% above 1957. The economy slows again with the policy upheavals of the "rectification" campaign.[9] Overall, growth from 1959 to 1990 is disappointing. Income per capita is below 1957 for most of the 1960s. To be sure, the economy grows in the 1970s and the early 1980s but this required massive Soviet aid as outlined later.[10]

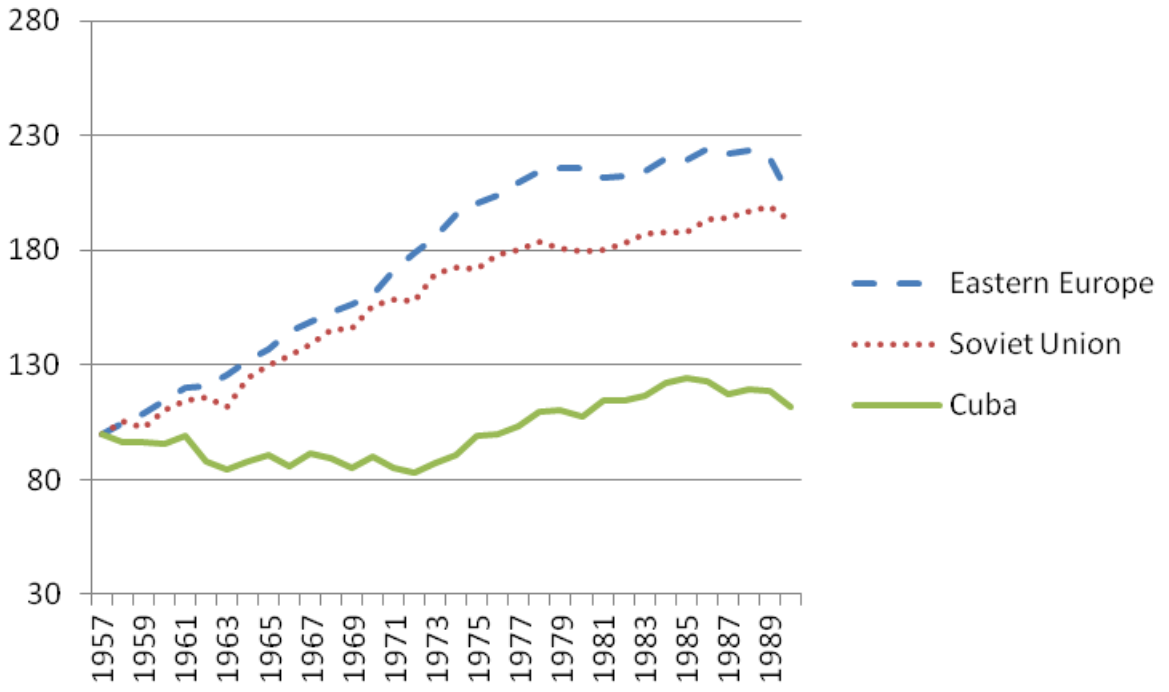
How does Cuban performance during these years compare to other planned economies? The natural comparison is with members of COMECON, which Cuba joined in 1972. As it turns out, Cuba is an outlier—its growth rates are well below Eastern Europe and the Soviet Union. To show this, Figure 3 tracks GDP per capita from 1957 to 1989 for Cuba, the Soviet Union, and Eastern Europe. I take Soviet

8. Sanguinnetty (2019) discusses how Ernesto "Che" Guevara, then head of the Cuban Central Bank, discontinued national income estimates after they showed income in 1959 grew by only one percent.

9. My GDP estimates show much slower growth than Brundenius (1984) and Zimbalest and Brundunius (1991). They are closer to Pérez-López (1987) except for services where I use a different methodology. Devereux (2019) reconciles the GDP series in Figure 2 with previous work.

10. Labor force participation increased between 1957 and 1985 as population growth slowed and women entered the labor force in great numbers, so output per worker growth is slower than income per capita. As it turns out, output per worker in 1985 is close to that for 1957, see Devereux (2019).

Figure 3. GDP per capita in Cuba, Eastern Europe and the Soviet Union, 1957 to 1990 (1957 = 100)



Source: Maddison (2007) provides GDP per capita for the Soviet Union and Eastern Europe. The estimates for Eastern Europe are population weighed indices derived from PPP adjusted income per capita.

and Eastern European GDP per capita from Maddison (2007).[11] The Eastern European measure aggregates GDP per capita for all planned economies in Europe except the Soviet Union. I set 1957 equal to one hundred.

Figure 3 shows that income per capita for the Soviet Union and Eastern Europe doubled from 1957 to 1990, although it is noticeable that growth slows near the end. Thus, Cuba greatly underperforms the Soviet Union and Eastern Europe. More generally, Cuba has the lowest growth rate of any planned economy over this period, including North Korea.

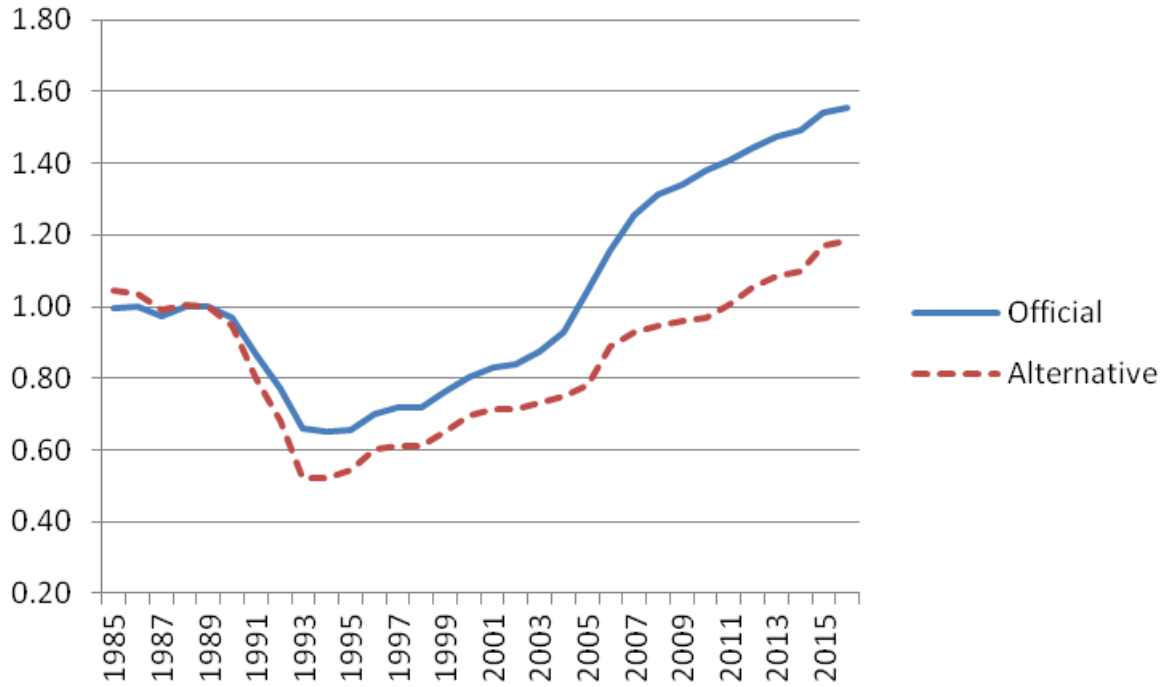
To summarize, the policy experiments of the first thirty years of Cuban planning did little to arrest the relative decline of Cuba. Worse follows. Soviet aid to Cuba ends, imports collapse, and the economy implodes during the "special period."

After the Fall

From 1985 onwards, Cuba provides GDP constructed, for the most part, along standard United Nations (U.N) methodological lines. The Cuban estimates depart, however, from the U.N. methodology in two respects. First, Cuba does not measure the output of government services such as education or healthcare at cost. Rather, it uses Cuban-determined prices reflecting "social valuation," see Pérez-López and Mesa Lago (2010) and Pérez-López (2019) on this point. Second, after 2000 Cuba exports doctors and other professionals to Venezuela and later Brazil in increasing numbers. The Cuban national accounts appear to count this activity as domestic production. For example, medical services produced in Venezuela by Cubans seem to be measured as part of domestic Cuban value added in healthcare, see Devereux (2019).

11. Maddison (2007) derives his Soviet estimates using research by CIA economists. His Eastern European estimates are from work by Thad Alton and associates at Columbia University. How reliable are these GDP series? While they should be used carefully, the consensus is that they provide a reasonably accurate picture of long run growth, see Maddison (1998) and Van Ark (1997).

Figure 4. Alternative GDP Indices, 1985 to 2017 (1989 = 100)



Source: UN national accounts database and authors' calculations. I use 1989 weights to measure official GDP per capita, which provides slightly different results from the Cuban national accounts.

Such revenues might better be measured as factor income from abroad or perhaps as a transfer as in the case of Venezuela discussed later.[12]

Figure 4 provides two series for Cuban GDP per capita from 1985 to 1989. The first is the standard series from the national accounts. The second modifies the national accounts to better approximate United Nations methodology for activities in sectors J-P of the U.N. International Standard Industrial Classification (ISIC), which cover personal services, education, healthcare and government current spending. I term the revised series "alternative GDP per capita."[13]

There are large differences between the GDP series. The official series show output per capita drops by 40% during the "special period," whereas the revised GDP series show it drops by 50%. In addition, the recovery is slower using the revised GDP per capita. Finally, the alternative index suggests slower growth, as Cuban income per capita for 2017 is 12% above 1985 whereas the official GDP per capita series is 55% percent higher.[14]

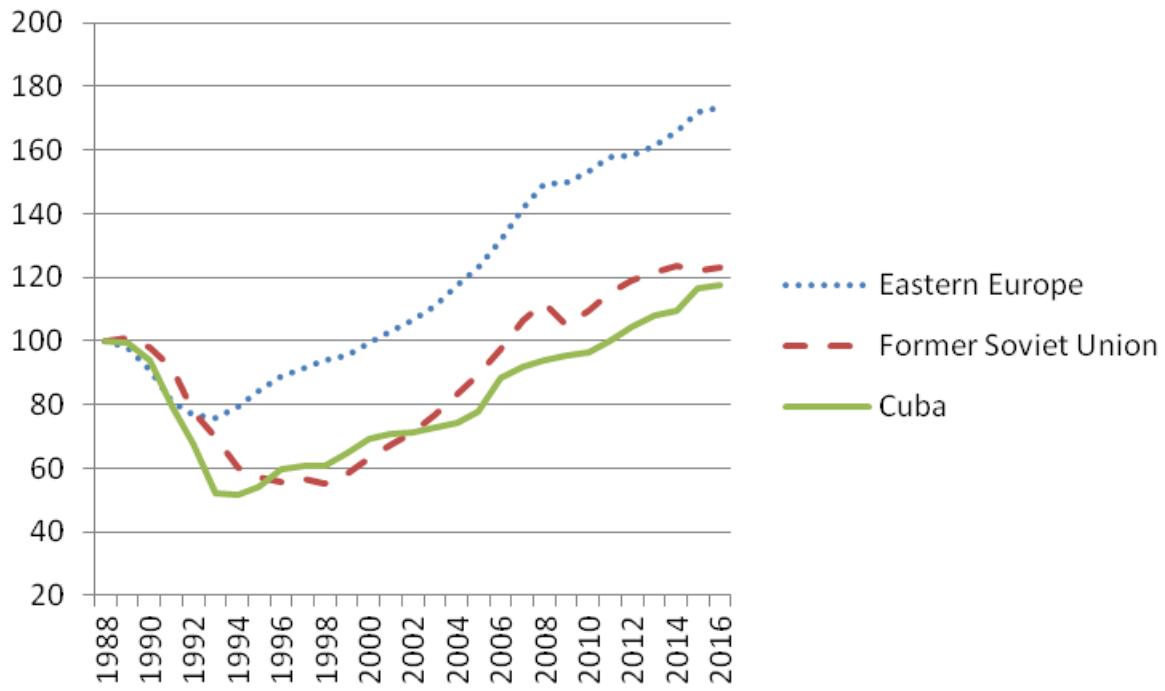
The Cuban experience after the fall of the Soviet Union and dissolution of the Eastern Bloc is not unique among planned economies. To show this, Figure 5 compares Cuban GDP per capita after the Soviet demise with aggregate GDP per capita for Eastern Europe as well as aggregate GDP per capita for the countries that once composed the Soviet Union. I form the aggregate GDP measures with

12. There are other issues with the Cuban National Accounts. Most notably, it is not clear how Cuba handles the issues of dual currencies.

13. The adjustments are described in Devereux (2019). If anything, the revised series likely overstates growth particularly for recent years.

14. Cuban living standards might be better measured by GNI for recent years as this includes the earnings of Cuban professionals abroad which accrue to the Cuban government. The data to determine GNI for Cuba do not appear to be available.

Figure 5. Comparing Cuba, the Soviet Union and Eastern Europe, 1989 to 2016 1989 = 100



Source: The Maddison Project; I use GDP in 1990 prices.

GDP for the constituent economies adjusted for purchasing power parity using data from the Maddison Project.

Cuba, the Soviet Union and Eastern Europe show large output drops with the end of Communism. Note that Cuba shows a larger fall in GDP per capita and a slower recovery than Eastern Europe. Thus, the Cuban experience is similar to that of the countries that once constituted the Soviet Union.[15] The results in Figure 5 reflect the fact that the economies of Eastern Europe moved towards market-based institutions after the crisis, whereas the successor states of the Soviet Union showed mixed policy responses.

To summarize the results so far, Cuba has grown at slow rates since the 1920s. The relative decline of Cuba is punctuated by two severe crises—the Great Depression and the fall of the Soviet Union—and two smaller crises associated with the move to planning in the early 1960s and the Venezuelan collapse.

The second characteristic of the revolutionary economy, to which I now turn, is that Cuba depends on foreign aid leading to calamitous "sudden stops" when aid ends.

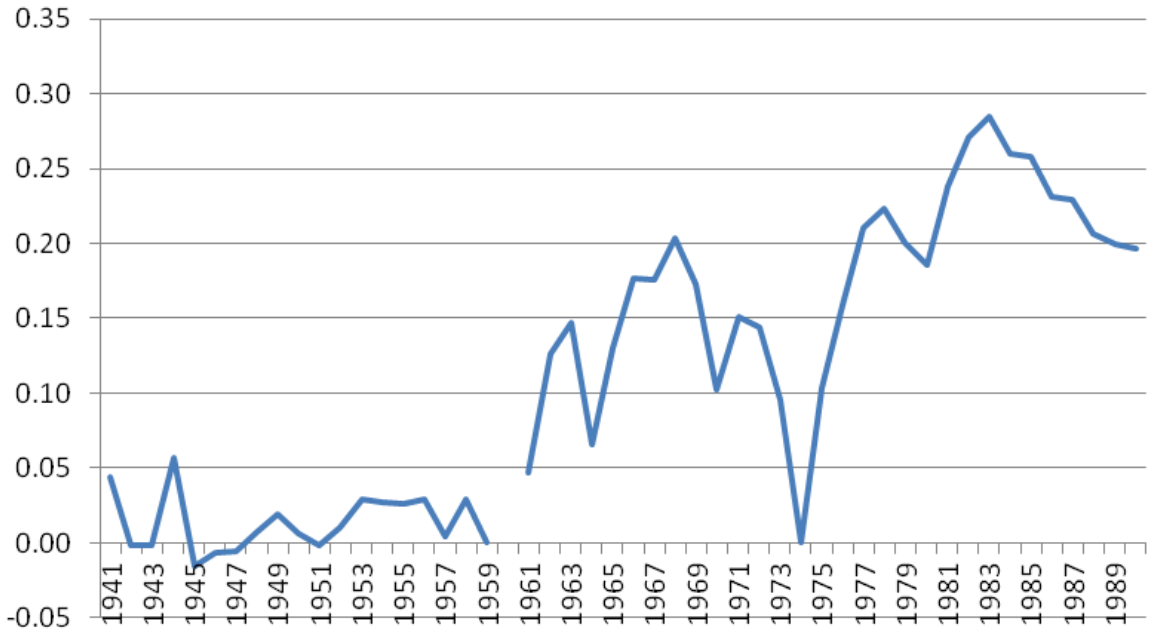
FOREIGN ASSISTANCE

Before the revolution, the U.S. sugar program transferred resources to Cuba by allowing Cuba sugar exporters to obtain U.S. prices that were above world levels. After the revolution, Cuba received aid from its communist allies. Soviet aid starts in 1961 and continues to the fall of the Soviet Union. Venezuelan aid begins in 2000 and tails off with the Venezuelan crisis.

To underline the quantitative importance of foreign assistance, Figure 6 looks at assistance as a share of real GDP for the Republican and the Soviet eras.

15. The results for former Soviet Union are driven by the Russian Federation where growth is similar to Cuba and by the Ukraine, where income per capita drops by 30% over the entire period. Other parts of the old Soviet Union, such as the Baltic Republics, have experienced robust growth.

Figure 6. U.S. and Soviet Assistance to Cuba as a Share of GDP, 1941 to 1990



Source: I calculate transfers from the U.S. sugar program using U.S. and world prices for Cuban sugar along with trade volumes from *A Study on Cuba* (1965) deflated by the import price index from Ward and Devereux (2012). For Soviet aid, I take the CIA estimates from formerly classified CIA handbooks (1968, 1970, 1972) and the CIA statistical reviews (1984, 1989) and CIA (1991). I deflate assistance by the Cuban import price index from Ward and Devereux (2012) and Devereux (2019). Real GDP is from Ward and Devereux (2012) and Devereux (2019).

The figure covers 1941 to 1990 covering transfers from the U.S. sugar program (1941–1959) and Soviet assistance (1961–1990).

I calculate sugar transfers from the U.S. as the difference between prices for Cuban sugar exports to the US and other Cuban sugar export prices (unit values) multiplied by Cuban sugar exports to the U.S., where I express transfers as a proportion of real Cuban GDP in 1953 prices.[16] The transfers to Cuba from the U.S. sugar program depend on the world price. They are negative if U.S. sugar prices for Cuban sugar were below world prices as is the case at the end of the Second World War. I deflate transfers by the Cuban import price index.

During the 1950s, sugar transfers average 2% to 3% of Cuban GDP in constant prices. The Cuban access to U.S. Sugar markets ends in 1960, as the U.S. terminates Cuba's participation in its sugar program and the Soviet Union assumes the burden of principal buyer of Cuban sugar.

I use CIA measures of Soviet assistance where I add assistance from other communist economies to the Soviet totals. The Soviets and other Eastern European economies bought Cuban sugar and nickel at prices above world levels. In addition, the Soviets provided direct aid, loans at subsidized rates and subsidized oil imports. To deflate aid, I use the import price in-

16. I use real GDP as nominal GDP is not available from 1959 to 1985. In addition, nominal income for the Republic appears to be understated in the official numbers, see Oshima (1961) and Ward and Devereux (2012).

dex and express transfers as share of GDP in 1957 prices.[17]

The results are startling. By 1962 Soviet assistance is close to ten percent of Cuban GDP. Assistance drops in the 1970's during the sugar boom when Cuban sugar prices for exports to the Eastern Bloc are below world prices. The level of assistance jumps again with the closer Soviet/Cuban alliance of the 1970's and total assistance increases to almost thirty percent of GDP during the early 1980's. By 1990, assistance is back to twenty percent of GDP. The Soviet aid ends unexpectedly with the demise of Soviet communism leading to the "special period" discussed earlier.[18]

It took Cuba a decade to find a replacement for the Soviet Union. In the early 2000s, Cuba enters into agreements with Venezuela where Cuba supplies doctors and other professionals including teachers and security personnel and, in return, receives oil, concessionary loans and perhaps some direct transfers. Assistance picks up after 2002 and declines with the Venezuelan crisis of recent years. To date, there is not enough information to quantify Venezuelan aid. For example, we do not know how many Cuban professionals are in Venezuela or how much the Cuban government is paid for them. Luis (2019a) puts the numbers of Cuban professionals in Venezuela at between 30,000 and 40,000 for 2012 to 2018 which is the figure most widely used.

One way to quantify Venezuelan assistance is to assume that it is part of a barter agreement where Cuba receives oil at zero cost from Venezuela. Luis (2019a) and Hernández-Catá (2019) provide estimates along these lines. Total oil receipts were worth about one billion dollars in 2003, rising to 5 to 6 billion dollars between 2010 and 2014 and tailing off in 2017 with the drop in world oil prices and reduced oil shipments from Venezuela. This estimate understates assistance as it ignores other forms of Venezuelan aid.[19] A further complication, pointed out by Luis (2019b), is the Venezuelans do not seem to have paid the agreed amounts for Cuban professionals in recent years.[20]

Using the oil estimates implies Venezuelan assistance goes from 3% of nominal GDP in 2003 to 8% at the peak in 2010/2011 though, as seen earlier, Cuban nominal GDP is likely overstated.

An alternative way to grasp the importance of Venezuelan largesse is by looking at Cuba's imports per capita in constant prices. This is given by Figure 7 where real imports per capita are calculated from the Cuban national accounts.[21]

In 1985, Cuban imports per capita are $1,100 in 2017 prices. The end of Soviet aid slashes imports per capita to $300 in 1993. As Cuba imported a large portion of its food, and most of its intermediate inputs including energy, the Cuban economy collapsed, and Cubans came close to starvation. The first round of reforms enacted during the special period brought increased tourism, remittances and some foreign investment, allowing imports to recover to

17. The CIA calculations add transfers from Cuban exports at prices above world prices and imports below world prices to direct aid and loans at concessionary rates. Their totals are not equal to transfers because the CIA does not estimate the concessionary portion of the loans, though most of the loans were never repaid. Rather, they show the flow of resources to Cuba from the Eastern Bloc. The aid was largely tied in that Cuba had to import from the Soviet Union, where many items—most notably capital goods—were higher in price and lower in quality as compared to western sources. Ideally, this should be reflected in the import price index which is, however, unlikely in practice. The issues surrounding Soviet aid were debated in heated controversies during the 1970s and 1980s see Pérez-López (1988) and Zimbalist (1983) for differing views. It should also be noted that this literature tended to ignore assistance from other Eastern Bloc countries which throughout the 1970s and 1980's was 10% to 15% of Soviet aid. The literature also ignored military aid which presumably freed up resources Cuba would otherwise have spent. Military aid averaged about 10% of economic aid. The scale and importance of Soviet aid to Cuba is no longer in doubt given what happened to the Cuba economy after Soviet aid dried up.

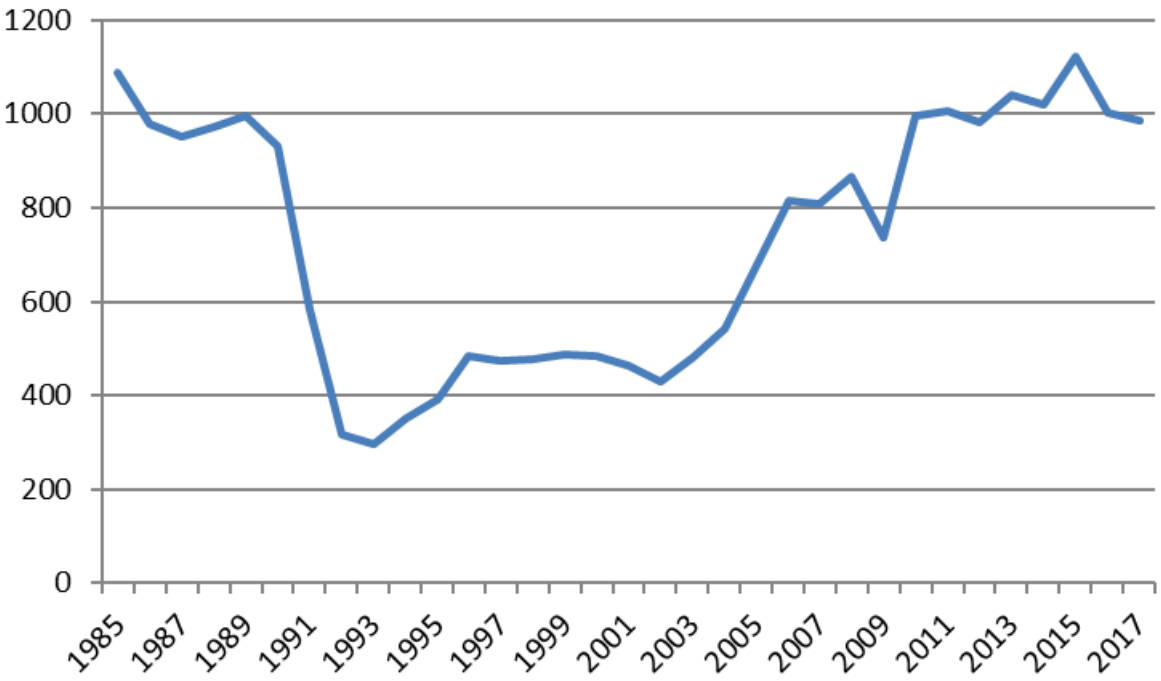
18. The CIA (1991) predicted that the end of Soviet aid would reduce GDP per capita by at least one third. They were correct.

19. Romero (2010) estimates aid for 2008 at $10 billion which is perhaps too large.

20. Also, what I term assistance overstates transfers as it assumes Cuban doctors and other professionals receive no market returns.

21. Nominal imports from the national accounts appear to be accurate. After the fall of the Soviet Union, Cuba shifted imports from the Eastern bloc to Western suppliers. The quality of imports of capital and consumer goods likely increased but it is not clear whether this is picked up by the national account deflators.

Figure 7. Cuban imports per capita in 2017 prices, 1985 to 2017



Note: I take nominal imports and the import deflator from the Cuban National accounts as reported to the United Nations.

about $450 per capita in constant prices. Matters improve again in the early 2000s when Venezuelan aid begins. By 2010, imports per capita are back to $1,000—close to 1985 a peak year for Cuba. So, as best we can tell, Venezuelan assistance financed much of the increase in Cuba's imports and explains some portion of the recovery in GDP documented earlier.

While Venezuelan aid in terms of GDP is less than Soviet aid in the 1970s and 1980s, the possible cessation of all payments to Cuba associated with Cuban professionals working in Venezuela will impose considerable hardships on Cuba given the island's limited supply of foreign exchange and the hostility of the Trump administration.[22]

SUMMING UP

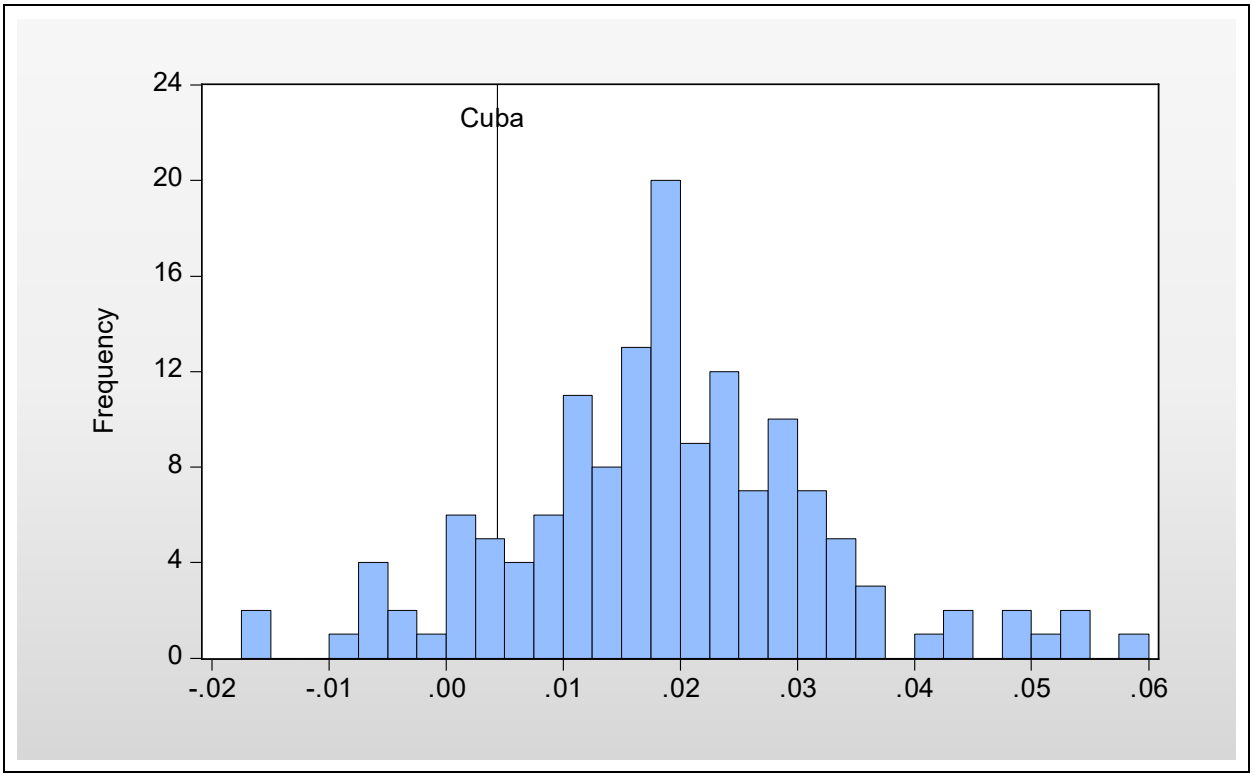
Previous sections compared Cuba to middle income Western economies and, after the revolution, to formerly planned economies. To conclude, I broaden the comparisons to cover all economies with data from 1960 to 2016 using GDP per capita data from the Maddison Project which, along with the Penn World Tables, is the standard source for comparative GDP data. I chose 2016 as it is the last year with data and 1960 rather than 1957 as coverage is greater. In total, there are 145 countries in the sample.[23]

Figure 8 provides a histogram of annual growth rates from 1960 to 2016. The results are sobering. From 1960 to 2016, Cuban income per capita grew at an annual rate of 0.56% while the average growth rate

22. The employment of Cuban professionals in Venezuela is part of a more widespread program where Cuban professional—doctors, teachers, sports instructors, security professionals—work outside Cuba. The numbers for recent years may amount to as much as sixty-five thousand, see the estimates of the Cuba Archive. (http://cubaarchive.org/files/FACT-SHEET-TRAFFICKING-IN-PERSONS.pdf). The increased deployment of these professionals appears to explain why Cuba's measured export of services increased from $0.8 million in 2003 to $10.4 billion in 2011, falling in recent years. Much of this revenue appears to be a transfer from Venezuela as the wages paid to the Cuban government for their professionals in Brazil appear to be fraction of those for Venezuela.

23. The Maddison coverage exceeds the Penn World Tables (PWT) where there are data for 110 economies. The results are almost identical using the PWT.

Figure 8. Growth Rates in the World Economy, 1960 to 2016



of income per capita for the sample is 1.9% and the median growth rate is also 1.9%. Growth for some economies, mostly in Africa, is negative. The fastest growing economies, Korea and Taiwan, show growth rates of 5%. In terms of growth, Cuba ranks as the 20th lowest in the sample. The countries below Cuba are African for the most part except Haiti, Nicaragua and Venezuela.

Growth rates compound. Between 1960 and 2016, income per capita for Korea and Taiwan increased twentyfold. Income per capita for China increased twelvefold. The mean ratio of income in 2016 to 1960 is 4.0 for the sample and the median ratio is 2.9. For Cuba, income per capita increased over the period by 46%.[24]

Thus, Cuba has fallen dramatically in the world income distribution.

To underline how far Cuba has slipped, the final column in Table 1 compares income per capita for 2011. The source for the comparisons, except Cuba, is the 2011 round of the ICP. For Cuba, I use PPP adjusted GNI per capita for 2011 from the UN Human Development Report of 2018. Whereas a century ago Cuba ranked with Italy, Ireland and Finland as a middle-income economy, Cuba is now counted among the poor of Latin America. As Venezuelan aid disappears and without viable sources of foreign exchange outside tourism and remittances, the descent of Cuba shows no sign of ending.

24. It worth noting that output per worker for 2017 is at approximately 1957 levels. The slower growth rate for output per worker is due to the fact that employment grows faster than the population as the population ages and women enter the labor force.

REFERENCES

Bergson, A. (1961) *The Real National Income of Soviet Russia Since 1928*. Harvard University Press: Cambridge.

Brundenius, C. (1984) *Revolutionary Cuba, the Challenge of Economic Growth with Equity*. Westview Press.

Central Intelligence Agency, (1968, 1970, 1972) Cuba—*Intelligence Handbook*. Previously classified handbooks released in 1999.

Central Intelligence Agency (1984, 1989) *The Cuban Economy—A Statistical Review*. Washington DC.

Central Intelligence Agency (1991) *Soviet Economic Assistance to Cuba: New Estimates for 1986–90 and the Outlook*. Previously classified report released in 1999.

Devereux, J. (2019) "Arrested Development—Puerto Rico in an American Century." *The Journal of Economic History,* 79: 708–735.

Devereux, J. (2019) "The Absolution of History." Working Paper. Queens College CUNY.

Dye, A. (1998). *Cuban Sugar in the Age of Mass Production*. Stanford University Press.

Dye, A. and R. Sicotte (2004) "The US Sugar Program and the Cuban Revolution." *The Journal of Economic History*, 64: 673–704.

Grupo Cubano de Investigaciones Económicas. (1965) *A Study on Cuba: The Colonial and Republican Periods, the Socialist Experiment, Economic Structure, Institutional Development, Socialism and Collectivization*. Coral Gables, Fla.: University of Miami Press.

Hernández-Catá, E. (2019) "Cuba's Petroleum Trade Statistics and the Impact of Cutbacks in Venezuelan Oil." Working Paper.

Kaplan, N. (1969) *The Record of Soviet Economic Growth, 1928–1965* (No. RM-6169). Rand Corporation.

Locay, L. and B. Roberts (2012) "Cuban Household Consumption: An Update." Working Paper, University of Miami.

Luis, L. (2019a) "Venezuela's Cuban Burden" ASCE Blog. May 10, 2019. https://www.ascecuba.org/venezuelass-cuban-burden/

Luis L. (2019b) "Cuba: International Economic Relations, 1959–2019: Trade, Aid and Debt" Working Paper.

Maddison, A. (1998) "Measuring the Performance of a Communist Command Economy: an Assessment of the CIA Estimates for the U.S.S.R." *Review of Income and Wealth* 44: 307–23.

Maddison, A. (2007) *The World Economy: Vol Two Historical Statistics*, Development Center of the Organization for Economic Co-Operation and Development.

Moorsteen, R. H. and R. P. Powell (1966) *The Soviet Capital Stock, 1928–1962*. RD Irwin.

Nutter, G.W. (1962) *The Growth of Industrial Production in the Soviet Union*, NBER, Princeton University Press.

Oshima, H.T. (1961) "A New Estimate of the National Income and Product of Cuba in 1953." *Food Research Institute Studies*, 2.

Pérez, L.A. (1988) *Cuba: Between Reform and Revolution*. Oxford University Press, USA.

Pérez-López, J. F. (1977) "An Index of Cuban Industrial Output, 1930−58." In *Quantitative Latin American Studies: Methods and Findings. Supplement 6 of Statistical Abstract of Latin America*, edited by James Wilkie and K. Ruddle, 37−72. Los Angeles: UCLA Latin American Center.

Pérez-López, J. F. (1987) *Measuring Cuban Economic Performance*. Austin: University of Texas Press.

Pérez-López, J. F. (1988) "Cuban-Soviet Sugar Trade: Price and Subsidy Issues." *Bulletin of Latin American Research*, 7: 123–147.

Pérez-López, J. F. (2019) "Reflections on Cuba's National Income Statistics." Forthcoming, *Cuban Studies*.

Pérez-López, J. F. and C. Mesa-Lago (2010) "Cuban GDP Statistics under the Special Period: Discontinuities, Obfuscation and Puzzles" *Cuba in*

Transition, Association for the Study of the Cuban Economy.

Romero, C (2010) "South-South Cooperation between Venezuela and Cuba."*in South–South Development Cooperation: A Challenge to the Aid System*: 107–114.

Sanguinnetty, J, (2019) "The Cuban Economy Sixty Years Later." Forthcoming. Cuba in Transition, Association for the Study of the Cuban Economy.

Speck, M. (2005) "Prosperity, Progress, and Wealth: Cuban Enterprise during the Early Republic, 1902–1927." *Cuban Studies*, 36: 50–86.

Thomas, H. (1998) *Cuba or the Pursuit of Freedom*. Revised Edition. Da Capo Press. New York.

U.S. Department of Commerce (1956) *Investment in Cuba*. US Government Printing Office. Washington.

Ward, M, and J. Devereux (2012) "The Road Not Taken: Pre-Revolutionary Cuban Living Standards in Comparative Perspective." *Journal of Economic History* 72: 104—132.

Van Ark, B., (1997) "Convergence and Divergence in the European Periphery: Productivity in Eastern and Southern Europe in Retrospect," in B. van Ark and N. Crafts, eds., *Quantitative Aspects of Post-War European Economic Growth*, pp. 271–326, Cambridge University Press.

Zimbalist, A. (1983) "Soviet aid, U. S blockade and the Cuban economy," *Comparative Economic Studies*. 24:137–46.

Zimbalist, A., C. Brundenius (1991) *The Cuban Economy: Measurement and Analysis of Socialist Performance*. Johns Hopkins. Baltimore.