

CUBA, THE SOVIET UNION, AND VENEZUELA: A TALE OF DEPENDENCE AND SHOCK

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Recently there have been several estimates of Venezuelan economic assistance to Cuba—for example by Lopez (2012) and Mesa-Lago (2013). My latest estimates suggest that payments from Venezuela increased rapidly during the first decade of the XXI century and peaked at almost 19% of Cuba's GDP in 2009. They declined over the following two years but remained quite large: I estimate Venezuelan assistance in 2011 (the last year for which the required data are available) at just over \$7 billion, or 11% of Cuba's GDP.² These numbers are large, and they have invited comparisons with Soviet assistance to Cuba in the late 1980s. It has been implied that the adverse effect on Cuba's real GDP of ending Venezuelan aid would be similar in size to the devastating impact of the elimination of Soviet aid in 1990. This is almost certainly wrong.

OVERVIEW

In the 1980s Cuba received large-scale assistance from the Soviet Union in the form of transfers and subsidies on Cuban oil imports and nickel and sugar exports. Soviet inflows averaged almost 23% of Cuba's GDP in 1985–1988; they were sharply reduced in 1989 and eliminated in 1990. The result was dramatic: Cuban GDP plunged by about 40% from 1990 to 1993. Consumption, wages, investment and imports also collapsed, and large-scale shortages and power outages added to the suffering of the popula-

tion. Only in 1994 did the economy begin to recover.

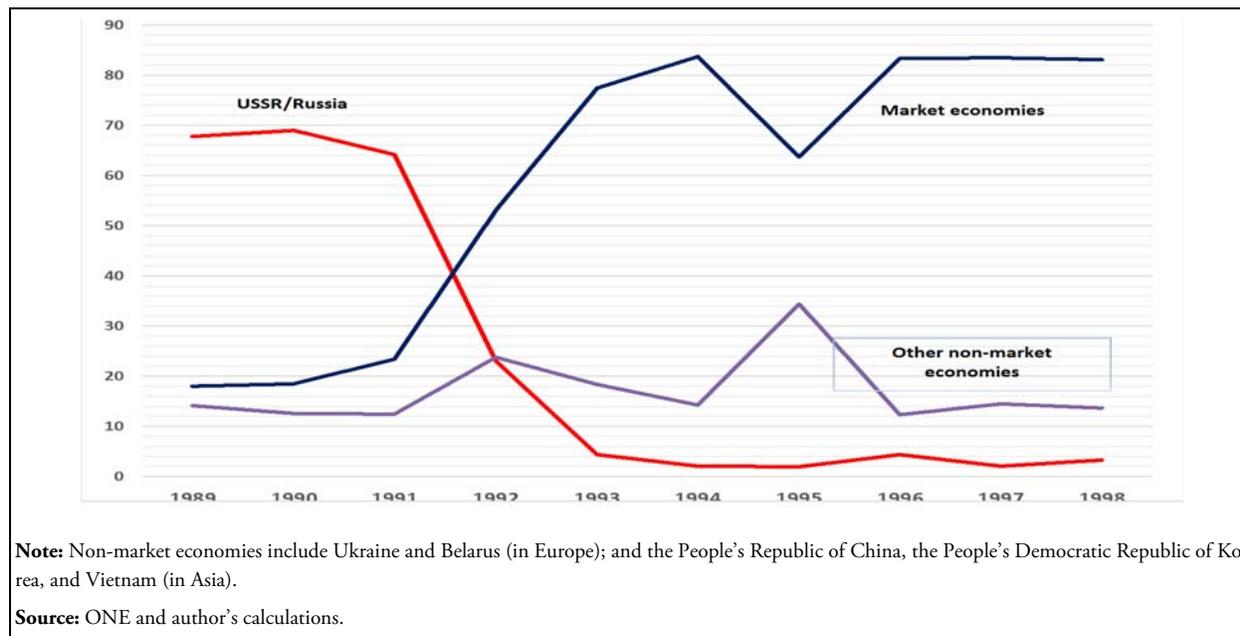
Early in the first decade of the XXI century, Cuba began to receive substantial assistance from Venezuela in the form of favorable financing terms for oil imports, transfers, and payments for the work of Cuban doctors, teachers and other professionals in Venezuela. There is no doubt that the termination of Venezuelan assistance would have a serious impact on the Cuban economy. However, there are three strong reasons to believe that the resulting damage would be small in comparison with the cataclysmic consequences of the withdrawal of Soviet aid more than two decades earlier.

1. The first reason is that **inflows from Venezuela in 2011 were less than one half of Soviet inflows** in 1998. Therefore, Cuba would now experience a lower reduction in external saving, and therefore lower reductions in domestic investment, than in the early 1990s.
2. **A technological shock.** The breakdown of relations with the USSR resulted in a massive change in the geographic structure of Cuba's foreign trade (see Figure 1). Imports from the USSR (and then from Russia) almost disappeared, and the stock of usable capital was severely curtailed as it became virtually impossible to import machinery, equipment and parts from Russia and

1. I would like to thank Luis Luis for extremely valuable comments on an earlier draft.

2. The derivation of these estimates is explained in Annex 2.

Figure 1. Cuba: Geographic Structure of Imports, 1989–1998
(in percent of total imports)



its former satellites. This was not just because the drop in external saving reduced the funds available to finance investment. Even if foreign saving had been available (or had been replaced by domestic saving) it would still have been almost impossible to import capital goods and parts *consistent with Cuba's existing Soviet technology*. The problem was compounded by the departure of Russian and East-European advisors. The rupture with the USSR (and then more radically with Russia) made repair and maintenance a veritable nightmare for Cuban enterprises and made much of the existing capital stock useless. Not much could be done about that in the short term because Soviet technology was deeply embedded in the Cuban economy. Nothing of that sort is likely to happen now because Venezuelan technology does not have such a predominant role in Cuba and, more to the point, because there is no such thing as Venezuelan technology.³

3. **Mistaken macroeconomic policies.** Cuba reacted to the “Soviet shock” by foolishly attempting to replace *real* Soviet subsidies by domestic budgetary subsidies financed by monetary expansion. Since most domestic prices were controlled, the surge in the money supply created a massive monetary overhang and a fall in household consumption through forced saving and widespread rationing, and the meager saving of household were vaporized by the inflation tax. Of course, this ill-advised policy did not erase the enterprise losses created by the collapse of foreign saving and domestic investment. Only in 1994 did the situation begin to improve after subsidies for enterprise losses were cut, the economy was aggressively stabilized (and modestly liberalized), and Soviet-style technology was gradually replaced.

The dramatic deterioration of the policy environment in the immediate post-Soviet area can be seen by comparing the first two columns of Table 1.

3. If anything, technology transfers go the other way around. Hernandez (2013) reports that *Albet* (a Cuban software company) has signed a contract with the Venezuelan government to provide and administer electronic identification documents, maintain a civilian registry, centralize information on the country's prison, security, emergency and hospital systems, and monitor oil rigs managed by the Venezuelan oil company PDVSA.

Money growth, the fiscal deficit, and subsidies for enterprise losses surged; the gap between market and official exchange rates widened dramatically; and

non-state (private and cooperative) employment remained extremely low.

Table 1. Cuba: Selected Indicators of Macroeconomic Instability, Efficiency and Dependence (In percent of GDP unless otherwise noted)

	Period averages		
	1986-1989	1990-1993	2008-2011
Macroeconomic stability			
Money (M2A—currency plus saving deposits) ^a	17.8	45.2	25.0
Fiscal balance (central and local governments)	-5.7	-24.7	-4.2
Subsidies for enterprise losses	9.2	23.9	1.5
Efficiency			
Subsidies for price differentials	3.3	4.2	4.5
Exchange rate gap (in percent) ^b	40	120	23
Non-state employment (percent of total) ^c	5.3	6.4	18.0
Dependence			
Dependence on Soviet/Venezuelan assistance ^d	22.8	0.0	10.5
Food imports	4.4	3.6	2.8
Imports of petroleum and products	12.5	6.5	6.9

Source: ONE (2012, CEPAL (2000 and 2012), Russian authorities, and author's calculations.

a. M2A is currency plus time and saving deposits denominated in non-convertible Cuban pesos.

b. For 1986–1989: parallel or informal market exchange rate (in non-convertible Cuban pesos per US\$). For 2008–2011: implicit exchange rate obtained by multiplying the Cuban peso/convertible peso rate in exchange houses by the convertible peso/US \$ rate.

c. Data reported under the 1986–1993 heading is for 1989 only, as data for earlier years is unavailable.

d. Soviet aid was already cut in 1989. Accordingly, the number under the heading 1986–89 is an average for 1986–88 which is more representative of the aid situation in the late 1980s. (The average for 1986–1989 is 19.8%.)

The present situation is very different from the one prevailing in the early 1990s: a comparison of the second and third columns in Table 1 shows a sharp improvement in all macro- and micro-economic indicators.⁴ In particular, there were sharp reductions in subsidies for enterprise losses, the fiscal deficit, the ratio of money to GDP, and the share of state employment. Even though statistical information is not available, there is evidence that some prices have been liberalized and that others have been adjusted more frequently.⁵ Private sales and purchases of houses, cars and some consumer durables by private agents have been authorized, and the exchange rate gap is now lower, although the misalignment remains huge.

In one important respect, the present situation is similar to the one prevailing in the late 1980s, *before*

the elimination of Soviet aid: the geographic distribution of trade has changed dramatically and it is, again, highly concentrated in a single country—this time Venezuela, which has become by far Cuba's main trading partner (Figure 2). The dependence on foreign aid is again quite large, but lower than it was towards the end of the Soviet era. Otherwise, the situation is now quite different. Comparing the first and third columns of Table 1 shows that the fiscal deficit is lower (in spite of an unusual surge in 2008); subsidies for enterprise losses are much lower; non-state employment is much higher; and dependence on food and petroleum imports has been reduced.

In sum, while the political future is unpredictable, it is doubtful that President Raúl Castro's administration will reverse course at this juncture and destroy

4. Subsidies for price differentials are the only exception, highlighting the continued difficulties in eliminating the rationing system.

5. The relative price of electricity and gas increased by 54% in 2006, while the relative deflator for the sugar industry more than doubled in 2010. Relative prices are measured by the ratio of own to total GDP deflators in the corresponding sector.

Figure 2. Cuba: Geographic Structure of Imports, 2005–2011
(in percent of total imports)

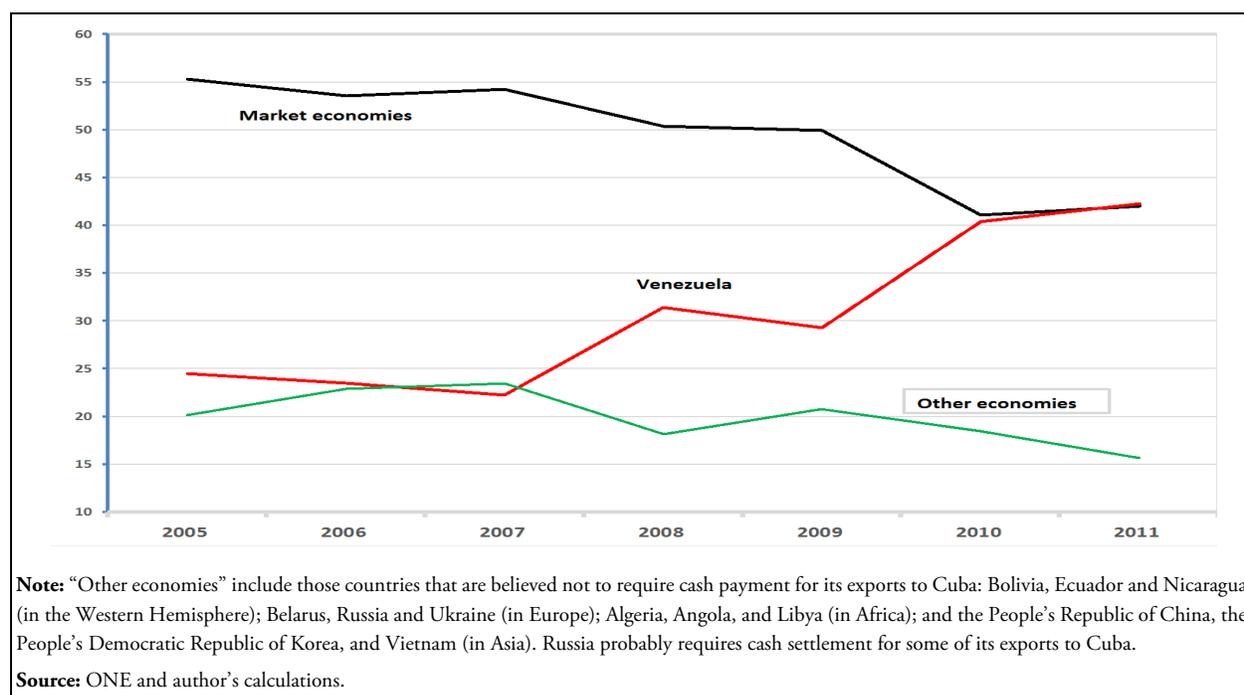


Table 2. Cuba: Contribution of the Explanatory Variables to the Change in Real GDP, 1991–1993

Variable	(1) % change in variable ^a	(2) Regression coefficient ^b	(3) Contribution (% change) ^a
Real GDP, actual	-39.7	n.a.	-39.7
Sum of contributions:	37.8	n.a.	-37.8
Employment	-1.86	$(1-\alpha)=0.614$	-1.14
Utilized capital stock			-8.92
Terms of trade	-59.28	$\chi =0.056$	-3.32
Post-Soviet technological disruption ^c	-194.2	0.065	-12.62
Cuban macro-policy variable ^d	92.90	$\mu =-0.127$	-11.80
Contribution of the utilized capital stock			-8.92
Existing capital stock	5.42	$\alpha =0.368$	1.99
Capacity utilization ^e	-5.63	$\alpha\varphi =1.938$	-10.91

Source: CEPAL (2000) and Hernández-Catá (2013).

Note: The symbols used in the table are defined as follows: α is the elasticity of the capital stock with respect to output; φ is the coefficient of the capacity utilization variable; χ is the coefficient of the terms of trade; and μ is the coefficient of the money/income ratio.

a. Percentage changes are calculated as changes in natural logarithms. For example, the percentage decline in GDP from 1990 to 1993 (39.7%) is calculated as the logarithm of output in 1993 minus the logarithm of output in 1990. From 1989 to 1993 the fall in output, calculated in the same way, would be 42.7% (because there was already a drop of about 3% in 1990), but there is insufficient data to perform the calculations for that period.

b. From Hernández-Catá (2013), Table 1, equation 2f.

c. Proxied by the change in the ratio of capital goods imports to total imports.

d. Proxied by the change in the ratio of M2A to nominal GDP. (See footnote a to Table 1.)

e. Proxied by the ratio of employment to population of working age.

**Table 3. Impact of the Elimination Foreign Assistance on Cuba's GDP
(Percent changes during relevant period^a)**

	Impact of actual end of Soviet aid 1990-1993		Impact of hypothetical end of Venezuelan aid	
	(1) Actual (bad) macro-policies	(2) Restrained macro policies	(3) Bad macro policies	
Total actual effect	-40	n.a.	n.a.	
Total estimated effect	-38	-7	-10	
Macroeconomic effects	-13	-7	-7	
Decline in utilized capital stock	-8	-6	-6	
Terms of trade	-3	
Employment	-1	-1	-1	
Technological disruption ^b	-13	0	0	
Cuban policy mistakes ^c	-12	0	-3	
Errors and omissions	-2	n.a.	n.a.	
Memo: Assistance/GDP (%)	22	11	11	

Source: Author's estimates, Tables 2–3.

a. See Table 2, footnote a.

b. Proxied by the change in the ratio of capital goods imports to total imports.

c. The number in column 3 reflects the effects on real GDP of higher state subsidies aimed (unsuccessfully) at protecting investment and employment, as explained in Annex 1. Each of the subsidies leads to an expansion in the money supply that is multiplied by the coefficient of the M2A/GDP ratio (μ) from Table 2. The negative contribution of these two factors to the change in GDP is estimated at -1.7 and -0.7 percentage points, respectively.

the progress made in stabilization and reform by repeating the policy mistakes of the early 1990s.

A MODEL-BASED APPROACH TO ESTIMATING CUTS IN FOREIGN ASSISTANCE

This section attempts to quantify and compare the economic events of the early 1990s and those that might occur following a hypothetical cancellation of current agreements with Venezuela.

Kurazh zakonchen: The End of the Party. In an earlier study, I examined the end of Soviet assistance to Cuba and its consequences using a production function relating real GDP to the usual variables (capital stock and employment). In addition, the regressions included proxies for technological disruptions and for the policy reaction of the Cuban authorities before 1994. (See Hernández-Catá, 2013 and Annex 1 of this paper.) On the basis of that study, this section tries to account for the contraction of output in the period 1991–93 (i.e., from 1990 to 1993). Table 2 shows the rate of change of the various explanatory variables during that period (column 1) and the corresponding regressions coefficients (column 2). Column 3 shows the estimated contribution of each explanatory variable to the decline in

output, obtained by multiplying columns 1 and 2. The estimated total impact on real GDP, nearly 38%, is the sum of contributions of all the explanatory variables.

In column 1 of Table 3 the output effects are listed under three main headings: (i) the decline due to direct macroeconomic changes; (ii) the technological disruption effect; and (iii) the effects of the misguided Cuban policy reaction. Each of these three variables explains approximately one third of the total estimated drop in production from 1990 to 1994.

As part of the direct macroeconomic effect, the fall in the utilized capital stock (ignoring the obsolescence resulting from the inability to obtain Soviet equipment and parts) accounts for 13.5% of the total decline, and the deterioration of the terms of trade for roughly 9%. The decline in employment explains only 3% of the total decline in production—a small contribution reflecting the government's propensity to absorb high unemployment by keeping unproductive workers in the state payroll.

Several aspects of Table 3 should be mentioned. First, the total *actual* decline in output from 1991 to 1993 (just under 40%) is much larger than the initial ratio of Soviet assistance to Cuban GDP, illustrating

the fallacy of evaluating the consequences of cutting aid on the basis of its initial magnitude. The contributions of technology and policy are correspondingly very large. Second, in the absence of the mistaken domestic policy reaction to the crisis, the estimated contraction of production would have been 26% instead of 38%.

Se acabó lo que se daba: The Effects of a Hypothetical Elimination of Venezuelan Assistance.

Here, the problem is a little more complicated, because data for the explanatory variables is not available for the relevant (future) period. As an alternative we specify *a priori* the changes in output that would result from a reduction in external saving (using data for 2011), and then apply the regression coefficients shown in Table 2 to estimate the contribution of each explanatory variables. (This is spelled out in Annex 1.)

COMPARING SHOCKS

The estimates provided in Table 3 (columns 2 and 3) indicate that the contraction of output due to a hypothetical post-Venezuelan shock is likely to be in the range of 7% to 10%, considerably less than the estimated post-Soviet impact of almost 38%. This is not only because the ratio of foreign assistance to GDP was much larger at the end of the Soviet period than in 2011 (the starting point for the post-Venezuelan exercise). It is mainly because the technological and domestic policy factors are now assumed not to play a role. The first assumption simply reflects the historical impossibility of a Venezuelan “technological” effect.

The second assumption reflects the belief that the misguided macro policies of the post-Soviet era will not be implemented by the Raúl Castro administration in response to an end of Venezuelan assistance. This assumption seems reasonable at this stage given the present economic situation in Cuba and the reforms that have already been implemented. Nevertheless, a cursory examination of the implications of alternative policy scenarios may still be of interest. As an illustrative exercise, the third column of Table 3 assumes that the Cuban government would extend budgetary subsidies to state enterprises in a (futile) attempt to avoid the drop in investment that would

otherwise result from the withdrawal of Venezuelan payments. These subsidies would be financed by monetary expansion and therefore give rise to a monetary overhang, forced saving and inflationary taxation that would contribute an estimated 1.7 percentage point drop in real GDP (Annex 1).

A comparison of the first two columns of Table 3 shows that the negative employment effect is the same in the post-Venezuelan case as in the post-Soviet case, in spite of the much larger contraction of real GDP in the latter case. The reason for this result is that the Cuban government in the early 1990s was very reluctant to accept a large increase in open unemployment. However, there are clear indications that the government’s propensity to absorb redundant workers is now considerably lower than in the past—as evidenced by the dismissal in 2011 of about 300,000 state employees that eventually found their way into cooperatives or in the small private services sector. Thus, the employment effect is higher relative to the output effect in column 2 than in column 1, because it is based on a higher income-elasticity. (This is explained more fully in Annex 1.)

By contrast, the alternative bad-policies scenario of column 3 assumes that the government returns to its earlier policy of resisting open unemployment, and that the subsidies to cover the corresponding rise in the wage bill are financed by money growth. The result, calculated by multiplying the regression coefficient of the monetary overhang variable (from Table 2) by the required increase in domestic subsidies, is to lower output by an additional 0.9 percentage point. In the third column of Table 3, the line labeled “policy mistakes” is the sum of the effects of subsidies to “protect” investment and employment, respectively.

CONCLUSION

The analysis presented in this paper indicates that a complete cancellation of Venezuelan assistance to Cuba would cause considerably less damage than the elimination of Soviet assistance in the early 1990s, with the fall in real GDP estimated at somewhere between 7% and 10%, compared to 38% after the breakdown of Cuban/Soviet relations. Moreover, if the Cuban government were to avoid the policies of

subsidization and inflationary finance pursued in the post-Soviet period, the post-Venezuelan contraction would be at the lower end of the range or approximately 7%.⁶

This is still a lot, however. To be sure, the danger of a sudden elimination of aid inflows has diminished considerably since the Venezuelan election of April 2013. Nevertheless, the prospect of a more gradual reduction in aid remains likely given Venezuela's economic difficulties. In that case, the effect would be a reduction in the growth of the Cuban economy spread over several years, rather than a sudden contraction of output. Furthermore, current efforts to obtain financing at non-market terms from other countries, like Algeria, Angola and Brazil, would, if successful, diminish the magnitude of the shock. But it would perpetuate dependence and delay the needed adjustment.

The only way to diminish the pain of reduced income and consumption would be a decisive effort to expand Cuba's productive capacity by intensifying the reform process. The list of required actions is familiar to all: liberalize prices, unify the exchange rate system, dismantle exchange and trade controls, stop

the bureaucratic interference with non-state agricultural producers, continue efforts to downsize employment in the state sector, and increase substantially the list of activities opened to the private sector, including (why not?) doctors, nurses, teachers and athletes. Private clinics and schools would pop up, consultancy services would flourish, and the baseball winter leagues would come back to life.

Karl Marx (1852) credited Hegel with the idea that history repeats itself twice. Unfortunately for him, he added: "the first time as a tragedy, the second time as a farce." This is not necessarily true. Often the second time is also a tragedy, as when the West gave Eastern Europe to Stalin at Yalta, less than a decade after giving it to Hitler in Munich. And why couldn't the second time be an epiphany? Cuba's rulers now have a historic opportunity to allow people to improve their own standard of living, and to stop wasting resources to keep the faded and sinister red banner afloat. Without a doubt, history will absolve them if they take that chance. And then, perhaps, Cuba will be allowed to replace its politically inspired dependence on doubtful friends with free, mutually beneficial trade with all nations.

Annex 1: The model

THE POST-SOVIET PERIOD

The starting point is the Cobb-Douglas production function:

$$Y = (K_u)^\alpha E^{1-\alpha} X \quad (1)$$

where Y is output, K_u is the effectively utilized capital stock, E is employment, X stands for all the other variables that affect output, and α is a parameter ranging between zero and one. The *utilized* capital stock is the product of a capacity utilization rate (H) and the *existing* capital stock (K); and H is assumed to

be a function of the ratio of employment to population of working age (E/N).

$$H = K_u/K = (E/N)^\varphi \quad (2)$$

where φ is a positive coefficient and N is the population of working age. Substituting into the production function and taking natural logarithms, yields:

$$y = \alpha k + \alpha\varphi (e-n) + (1-\alpha) e + x \quad (3)$$

where logarithms are denoted by lower-case Latin letters. Taking first differences yields the equation used in Table 2 to calculate the various contributions:

6. There may well be other adverse effects down the line. For example, the shift from Venezuela to other oil suppliers may involve a shift from long-term, subsidized debt with a generous grace period to unsubsidized short-term borrowing with shorter grace period, if any. This would occur to the extent that Cuba fails to persuade new oil exporters to duplicate the term now provided by Venezuela. In addition, unless the alternative suppliers continue to provide additional quantities of oil to be refined in Cuba and then re-exported, Cuba could suffer a loss of output and jobs at the Cienfuegos refinery.

$$\Delta y = \alpha \Delta k + \alpha \phi \Delta (e-n) + (1-\alpha) \Delta e + \Delta x \quad (4)$$

The change in output caused by the change in the *utilized* capital stock has two components: the contribution of the change in the measured capital stock (cumulated investment net of depreciation); and the contribution of capacity utilization. The third item in the equation is the contribution of the change in employment, and the fourth item is the contribution of other variables such as changes in the terms of trade, technology, and the reaction of macro-policies. (Table 3, column 1).

The Post-Venezuelan Effect

Apply the formula for logarithmic differentiation to Δk in the previous equation and assume that capital depreciation and the population of working age remain constant. Under these assumptions the change in the capital stock equals the change in gross investment ($\Delta K = I$) and the change incapacity utilization equals the change in employment ($\Delta h = \Delta e$):

$$\Delta y = \alpha \Delta I / K + \alpha \phi \Delta e + (1-\alpha) \Delta e + \Delta x \quad (5)$$

Assume next that *domestic* saving remains constant, so that the change in *total* saving (and therefore the change in investment) is equal to the change in *foreign* saving ($\Delta I = \Delta S = \Delta S_f$). Finally, employment is a log-linear function of output (i.e., $\Delta e = \eta_0 + \eta \Delta y$) where the positive coefficient η is the elasticity of employment with respect to output and is obtained by regression (See Annex 1c). Substituting in the previous equation yields:

$$\Delta y = \alpha \Delta S_f / K + \alpha \phi \eta \Delta y + (1-\alpha) \eta \Delta y + \Delta x \quad (6)$$

where S_f is the inflow of external saving i.e., in this case, the inflow of payments from Venezuela. The first term on the right hand side of the equation is the contribution of capital formation; the second is the contribution of capital utilization; and the third is the contribution of employment. The sum of the first and second terms represent the contribution of the *utilized* capital stock.

The various contributions can now be quantified using an iterative procedure, i.e., plugging alternative values of Δy on the right hand side of the equation until convergence occurs—i.e., until the value of Δy is equal to on both sides of the equation.⁷ The total

effect of ending Venezuelan aid and the contribution of the relevant variables can now be calculated by setting $\Delta S_f = -\$7$ billion (the estimated fall in external saving *alias* Venezuelan payments) and using the parameter values listed in Table 2. The results are summarized in columns (2) of (3) of Table 3. In the second columns there is no adverse effect from inappropriate domestic macro-policies. In the alternative scenario of column (3), subsidies aimed at protecting investment are assumed to be financed by monetary expansion and, with many prices still controlled, will have an adverse effect on real GDP growth of 1.7 percentage points. This effect is calculated by multiplying the fall in external saving by μ , the coefficient of the M2A/GDP ratio taken from Table 2.

The Employment Regressions

The equations relating total employment to real GDP (referred to in the section 3, above) were estimated for the period 1989–2011) with the following results:

$$e = 6.02 + 0.231 y \quad (31.0) \quad (12.3) \quad (7)$$

$$\text{Adjusted R}^2 = 0.877$$

$$e = 7.40 d + 5.94 (1-d) + 0.094 d y + 0.240 (1-d) y \quad (24.3) \quad (40.6) \quad (3.14) \quad (4.4) \quad (8)$$

$$\text{Adjusted R}^2 = 0.947$$

Both e and y are expressed as natural logarithms and d is a dummy variable equal to 1 when output is falling (i.e., during the period 1989–1994) and to zero otherwise. Absolute values of t ratios are in parenthesis. The results imply that the elasticity of employment with respect to output is significantly smaller for the period of declining output ($\eta_1=0.094$) than for periods when output is rising ($\eta_2=0.240$). The impact of labor hoarding on the estimated change in GDP is given by:

$$\mu (E_2 - E_1) W/M, \quad (9)$$

where μ is the coefficient of the monetary overhang variable, $E_2 - E_1$ is the differential between employment levels evaluated at high and low income elasticities, respectively (calculated on the basis of the esti-

7. An alternative that yields exactly the same result is to solve the first difference equation for the change in output, using the formula $\Delta y = (\alpha \Delta S_f / K + \Delta x) / \phi$, where $\phi = 1 - \alpha \phi \eta - (1-\alpha)\eta$. However, this method does not allow the separate calculation of the various contributions.

mated coefficients for the second equation above). W is the annual average wage rate in the state sector; and M is the money supply (M2A, i.e., currency plus

time and saving deposits denominated in non-convertible Cuban pesos).

Annex 2: Estimating Venezuelan Assistance to Cuba

The estimate of \$7 billion, or 11% of Cuban GDP, for Venezuelan payments to Cuba in 2011 is an average of two independent estimates. The first is derived by subtracting “other transfers to enterprises” (*transferencias al sector empresarial, otros*) from “other non-tax revenue” (*otros ingresos no tributarios*). This operation helps to adjust the budget numbers to national income accounts basis—the appropriate concept to estimate the impact on GDP of eliminating Venezuelan aid. All variables are from (ONE 2012), State Budget Performance table, according to which “other non-tax revenue” includes “price differentials in foreign trade and net foreign income.”

The second estimate is calculated by adding central government outlays corresponding to services of Cuban medical and teaching personnel abroad to a rough estimate of investment projects financed by Venezuela. A third estimate (not used in this paper) was derived by replacing central government spending on health and education by exports of services (balance of payments basis) minus tourism and trans-

portation. The resulting series is highly correlated with the first estimate, but displays somewhat larger errors and omissions.

It is important to note that the value of oil imports from Venezuela is *not* included in the definition of S_f because these imports, contrary to a common misunderstanding, are valued at world market prices and will need to be replaced by imports from other countries (also at world market prices) after the cancellation of the program with Venezuela. Unless the new suppliers agree to Venezuelan terms, new oil imports would have to be financed at a higher interest. (Oil imports from Venezuela now carry an interest rate of 1%, but they do not involve an interest payments at present because of the grace period specified in the agreement.) Oil imports amounted to \$3.5 billion in 2011, excluding oil imports to be refined in Cuba and re-exported. This estimate is based on the methodology provided by Piñón and Benjamin-Alvarado (2010), explained in the footnotes to Table 2–5 of their article.

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