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The Role of Sanctions in Venezuela's Collapse: A Critical Comment on Santos et al. (2026)

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Abstract

Santos, Morales-Arilla, and Partipilo Cornielles (2026) claim that the bulk of the decline in Venezuela's income preceded the imposition of economic sanctions and that the rate at which the economy contracted did not accelerate after sanctions. Both claims are false. Even if they were true, they would support the authors' conclusions only if one were to disregard the effect of oil prices on the Venezuelan economy.

Santos, Morales-Arilla, and Partipilo Cornielles (2026) [henceforth SMP] claim that economic sanctions are not a major contributor to Venezuela's collapse. They base their argument on two factual and two analytical claims. The factual claims are that: (i) most of the country's drop in income preceded sanctions, and (ii) the rate of economic contraction did not accelerate after the imposition of sanctions. The analytical claims are that: (iii) the post-sanctions share of the drop in income provides an upper bound on the economic effects of sanctions, and (iv) the lack of acceleration of the rate of output decline provides evidence against the effect of sanctions.

None of these claims withstand scrutiny. The factual claims are wrong and appear to derive from calculation or interpretational errors. The analytical claims are incorrect in that even if the mistaken factual claims on which they rely were true, they would not lend support to the authors' conclusions without imposing additional assumptions that, in the Venezuelan case, are simply untenable.

We now discuss each of their claims in detail.

The bulk of Venezuela's collapse did not precede sanctions.

SMP claim that 52% of Venezuela's decline in GDP occurred prior to the imposition of sanctions.[1] This is incorrect. They appear to arrive at this number by dividing the decline in GDP observed between 2013 and 2017 by the decline for the 2013-2023 period. In doing so,

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1. "[T]he bulk of Venezuela's economic devastation - including 52 percent of GDP losses (...) – largely occurred before financial sanctions were imposed in August 2017." (Santos, Morales-Arilla, and Partipilo Cornielles 2026, iii)

they incorrectly include the year in which sanctions were imposed, 2017, in their pre-sanctions period.[2] Since sanctions may have affected GDP in the year in which they were imposed, the only time periods that can be meaningfully described as pre-sanctions are those that end before the economy faced sanctions. Correcting this mistake yields a ratio of the pre-sanctions decline to the total 2013-23 contraction of 35.6%.[3]

The pace of Venezuela's contraction accelerated following sanctions

SMP's second claim is that the rate of decline in GDP did not accelerate after the imposition of sanctions.[4] This is also false. Table 1 shows the GDP growth series used by SMP. The average rate of contraction in the four years preceding the imposition of sanctions (2013-2016) is 6.7% and in the last year of that period it is 17.0%. The average annual rate of contraction in the four years following the imposition of sanctions (2017-2020) is 23.5%.[5]

Table 1: GDP growth in Venezuela, 2013–2020

	Pre-sanctions (2013–2016)				Sanctions (2017–2020)			
	2013	2014	2015	2016	2017	2018	2019	2020
Annual growth	1.3	-3.9	-6.2	-17.0	-15.7	-19.7	-27.7	-30.0
Average growth		-6.7				-23.5		

Annual growth rates are year-over-year percentage changes. Average growth rates are geometric averages of annual growth rates for each period. Source: Own calculations based on International Monetary Fund (2026).

Figure 1 shows the rates of contraction of the economy for the pre-sanctions and sanctions periods, using both the annual data used by SMP (Panel A) and quarterly data from Banco Central de Venezuela (2026) (Panel B). Both series show a marked deterioration following the imposition of sanctions. The quarterly series also shows that the rate of contraction had begun to decelerate in the first two quarters of 2017, and then accelerated markedly following the imposition of sanctions in the third quarter of 2017.

SMP's error appears to come from their misinterpreting a linear decline in the plot of GDP over time as evidence of no acceleration. However, a linear decline in levels corresponds to an accelerating rate of contraction. This is the reason why it is standard practice to use logarithmic

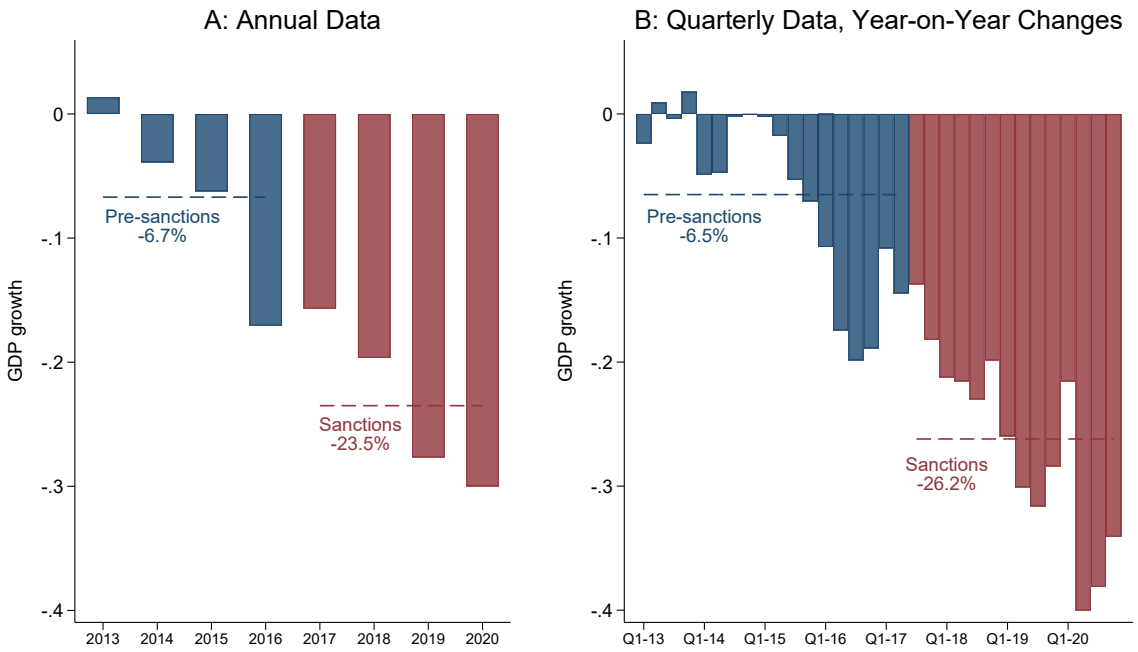
2. In their concluding chapter, SMP state that by 2016 "the country had experienced over 85% of the total GDP and import contraction that would characterize its crisis" (Santos, Morales-Arilla, and Partipilo Cornielles 2026, 61–62). We are unable to construct any computation of the GDP decline that comes close to the 85 % threshold mentioned by the authors (see footnote 3).

3. The ratio falls further to 31.6% using the most recent GDP series published by the Banco Central de Venezuela (2026). If one drops the 2017 observation, then the corresponding ratios would be 38.5% for the series used by SMP and 34.1% for the more recent series. If, in addition to this, one uses the trough of the collapse in 2020 as the endpoint, then the ratios become 36.3% and 31.1%, respectively. Note that SMP also include 2023 in their treatment period, despite the fact that sanctions began to be eased in late 2022 with the granting of an authorization that led Chevron to triple its production of Venezuelan oil (Más Energía 2023).

4. "We observe no acceleration in rate of collapse then [in 2017], but a continuation of pre-sanctions trends - that is, had the Venezuelan economy continued to evolve as it was before sanctions were first enacted, we would observe very similar outcomes by 2020." (Santos, Morales-Arilla, and Partipilo Cornielles 2026, 2)

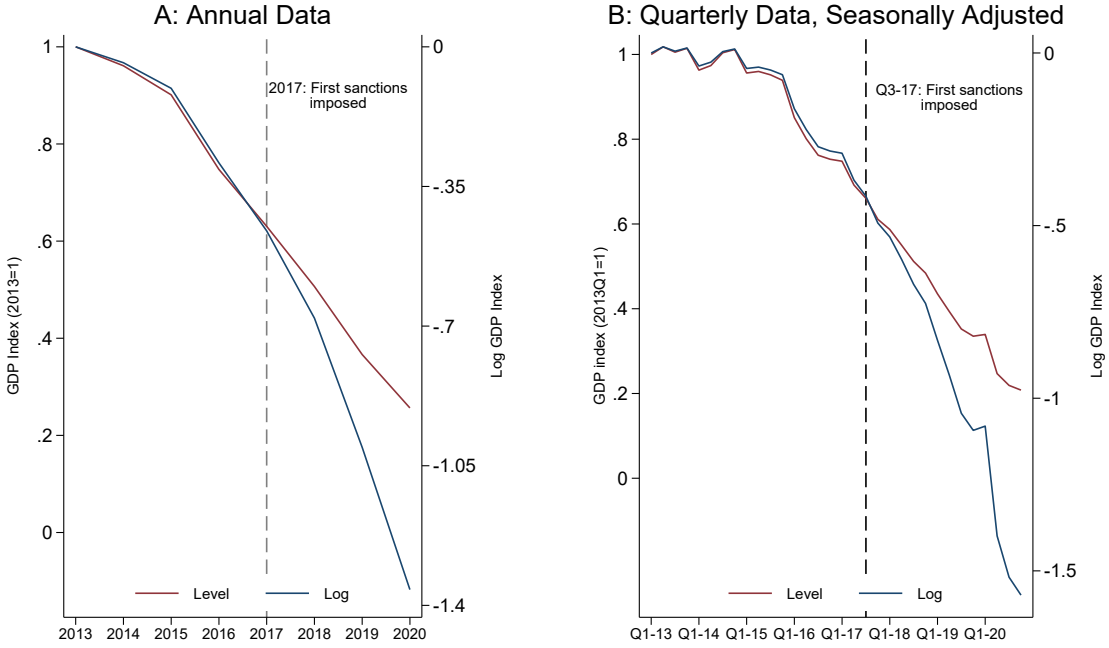
5. Using the most recent GDP series published by the Banco Central de Venezuela (2026), the annual rate of contraction for 2013-2016 is 6.0%, and for 2017-2020 it is 24.8%.

Figure 1: Venezuelan GDP growth rates, 2013-2020



Source: Own calculations based on International Monetary Fund (2026) and Banco Central de Venezuela (2026).

Figure 2: Venezuelan GDP in levels and logarithms, 2013-2020



Source: Own calculations based on International Monetary Fund (2026) and Banco Central de Venezuela (2026). Seasonal adjustment carried out using the JDemetra+ X-13 algorithm.

plots to diagnose trend breaks in macroeconomic time series. Figure 2 compares the levels plot used by SMP with a logarithmic representation. The latter clearly shows a break in trend following the imposition of sanctions, both in the annual and quarterly series.

SMP further write that "The Venezuelan economic collapse comes to a halt in 2020-2021, right after the enactment of oil sanctions in 2019, and despite the COVID-19 pandemic." This is also false. Venezuela contracted by a cumulative 49.4% in the two-year period that followed the imposition of oil sanctions. This was the second-largest economic contraction in the world in that period.[6]

The magnitude of the pre-sanctions decline does not constrain the effect of sanctions

We now discuss two analytical claims made by SMP which, while not factually incorrect, rely on implicit assumptions that in the Venezuelan context are simply untenable.

The first of these claims is that the share of the output drop occurring during the sanctions period functions as an upper bound for the effect of sanctions.[7] Recall that, as we have already seen, once properly calculated, this share is 64% of the total output drop, and thus completely consistent with a large effect of sanctions on output. Nevertheless, let us assume that the share of sanctions period output drop were indeed lower than 50%, as incorrectly calculated by SMP. Their claim that this would somehow bound the effect of sanctions would only be true if there were no other factors affecting Venezuelan growth that experienced meaningful variations between the pre-sanctions and the sanctions period. Yet we know this is not the case, as Venezuelan oil prices recovered substantially at around the same time that sanctions were first imposed.

To fix ideas, imagine a simple model of the Venezuelan economy in which the country's income is a function of oil revenues:

$$y_t = \alpha_0 + \alpha_1 x_t = \alpha_0 + \alpha_1 p_t q_t \tag{1}$$

where y denotes GDP, x denotes oil export revenues, p is the price of a Venezuelan barrel of oil, q is the volume of Venezuelan oil exported, and the subscript t denotes year.[8] Let $t = 0, 1, 2$ respectively denote the start of the pre-sanctions period, the last year of the pre-sanctions period, and the last year of the period over which we measure the decline. Let us also assume for simplicity that oil output remains unchanged between periods 0 and 1 and that it declines between 1 and 2 only due to the effect of sanctions.

6. Only Macao, whose gaming and tourism sector was completely shuttered during the pandemic, contracted at a more rapid rate than Venezuela during the 2019-20 period, according to the Penn World Table dataset (Groningen Growth and Development Centre, Penn World Table Version 11.0; Feenstra, Inklaar, and Timmer 2015).

7. "If the lion's share of economic and developmental collapses had occurred by the time sanctions were enacted, and if their worsening trends attenuated and started improving after sanctions, then it is extremely hard to justify statements that impute '52% of the Venezuelan economic collapse' and four out of eight million Venezuelan refugees as a consequence of sanctions" (Santos, Morales-Arilla, and Partipilo Cornielles 2026, 7).

8. Variants of equation (1) can be derived from most workhorse models of the Venezuelan economy, including Rodríguez and Sachs (1999), Hausmann and Rigobón (2003), Hausmann (2003) and Hausmann and Rodríguez (2014).

The total contribution of sanctions to the decline in the country's GDP between $t = 0$ and $t = 2$, measured at terminal-period prices, will be given by:

$$f_S = \frac{\alpha_1 p_2 \Delta q}{y_2 - y_0} \tag{2}$$

The share of GDP decline in the pre-sanctions period will be:

$$f_P = \frac{\alpha_1 q_1 (p_1 - p_0)}{y_2 - y_0} \tag{3}$$

SMP contend that the share of the decline that occurs after the imposition of sanctions, $1 - f_P$ should be treated as an upper bound for the effect of sanctions. Call this upper bound U_{SMP}:

$$U_{SMP} = 1 - f_P = \frac{y_2 - y_0 - \alpha_1 q_1 (p_1 - p_0)}{y_2 - y_0} \tag{4}$$

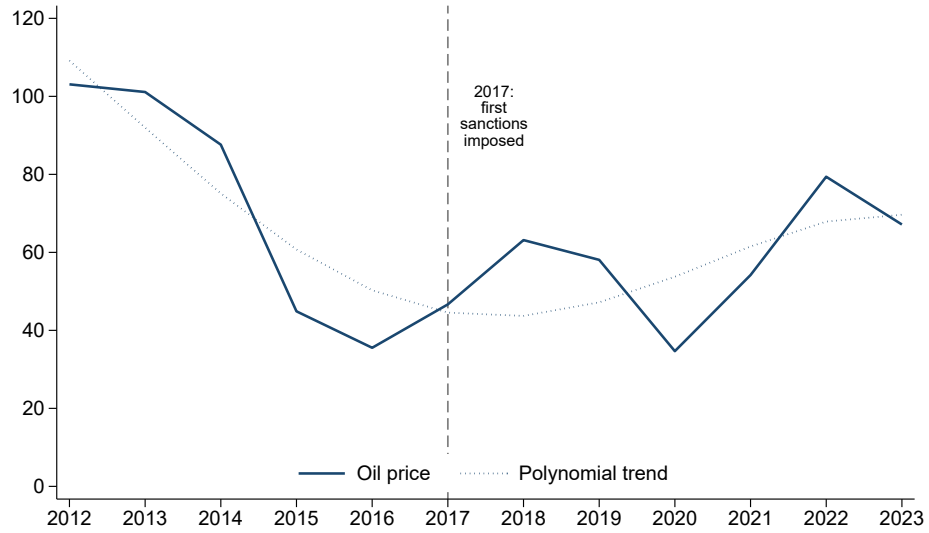
Note that $f_S < U_{SMP}$ if and only if

$$\alpha_1 p_2 \Delta q > y_2 - y_0 - \alpha_1 q_1 (p_1 - p_0) \tag{5}$$

which implies:

$$p_2 < p_1. \tag{6}$$

Figure 3: Venezuelan oil prices, 2012-2023



Source: Own calculations based on data from OPEC (various years).

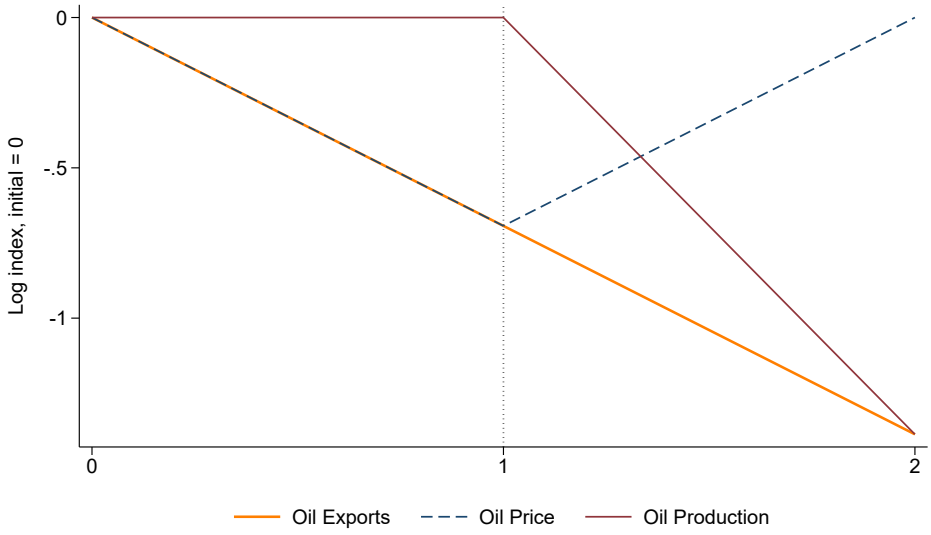
That is, for SMP's upper bound condition to be correct, oil prices must not increase in the sanctions period. This condition was clearly violated in Venezuela in the period in question (Figure 3). The price of a barrel of Venezuelan oil, which had fallen by 66% between 2012 and 2016, began to recover at the same time as sanctions were imposed. It rose from $36 to $79

between 2017 and 2022, erasing half of the 2012-16 decline.[9]

Absence of trend breaks is uninformative of treatment effects under changing covariates

Last, SMP contend that the lack of variation in trends of decline of income which they claim exists between the pre-sanctions and the sanctions periods is evidence against sanctions having an effect on output.[10] Recall once again that their premise is incorrect – the rate of decline in GDP accelerated significantly after the imposition of sanctions. But, for the sake of argument, let us assume that they were right on the facts. Even in that case, their analysis would still be incorrect.

Figure 4: Example of sanctions-driven decline with constant output trend



We can prove this with a simple example, illustrated in Figure 4. Assume that oil prices fall by 50% in the pre-sanctions period, and then recover fully, and that oil output falls as a result of sanctions by 75%. Assume also that income is proportional to exports.[11] Then oil exports – and income – will fall by 50% in the pre-sanctions period, and by an additional 50% (that is, to 25% of its value in $t = 0$) in the post-sanctions period. The pre-sanctions and post-sanctions rates of decline will be the same (50%), even though sanctions explain all of the output decline.

In other words, improving oil prices lead to ceteris paribus improvements in Venezuelan economic conditions. Therefore, two factors with different impacts on the economy – sanctions, which hurt the economy, and oil prices, which help it – coincide in time. This makes it impossible to infer the effect of sanctions without controlling for oil prices.[12] Nevertheless, the fact that

9. As I have explained elsewhere, the initial decline in prices – combined with the fact that the economy, due to the effects of poor past policies, was not prepared to deal with a negative term of trade shock of this magnitude – was the proximate cause of Venezuela's 2013-2016 recession (Rodríguez 2025, chapter 4).

10. See footnote 4.

11. This requires either $\alpha_0 = 0$, or $\alpha_1 = 1$ and equation (1) being in logarithms. Relaxing either of these assumptions complicates the algebra while leading to the same substantive conclusions.

12. I provide a summary of different ways to approach this problem in chapter 9 of Rodríguez (2025).

the economy failed to stabilize despite rising oil prices after 2017 strongly suggests that negative forces, such as the impact of sanctions, were counteracting the positive effect of the recovery in oil prices.

Our argument is a simple restatement of classic omitted variable bias: SMP's misguided conclusion follows from disregarding the effect of a key determinant of Venezuelan economic growth that moved in the opposite direction to sanctions in the period in question. The aggravating factor is that the omitted variable is one that has been central to nearly all analyses of the Venezuelan economy published over the past century (see, e.g., Adriani 1931; Mayobre 1944; Peltzer 1944; Mieres 1962; Maza Zavala 1964; Pérez Alfonzo 1971; Mommer 1988; Rodríguez 1986; Hausmann 1990; Baptista 1997).

Additional issues

There is, of course, much more analytical material in SMP than what we have set out to discuss in this short note. Regrettably, much of it suffers from similarly serious deficiencies.

First, SMP extend their flawed analysis of GDP trends to other trends of economic and social development indicators. These variables all show strong correlations with and similar points of inflection as the GDP series. The same analytical problems of interpretation that we have pointed to in this discussion extend to their analysis of these series.

Nevertheless, their discussion of these variables introduces additional distortions and interpretational problems. To name just one example, SMP claim that "infant mortality rates stabilize in 2017–18" [p. 4], showing two series in support of that claim. But one of the series (from EIU) shows large increases in those years while the other one – from the World Development Indicators, and originally produced by the United Nations Inter-Agency Group for Child Mortality Estimation (UN-IGME) – shows a constant value for 2016-2020 only because the government stopped reporting data about it to international agencies (UN Inter-agency Group for Child Mortality Estimation (UN IGME) 2025).[13]

Second, SMP contend that economic activity did not decline more and migration did not increase more in oil-producing regions after the sanctions. But this tells us nothing about the effect of sanctions, which largely operate through the reduction in the availability of foreign exchange and the consequent reductions in imports and government spending, reductions which can fall just as heavily on the non-oil sector.

Third, SMP claim that the fact that the 2019 electricity blackouts affected oil production is somehow evidence against the effect of concurrent oil sanctions, despite the fact that the post-sanctions drop in production was permanent and that the massive blackouts experienced in early 2019 were not recurrent.

Fourth, some key pieces of empirical analysis in SMP – those that use their field-level oil production data and cornflour sales data – are provided by firms whose identity, in the authors' language, "shall remain anonymous" (Santos, Morales-Arilla, and Partipilo Cornielles 2026, 41,

13. Although the UN IGME methodology uses B-spline estimation for extrapolation of missing data, these are overridden by constant estimates in some contexts in which reliable primary information is unavailable (Alkema and New 2014).

72, 75). Lack of reproducibility of these results limits their informational value for evidence-based policy debates.

Lastly, SMP argue that welfare-improving economic reforms, such as the lifting of price controls, were a consequence of sanctions. This is the basis of their characterization of sanctions on Venezuela as welfare-improving "constraints on authority."

There is, of course, a longstanding literature that claims that economic crises lead to reforms (see, e.g. Drazen and Grilli 1993; Drazen 2000; Mahmalat and Curran 2018). There is nothing unusual in the Venezuelan case in this respect: as the country's economy imploded, Nicolás Maduro was deprived of the money to fund the populist largesse of his predecessor and was left with no choice other than to partially liberalize the economy.

However, SMP largely get the timing wrong by arguing that these changes came primarily after the imposition of sanctions. In contrast, there is strong evidence that the easing of price controls began before the first economic sanctions of August 2017. In February 2016, Maduro announced a 6,000% increase in gasoline prices, the first one in 17 years of Chavismo in power, and disbanded the system of government-run grocery stores that channeled indirect food subsidies to consumers (Brodzinsky 2016; El Estímulo 2016). As Anatoly Kurmanaev (2016) reported later that year:

> "President Nicolás Maduro's government has begun dismantling price controls, a major policy shift that aims to ease widespread unrest by letting shops sell food at market prices but is worsening Venezuela's already punishing inflation. The scheme allows state governments and private retailers with access to dollars to import everything from ketchup to rice from neighboring Brazil, Colombia and tiny Trinidad and Tobago. Stores and distributors recuperate the investment by reselling the products at many times the state-controlled price, an approach that until now was anathema to a socialist government bent on controlling every aspect of the economy."

During early 2017 the government implemented new policies aimed at further easing controls, including selling gasoline at near-international prices in border regions (El Siglo 2017) and transitioning to a system of direct cash and in-kind transfers to low-income families to replace the prior indirect subsidies (Rodríguez 2024; Rodríguez and Bravo, forthcoming).

Certainly, the easing of controls gained speed in late 2017 and 2018, as the government unified the official rate and allowed it to converge with the parallel rate. Yet there is a major contradiction between SMP's contention that the 2017 financial sanctions had a "relatively limited scope" [p. 2] because the government had already lost access to international capital markets and their claim that it was the introduction of these sanctions that forced major policy reforms.[14] It is odd to argue in the same breath that financial sanctions imposed no binding constraint on government actions but at the same time should be characterized as "constraints on authority." SMP offer no explanation for how constraints which they claim did not materially alter the government's choice set nevertheless forced it to adopt major economic and political reforms.

14. As I explain in Rodríguez (2025, 256–260), this argument disregards the large levels of financing that the oil industry obtained through loans to joint ventures, as well as the economic effects of not being able to restructure the nation's debt.

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