

Swapping Petroleum for Doctors and the Impact of Cutbacks in Venezuelan Oil Deliveries.

Ernesto Hernández-Catá
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SWAPPING PETROLEUM FOR DOCTORS AND THE IMPACT OF CUTBACKS IN VENEZUELAN OIL EXPORTS TO CUBA.¹

Ernesto Hernández-Catá

In a 2009 article, Jorge Perez-Lopez and Carmelo Mesa-Lago described Cuba's official GDP data as involving "...discontinuities, obfuscation and puzzles". Something similar could be said about the statistics on petroleum trade published by the official Cuban statistical agency, ONEI. Data for the value of fuel imports (overwhelmingly petroleum products) are published with a considerable lag—one year beyond the already long publication lag for ONEI's annual *Anuario Estadístico de Cuba*. Exports of oil products (refined or blended in Cuba using crude oil imported from Venezuela) are not reported at all. And there is no information on the prices of oil traded. All this is unfortunate, because the oil sector is of great interest to observers of the Cuban economy given the island's heavy dependence on imported energy, particularly on Venezuelan oil. There are, however, ways to overcome some of these problems.

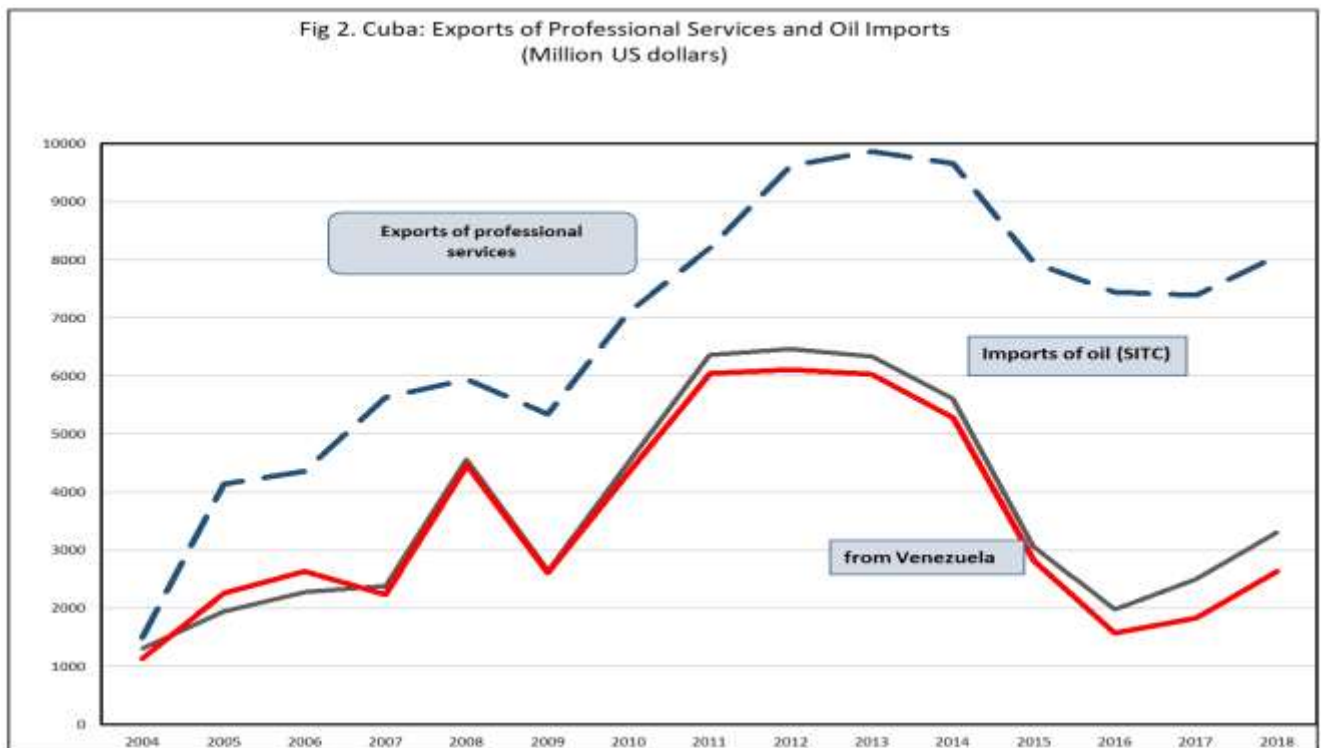
The first section of this paper examines the evolution of Cuba's oil trade in recent years. Section 2 evaluates the impact of cuts in Venezuelan oil exports to Cuba since 2013 and estimates the effects of a hypothetical elimination of these exports in the period ahead. Section 3 explores the relation between Cuba's services exports and the output of Cuban health sector. Section 4 examines the impact cutbacks in Venezuelan oil exports on Cuba's balance of payments. Annex 1 tries to fill the gaps that affect the Cuba's oil trade statistics. Annex 2 describes the framework used to evaluate the impact on the Cuban economy of Venezuelan cuts. And Annex 3 clarifies the relation between ONEI and United Nations' data for Cuban exports of oil products.

1. The recent evolution of Cuba's oil trade.

Armed with the estimates and proxies provided in Annex 1, we can try to understand the evolution of Cuba's oil trade from the early 2000s to 2018, the last year for which data are available. This period includes extraordinarily large movements in both prices and volumes.

- After increasing rapidly after the turn of the century, the value of Cuba's **oil imports** fell by almost half from 2012 to 2018, owing largely to a 37% drop in price². The volume of imports also contracted reflecting a cutback in Venezuelan deliveries. (See Fig. 1 and tables 1 and 3 at the end of this paper).
- Standard International Trade (SITC) and Direction of Trade (DOT) import data remained very close until 2015, indicating that Venezuela and Algeria were basically the only suppliers of oil to Cuba. In 2016-2017, however, the SITC numbers exceeded the DOT numbers by a significant margin. This suggested that Cuban diplomacy has been moderately successful in

eliciting oil-for-doctors swaps from countries other than Venezuela and Algeria—although data for 2018 seems to contradict this hypothesis. There have been unconfirmed reports of barter arrangements being negotiated with Qatar (where 400 Cuban doctors and nurses already work), with the United Arab Emirates (UAR), with Saudi Arabia. However, imports from the UAR remain small and have not increased significantly in recent years. Imports from Qatar and Saudi Arabia are not listed separately in ONEI’s DOT tables, but the rise in unclassified Cuban imports from Asia has been modest. Early in 2019, *Rosneft* announced, for the first time since the Soviet era, a shipment of Russian oil and diesel fuel to Cuba. According to Jorge Piñon of the University of Texas at Austin, this would be part of a deal valued at \$105 million— a small contribution towards filling the gap resulting from Venezuelan cuts.



- From 2013 to 2017, the value of Cuba’s **net imports of fuels** (a good proxy for domestic absorption) fell sharply, reflecting predominantly the drop in oil price. In real terms the decline in net imports was significant, but considerably smaller.
- The value of Cuba’s **oil exports** collapsed from 2013 to 2017 reflecting a sharp declines in both volume and price. (Table 3). The collapse in real terms reflected mostly the plunge in crude imports from Venezuela—a key input in the output of Cuban refineries. The large fall in real terms confirmed the Cuban government’s decision to reduce the output of its oil processing

industries, with implications for GDP and unemployment, in order to protect household consumption from the Venezuelan cuts. Data for 2018 show a small increase (see annex 3).

- Cuba also **exports doctors and other professionals** to Venezuela and Algeria partly in exchange for oil. It also exports professionals to other countries, including Bolivia and various African countries and, in the more distant past, Guatemala and Honduras.³ (This explains the gap between exports of professional services and oil imports in Fig. 1). By far the most important of these arrangements was concluded in 2013 with Brazil. According to Clara Nugent (2019), in November 2018 there were 8,300 Cuban doctors in Brazil.⁴ This was just before Cuba discontinued the program following a dispute with Brazil over the discriminatory and confiscatory compensation of expatriate doctors by the Cuban government. How these exports are paid for is not known, but they are probably not bartered against oil shipments.⁵

In 2018 OENI published for the first time data on the composition of Cuban services exports. Based on this information, it would appear that total exports of professional services could total \$8 billion in that year. Health-related services would amount to 80% of the total, education services to 3%, culture and sports to 1%, and a category that ONEI labels “support services” to 16%. This last category probably includes, among others, compensation of Cuban security and military specialists. According to General Antonio Rivera (who left the country and joined the opposition), in 2012 there were 5,600 Cuban security, intelligence and counter-intelligence specialists in Venezuela.⁶ (See Juan Antonio Blanco and his associates, 1919). But with the political situation deteriorating rapidly, the number probably has increased considerably since then. A time series for professional exports, estimated using a somewhat different methodology, is shown in Table 4.

2. The impact of Venezuelan actions on the Cuban economy⁷

Using a simple accounting framework⁸ without multiplier effects, I have estimated that:

- **The drop in oil imports from Venezuela over the period 2013-2017 lowered real absorption in Cuba by 2.1%**, or just over ½% at annual rate. This may appear to be small, but it should be recalled that the fall in real oil imports during that period was not very large (most of the decline in nominal terms reflected the plunge in the price of oil), and that imports from Venezuela are a small share of aggregate absorption in Cuba.
- **The fall in real oil real exports of goods and services to Venezuela is estimated to have lowered real GDP in Cuba by 4.9% from 2013 to 2017** ⁷ (1 ¼ % at average annual rate).⁹ This reflected the impact of (i) the fall in real exports of goods (refined or blended petroleum products); and (ii) the fall in real exports of services provided by Cuba to Venezuela that are partly, albeit not entirely, bartered against oil imports.

So much for the past. The key question now is what would happen to the Cuban economy if the Accord with Venezuela were abolished. Using the accounting framework of Annex 2, I estimated that:

- **the complete elimination of Cuban oil imports from Venezuela would reduce real absorption in Cuba by an additional 2%; and**
- **the disappearance of exports of both oil products and professional services to Venezuela would lower real GDP by 7%.**

These estimates are considerably lower than those referring the termination of Soviet/Russian assistance to Cuba in the early 1900s—an episode that involved a much larger loss of foreign assistance and a severe supply-side shock, as domestic enterprises were unable to repair or replace a capital stock based almost entirely on Soviet technology. This would not play a role now since there is no Venezuelan technology. In an earlier article (2013), I had estimated the cost of the elimination of Soviet/Russian aid at 38% of Cuba's GDP, more than five times the estimated cost of ending current arrangements with Venezuela.

It could be argued that there is no Venezuelan assistance to Cuba because its oil imports are paid for by the services of Cuban doctors and other specialists. It is likely, however, that the compensation paid by Venezuela for these services has been at times much higher than what a market solution would have produced, so that there would be a real net transfer of resources from Venezuela to Cuba. As far as I know, the only serious study of this problem was provided by Luis (2019) who calculated the difference between the value of Venezuelan oil exports to Cuba and the market equivalent value of compensation received by Cuban doctors.¹⁰ On that basis, Luis estimated that the grant element provided by Venezuela reached \$4½ billion dollars in 2012 before declining steadily to virtually zero in 2018. In any event, this would pale in comparison with Soviet assistance to Cuba until 1989.

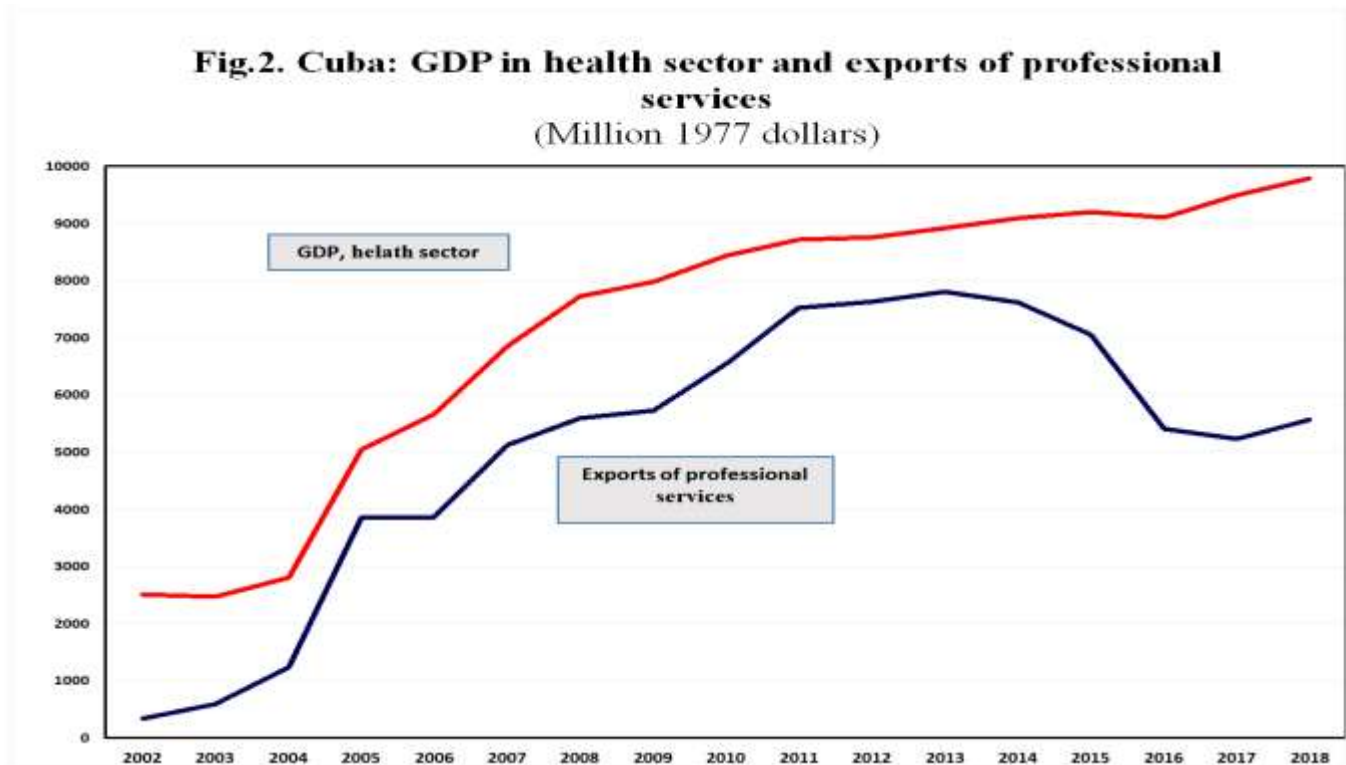
The estimated costs of ending the Accord with Venezuela, combined with the costs of cuts that had already occurred since 2013, are nevertheless substantial. They could be even larger for three reasons.

1. *ONEI* translates dollar values into non-convertible pesos (CUPs) at the overvalued official exchange rate of 1 CUP for 1 US dollar, thus artificially lowering the ratios of exports to GDI and imports to absorption.
2. Taking into account multiplier effects could raise the negative effects on absorption.
3. The removal of Cuban doctors from Brazil could raise the impact on real GDI from 7% to nearly 8%.
4. The adverse effects could also be larger than estimated if the cutbacks in oil imports had adverse supply-side effects. In particular, the loss of currently subsidized energy could force Cuban enterprises to modify existing energy-intensive production methods and/or to cut production and fire redundant workers. The possible policy responses are considered in section 4.

3. Exports of doctors as exports of services.

We know that Cuba's oil imports from Venezuela are not paid in cash or by borrowing but are bartered against exports of Cuban professionals, including mostly doctors (similar arrangements apply to oil imports from Algeria). This is not the end of the story, however, because, as shown in Fig. 1, Cuban exports of professional services exceed oil imports by a wide margin. The reason is that Cuba has provided medical services to a number of countries (including notably Brazil as well as Venezuela and Algeria), and that these services have *not* been bartered for oil, but are paid for in cash, investments and/or loans. Precise information on these exports and their financing counterpart are not available. But they probably affect the capital account of the balance of payment (for which data has been suppressed since 2001), but not the current account.

Thousands of Cuban doctors, medical technicians and nurses have been sent to various countries, notably (albeit temporarily) to Brazil. Unfortunately, ONEI has not provided a time series for these transactions, only data for the single year 1918. Therefore, the relation between payments for medical practitioners working abroad and GDP cannot be tested directly on the basis of official data. But it can be tested indirectly using a proxy for health practitioners. This is important because, if the relation holds, the sharp rise in both real exports of services and real GDP after the turn of the century could not be attributed to data manipulation but would reflect the surge in exports of professionals.¹¹



Source: ONEI and author's calculations

The test involves two steps.

- First, ONEI's data for exports of services were adjusted to exclude tourism, international travel and proxies for communications and other services—all of which are unrelated to exports of professionals (see Table 4).¹² The resulting variable was then converted from nominal to real terms.
- Second, I ran a regression relating GDP in the health sector to exports of services (properly adjusted), with both variables measured in real terms. The adjusted R^2 of the regression was 0.84 and the estimated coefficient of the export variable (0.87) had a t-statistic of 9.02 and was not significantly different from one at the 99% confidence level. The correlation between GDP in health and exports of professional services also holds when the two variables are expressed in nominal terms, and when they are specified as first differences.

As illustrated in Fig. 2, there is a persistent difference between the *levels* of health output and services exports, which presumably captures the output of health practitioners operating in Cuba, which was assumed to be roughly constant. The justification for this assumption is that the Cuban population has not changed much during the sample period and that domestic health indicators, like the number of beds in hospitals, have been roughly constant.

Fig. 2 shows that the relation between the two variables is very tight from 2002 to 2014. But it appears to break down in the next two years: services exports fall after 2015—as expected, since the decline in Cuban oil imports from Venezuela should be accompanied by a decline in Cuban exports of doctors—but real GDP in the health sector continues to rise. The reason for this lack of parallelism is unclear.

4. Effects on the balance of payments

So far, this paper has focused on the effects on GDP and absorption of the reduction in both oil imports and exports of goods and professional services. These reductions also have a significant effect on Cuba's balance of payments. Table 5 shows the actual values of key variables in 2017 as well as two scenarios illustrating the possible consequences of terminating transactions with Venezuela and Brazil,

Both scenarios assume that (i) Cuban imports of oil from Venezuela vanish; (ii) Cuban exports of petroleum products and of professional services to Venezuela disappear; and (iii) exports of doctors to Brazil are eliminated. In both scenarios the disappearance of oil imports from Venezuela is offset by a corresponding fall in payments for Cuban professionals.

Table 5. Cuba: Effects on the oil-related balance of payments of ending Transactions with Venezuela and Brazil

(Million U.S. dollars)

		(A)	(B)	(C)
		<u>Actual</u>	<u>Cold turkey</u>	<u>Optimistic</u>
		<u>2017</u>	<u>2019</u>	<u>2019</u>
1	Exports of professional services	7,763	2,236	2,303
1.1	To Venezuela	4,777	0	0
1.2	To Brazil	750	0	0
1.3	To Algeria	295	295	325
1.4	To others	1,941	1,941	1,978
2	Exports of oil products	225	0	0
3	Imports of oil	-2,504	-665	-2,922
3.1	From Venezuela	-1,839	0	0
3.2	From Algeria	-295	-295	-325
3.3	From others	-370	-370	-407
3.4	From the market	0	0	-2,190
4	Current account balance	5,484	1,571	-619

Signs are based on balance of payments conventions (imports are negative)

Line 1. Excludes tourism, international travel, communications and other services

Lines 1.1 through 1.4 are author's estimates.

Line 2. SITC basis (Table 2).

Line 3. SITC basis (from Table 1). Lines 3.4 is hypothetical.

Line 4: Sum of lines 2, 3, and 4

Scenario B (cold turkey) shows the consequences of accepting the contraction of oil imports without policy response. The external current account balance deteriorates sharply but remains in surplus. However, the country would be deprived of a large share of its energy resources, leading enterprises to cut production and employment and to ration electricity and gasoline—in fact, power outages and shortages of gasoline have already occurred. A costly alternative would be to increase the already large government subsidies to enterprises, and finance the resulting fiscal deficits through monetary expansion—the failed policy adopted in response to the post-Soviet crisis in the early 1990s. This policy might prevent a rise in open unemployment but only to provoke an equivalent increase in disguised unemployment while raising an already large fiscal deficit. Once introduced, the subsidies would be hard to remove, as revealed by the experience of the 1990s.

The somewhat more optimistic Scenario C illustrates the consequences of purchasing oil in the world market while reaching agreement with Algeria and non-traditional partners on new swaps of doctors against oil, loans or cash. Purchases of oil in the market would restore the level of *net* imports roughly to

the level of 127 barrels per day prevailing in 2017. Assuming a world oil price of \$49.52 (the Cushing-Oklahoma price level prevailing at the end of 2018), the required purchases would amount to \$2.2 billion a year—which would restore oil consumption to the pre-disturbance levels but would not allow a full resumption of exports by the Cienfuegos refinery.

The problem with this scenario is that Cuba's current account balance would suffer a large deterioration and shift into deficit. This deficit would have to be financed either by drawing down on the Central Bank of Cuba's foreign exchange reserves (which could not go on for long since reserves are small and finite), or by attracting new capital inflows (presumably direct investment or loans, since bond/equity instruments do not exist in Cuba). This would require ending the bureaucratic hassles and regulations that currently discourage foreign investors and improving the confidence of foreign lenders in the Cuban economy—which in turn would require action to moderate the highly expansionary fiscal and monetary policy pursued in recent years.

The silver lining in scenario (C) would be that the desperate need for foreign exchange could provide an incentive to adopt market-oriented reforms in various areas. In particular, an increase in exports of goods following their disastrous performance in the past three decades¹³ would improve the current account and the liquidity position of the central bank—provided the government stops dragging its feet and finally moves to liberalize the exchange rate system.

* * *

For Cuba there is no easy way to deal with the problems caused by Venezuelan and Brazilian decisions. The possible remedies—rationing, subsidies, or market purchases—all have their costs. If oil transactions with Venezuela disappear and Brazil stops paying for Cuban doctors, the celebrated merits of the doctors-for-oil (or money) programs would have been reversed. The chickens will have come home to roost and, one more time, Cuba will pay the price for its politically-based trade agreements with unreliable foreign governments.

Annex 1. Filling the statistical gaps.

ONEI publishes the value of Cuba's **imports of fuel** on a Standard International Trade Classification (SITC) basis, but with a long lag. For example, the value of imports for 2018 is omitted from the latest issue of ONEI's yearbook, which itself lags by more than a year (See Table 1 at the end of this article). However, this lag can be shortened by calculating fuel imports as a residual from ONEI's table on imports by main categories. The validity of this trick can be confirmed by comparing the current estimate with ONEI's published number when it becomes available. (See Table 1. References to ONEI's data are provided in the footnotes to the tables at the end of this article).

A less precise proxy for current year fuel imports can also be obtained by looking at Direction of Trade (DOT) data. Until 2015, Cuba's oil imports came almost entirely from two countries: Venezuela (including imports routed through the Netherland Antilles) and, to a lesser extent, Algeria. Adding up Cuba's imports from these two countries provides a proxy for total fuel imports on a DOT basis. These imports are bartered against the services provided by Cuban professionals. As shown in Table 1 the differences between the DOT and SITC series are small until 2015, and the two series are highly correlated. This is reassuring because it suggests a degree of consistency between data obtained through different methods.

Cuba's **fuel exports** consist of (i) gasoline, diesel, jet fuel and residual oils processed in the Cienfuegos and other refineries using crude oil imported from Venezuela: and (ii) products from the blending operation. Data on these exports can be derived as a residual from ONEI's table on exports by main categories. As a check, oil exports can also be gauged approximately by looking at Cuba's (total) exports of goods to Venezuela, which appear to consist mostly of oil products. The difference between the DOT and SITC series is larger than in the case of imports, as Cuban exports of oil products to other countries are small (See Annex 3), but the two export series are correlated.

Annex 2. Estimating the impact of changes in Venezuelan oil trade with Cuba.

GDP (y) is the sum of absorption (a) and net exports of goods and services ($x - m$). Absorption (a) is the sum of consumption and investment by governments and households. It includes all goods sold in the domestic market whether produced domestically (d) or imported (m). The external current account balance is the difference between exports (defined to include factor income) and imports, ($x - m$). All variables are in real terms. From the familiar GDP identity, it follows that:

**Table 6. Cuba: Estimated effects of ...
on Cuba's real GDP and**

Effects on real GDP	% change in <u>exports</u>	E
2013-2017	-39%	
After 2019	-100%	
Effects on absorption	% change in <u>imports</u>	ab
2013-2017	-26%	
After 2019	-100%	

Note: Exports include oil products sold to Venezuela and professionals in Venezuela. Imports are both directly through the Netherland Antilles. All trade between Cuba stop in 2019.

(1)

$$y = (d + m) + (x - m)$$

The m 's cancel out, and therefore:

$$(2) \quad y = d + x$$

GDP is the sum of all goods and services produced internally, including those sold in the domestic market (d) and those sold abroad (x); exports include goods and services. We use equation (2) to estimate the impact of changes in trade with Venezuela on Cuba's GNP and absorption.

Taking first differences in equation (2), and given that there is no direct change in d as a result of Venezuelan actions, we have:

$$\Delta y/y_0 = \Delta x/x_0 \cdot x_0/y_0$$

Where the subscript (0) indicates the value of the variable at the beginning of the period. In words, the percentage change in Cuban GDP resulting from the change in exports to Venezuela equals the percentage change in exports times the share of those exports in GDP.

In a similar vein, absorption (a) consists of domestically produced and imported goods sold in the domestic market. Therefore, the change in absorption resulting from a change in Cuban imports from Venezuela is:¹⁴

$$a/a_0 = \Delta m/m_0 \cdot m_0/a_0,$$

meaning that the impact on absorption is equal to the percentage change in imports from Venezuela times the share of these imports in absorption. The results of the exercise are summarized in table 6.¹⁵

Table 7: Cuba: Estimated country distribution of Cuban exports of professional services					
	Million US \$		% of total		
	<u>2013</u>	<u>2017</u>	<u>2013</u>	<u>2017</u>	
<u>Total</u>	<u>9281</u>	<u>6662</u>	<u>100%</u>	<u>100%</u>	
Venezuela	6480	3952	69.8%	59.3%	
Brazil	173	750	1.9%	11.3%	
Algeria	308	295	3.3%	4.4%	
Others	2320	1666	25.0%	25.0%	
^a Adjusted for tourism, international travel, communication and other services					

There is no published information on the share of Venezuela in Cuban exports of professional services. A proxy for this variable was estimated by subtracting the shares of Brazil (from various press reports) and Algeria (from Table 1) from total services exports (properly adjusted), and assuming that the share of other countries remained unchanged at approximately 25%. The combined share of Brazil and Algeria rises from 4.7% in 2013 to 13.5% in 2017; as a result, the share of Venezuela declines from 70% to 62%. (Table 7).

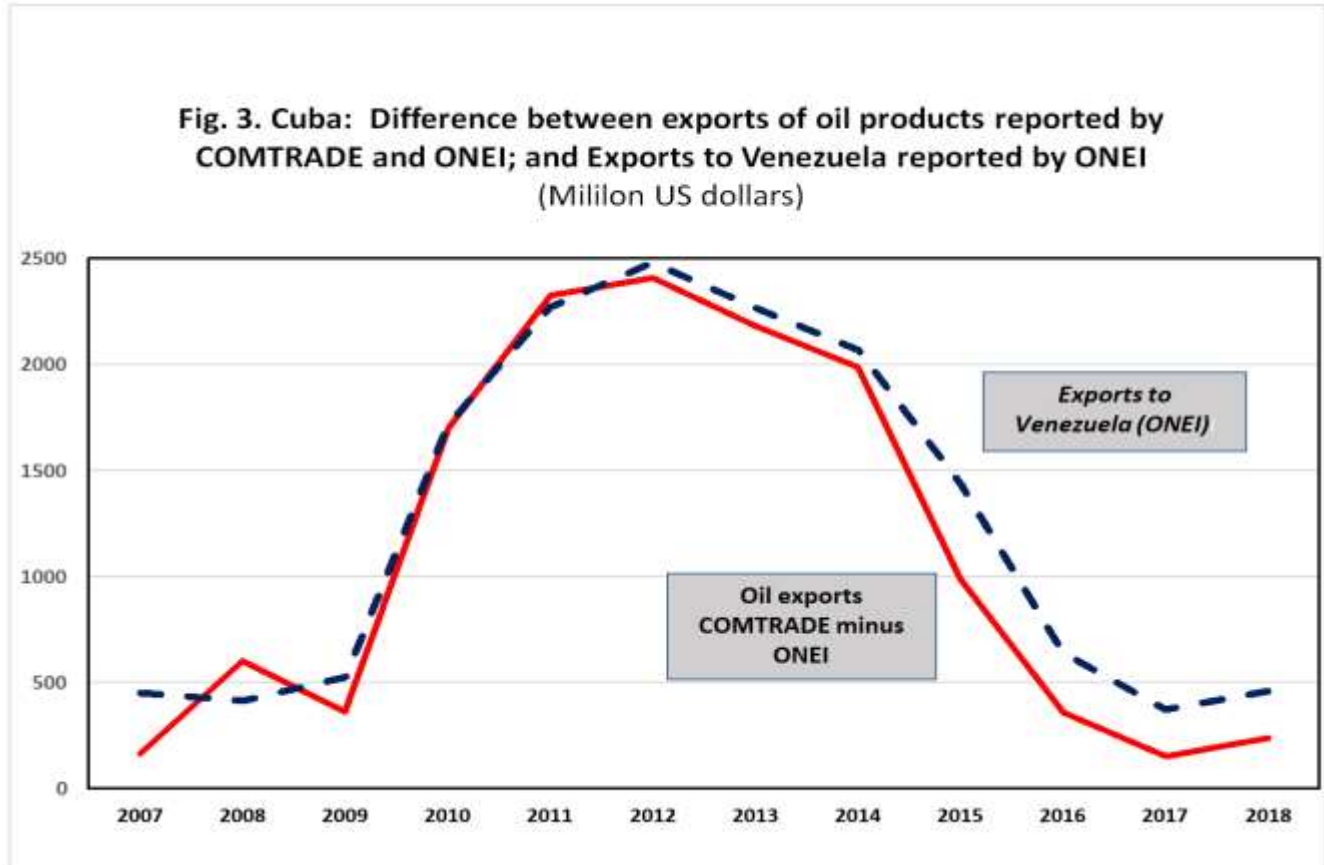
Annex 3. Reconciling ONEI and UN data on Cuban exports of fuels. The Gordian knot untied.

Statistics on Cuban exports of petroleum products are a puzzle wrapped in a mystery. As explained in section 1, these exports can be identified by calculating the residual from ONEI's table on Cuban exports by main SITC categories. They are listed on line 1 of Table 8, below. The United Nations (UN) tables in COMSTAT also provide data on Cuba's exports of blended and refined products that are known to constitute most or all of Cuban fuel exports. The UN data are shown on line 2 of Table 8. The difference between the two Series, is shown on line 3, and the puzzle is why these ONEI and COMSTAT numbers differ so much, i.e., why are the numbers in line 3 so large?

	(Millions of dollars)											
	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>
1 Exports of fuels, SITC basis (ONEI)	305	813	513	1,883	2,682	2,697	2,613	2,327	1,150	374	225	241
2 Exports of petroleum products (COMTRADE)	139	209	150	184	354	287	431	336	160	15	71	0
	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>
3 Cuban exports of oil products (ONEI minus UNCOMTRADE)	166	604	363	1,699	2,328	2,410	2,182	1,991	989	359	154	241
4 Cuban exports to Venezuela (ONEI)	450	414	528	1,717	2,273	2,484	2,266	2,070	1,438	642	375	462

Sources: ONEI, United Nations' COMTRADE, and author's calculations

In my interpretation, the explanation is that UN data exclude exports to Venezuela while ONEI's data includes them. This is because COMSTAT data are based on information provided by reporting partner country imports, and Venezuela does not report. So we expect the difference between the two series to reflect Cuban fuel exports to Venezuela. This is confirmed by Fig. 3.



Source: Table 8

UNCOMTRADE publishes data for individual reporting countries other than Venezuela (Line 2.) are fairly small, and most of these countries import infrequently. The largest importers were Belgium (with average annual imports of \$45 million in the period 2009-2018), the United Kingdom (\$42 million), Spain (\$23 million), and Denmark (\$22 million).

Table 3. Cuba: Net Imports of Fuels
(Million U.S. dollars, unless otherwise noted)

	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>
1 Net imports (DOT)	840	2006	2461	2019	4304	2249	2837	4088	3956	4084	3506	1577	1192	1758	2552
2 Net imports (SITC)	1135	1814	2019	2077	3749	2137	2647	3688	3778	3730	3290	1908	1616	2279	3067
3 Oil price (\$/barrel)	40.6	46.2	56.4	64.7	86.5	57.0	72.4	101.1	103.4	98.1	88.4	44.7	43.2	50.8	65.2
4 Net imports (DOT), thousand bpd	57	119	120	85	136	108	107	111	105	114	109	97	76	95	107
5 Net imports (SITC), thousand bpd	77	108	98	88	119	103	100	100	100	104	102	117	102	123	129
<i>Difference: Line 4 minus line 5</i>	<i>-19.9</i>	<i>11.4</i>	<i>21.5</i>	<i>-2.5</i>	<i>17.6</i>	<i>5.4</i>	<i>7.2</i>	<i>10.8</i>	<i>4.7</i>	<i>9.9</i>	<i>6.7</i>	<i>-20.3</i>	<i>-26.9</i>	<i>-28.1</i>	<i>-22</i>
DOT = Direction of Trade; SITC = Standard International Trade Classification															
<i>Line 1: Imports minus exports, DOT basis. From Tables 1 and 2.</i>															
<i>Line 2: Imports minus exports, SITC basis. From Tables 1 and 2.</i>															
<i>Line 3: PDVSA basket price before 2013; Cushing Oklahoma price thereafter.</i>															
<i>Lines 4 and 5 = lines 1 and 2 divided by line 3</i>															

Table 4. Cuba: Exports of Services, Compensation of Professionals Abroad, and GDP in the Health Sector.
(Million U.S. dollars unless otherwise noted)

	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>
1 Exports of services	3634	6551	6667	7952	8566	7819	9765	11149	12760	13027	12663	11369	11144	11379	11764
2 Tourism	2113	2399	2235	2236	2347	2082	2218	2503	2613	2608	2546	2819	3069	3302	2969
3 Communications	26	14	63	81	279	390	446	436	517	553	456	590	628	675	722
4 Other services	292	326	403	448	464	474	491	527	559	585	616	666	698	740	764
5 Exports of professional services	1203	3812	3967	5186	5477	4873	6610	7683	9071	9281	9045	7294	6749	6662	7309
6 Deflator, exports of services	97.6	98.9	102.7	101.2	97.8	85.1	101	102.1	118.8	118.8	118.8	103.3	124.8	127.4	131.2
7 Real exports of prof. services	1233	3854	3862	5125	5600	5726	6544	7525	7635	7812	7614	7061	5408	5229	5572
8 Real GDP, health sector	2808	5051	5664	6850	7722	7984	8432	8722	8756	8917	9095	9204	9103	9497	9785
Line 1: from ONEI Cuadro 5.17															
Line 2: from ONEI Cuadro 15.15. Includes international travel.															
Line 3: estimated from ONEI 2018 and data for Venezuelan communications data.															
Line 4: from ONEI 2018 data extrapolated with nominal GDP.															
Line 5: Proxy for earnings of Cuban professionals abroad. Equals line 1 minus lines 2, 3 and 4'.															
Line 6: Exports of services, current prices divided by 1977 prices. From ONEI, cuadro 5.17.															
Line 7: at 1977 prices; line 4 divide by line 6															
Line 8: from ONEI cuadro 5.7															

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ENDNOTES

¹ This article is a revised and updated version of paper presented at the Annual Conference of the Association for the Study of the Cuban Economy in July 1919. It has benefited from extensive discussions with Luis R. Luis and John Devereux.

² The price variable used is an average of the Venezuelan export price provided by PDVSA before 2013 (the last year for which PDVSA provided the information); and the Cushing Oklahoma oil price thereafter. (See Table 3). The two series were strongly correlated before 2013.

³ It is remarkable that, in spite of these exports of doctors, Cuban imports from Angola have dropped to zero in 2008.

⁴ Other estimates are higher, however. In “Cuba’s most valuable Exports” Bill Frist (2019) estimated the number of Cuban doctors in Brazil at 4,000 in 2013 and 11,429 in 2014, approximately 30% of all Cuban doctors working abroad.

⁵ Nugent (2019) reported that in 2013 Brazil paid the Cuban government \$3,600 per doctor per month, only a small fraction of which is paid to the doctors, the rest is captured by the Cuban government. This would amount to \$522 million a year—a significant number but well below the \$6 billion value of Venezuelan oil exports to Cuba in that year. These numbers have to be taken with a grain of salt, however: other estimates put the monthly payment per doctor anywhere between \$1,200 and at \$5,000.

⁶ The number of Cuban soldiers is probably much smaller. However, it has been reported that an elite unit of the Cuban Revolutionary Armed Forces (FAR) is now in Venezuela and has been sent to the Colombian border.

⁷ The national accounts and balance of payments statistics presented by ONEI classify the earnings of Cuban professionals abroad as exports of services and thus as part of GDP. Both Devereux (2018) and Luis (2019) have correctly pointed out that these earnings did not directly affect the island’s GDP because they involve productive activities carried out abroad, and *not* within the territory of Cuba. However, these ‘earnings’ did affect the balance on current account and therefore gross national income (GNI). Recently, however, the IMF has changed its balance of payments accounting, and now classifies factor income as exports of services if the workers involved have a contact with a national entity (in this case of Venezuela, the Cuban government). Under this methodology, these payments now affect both GDP and GNI. I believe the previous definition was correct, but for the purposes of this article, and to simplify things, I have used the term “exports of services” to denote the income received by Cuba for the work of its professionals abroad. This is in line with ONEI’s definition.

⁸ Details on the calculations underlying this framework are spelled out in Annex 1.

⁹ This implies that the average growth of real GNP in the period 2013-2017 would have been 3.2 % per annum in the absence of the Venezuelan actions, compared with an actual growth rate of 1.9 %.

¹⁰ Luis takes the per capita compensation of Cuban doctors by the Brazilian government as a market equivalent wage and multiplies it by 40,000—his assumption about the number of Cuban professionals in Venezuela.

¹¹ This important question was first raised by John Devereux (2018).

¹² Adjustment for other exports, such as financial, legal, computer and information services, would have been appropriate but was not feasible due to lack of data before 2018.

¹³ See Hernandez-Cata (2000).

¹⁴ In order to neutralize differences between trade prices and national accounts deflators, the share of imports in absorption is specified in nominal terms.

¹⁵ The data utilized to generate this table are as follows: Fuel imports from Table 1; exports of goods from Table 2; and exports of services from Table 4. The share of Venezuela in exports of services exports was calculated by subtracting the shares of Brazil (from various press reports) and Algeria (from Table 1) from the total and assuming that the share of other countries remained unchanged at the 2013 level of 22%.