Is Venezuela Still an Upper-Middle-Income Country?
Estimating the GNI per Capita for 2015–2021

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Abstract

In the 2022 World Bank (WB) country classifications by income level, Venezuela is classified as an upper-middle-income country. Due to the lack of reliable official economic information from the Venezuelan regime, the WB ranked the country using its gross national income (GNI) of 2013. However, after 2013 Venezuela started to experience one of the largest economic collapses observed in Latin American history. We use three different approaches (the Atlas method, extrapolation, and an adjusted deflator) to obtain consistent and robust estimates of the GNI per capita for Venezuela up to 2021. Our findings reveal that Venezuela has been a lower-middle-income country since 2018 and suggest a 2021 GNI per capita of US$1,826 using the Atlas method, US$2,070 applying an extrapolation technique, and US$2,079 following an adjusted deflator. These results are substantially lower than the US$11,970 and US$13,080 reported by the WB for 2013 and 2014, respectively. A reconsideration of Venezuela's WB income-level classification could facilitate access to concessional conditions to internationally supported mechanisms.

Keywords: Atlas method; country classifications; deflator; extrapolation; GNI per capita; gross national income; Venezuela

JEL Codes: F35, O10, O19, O54

1. Introduction

In the 2022 World Bank (WB) country classifications based on gross national income (GNI)[1] per capita data, Venezuela is listed as an upper-middle-income country. To be considered as such, Venezuela's GNI per capita should be between US$4,255 and 13,205, inclusive. In contrast to its treatment for most of the countries here, however, the WB uses Venezuela's GNI data from 2014, and that country's 2013 figure justifies the classification mentioned above. This is due mainly to the fact that the WB has not received official data from the Venezuelan regime over the last eight years. Even with some data for 2015–2018, the strong acceleration of inflation (with a quasi-fixed official exchange rate at significantly overvalued levels) complicates the conversion of macroeconomic aggregates expressed in local currency to US dollars. Moreover, the Central Bank of Venezuela (Banco Central de Venezuela, BCV) has not released national account aggregates since 2018.

Nonetheless, in 2013 it is clear that the Venezuelan economy started to experience one of the greatest collapses observed in Latin American history, losing almost 75 percent of its real GDP between that year and 2021. Thus, matching the WB classification of Venezuela as an upper-middle-income country with the current massive deterioration of its economy and social conditions requires a fertile imagination. In this paper, we use available information to obtain consistent and robust estimates of the GNI per capita for Venezuela.

We follow the fundamental elements of the methodology suggested by the WB for income classification (the Atlas method), an alternative extrapolation procedure also recommended in the WB's methodological report, and a deflator adjustment in order to correct the greatly distorted nominal GDP. These estimates should capture the recent evolution of Venezuela's economic situation and enable us to answer the

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[1] In general, the gross domestic product (GDP) is the basic macroeconomic aggregate that describes the output, income, and expenditure of an economy. GDP can be measured in three ways: (1) from the supply side; (2) from the demand side; and (3) from the income side. From the income side, GDP is obtained by aggregating all factor incomes generated domestically. The GNI is understood as the GDP plus the net factor income from abroad (that is, net earnings—or payments—from wages, interest, and profits earned or remitted overseas).

question: Is Venezuela still an upper-middle-income country? This is the main contribution of the paper.

The observed mismatch is not simply an issue for abstract discussion, because it has real effects on the country. For example, the COVID-19 pandemic triggered the need for countries to quickly access tests, treatments, and vaccines. COVID-19 Vaccines Global Access (COVAX) was launched in April 2019 in response to the pandemic as an initiative to provide equitable access to vaccines worldwide once they became available. Despite its socioeconomic crisis, Venezuela agreed to participate in the vaccine-sharing scheme (COVAX advance market commitment, AMC) through a self-financing mechanism and pay a full price per dose received. However, 92 low-income and lower-middle-income countries were eligible to access COVID-19 vaccines via a separate financial mechanism funded mainly through official development assistance (ODA) provided by members of the Organization for Economic Co-operation and Development (OECD)'s Development Assistance Committee (DAC). In Latin America and the Caribbean (LAC), Bolivia, El Salvador, Guyana, Haiti, Honduras, and Nicaragua were AMC-eligible economies. Venezuela could have accessed COVID-19 vaccines in similar concessional conditions but was considered an upper-middle-income country. In fact, our findings reveal that Venezuela has actually been a lower-middle-income country since at least 2018.

Following different approaches, we observe a sustained decline in Venezuela's GNI per capita after 2013. The Atlas method and an extrapolation technique suggest a 2021 GNI per capita of US$1,826 and US$2,070, respectively, and using an adjusted deflator, around US$2,079. This scenario allows us to reclassify Venezuela as a lower-middle-income country at present.

The paper is organized as follows: in the next section, we briefly examine the context of the economic collapse in Venezuela and offer evidence for why Venezuela's current position in the classification by income level may be outdated. The third section reveals the rapid advancement of Venezuela toward a situation of high institutional and social fragility. In the fourth section, we briefly describe each approach and the available data for our calculations. The fifth section presents our results and some robustness checks, while the sixth section concludes.

2. Is Venezuela Actually an Upper-Middle-Income Country?

Since 1993, the WB has been using the Atlas method to estimate the size of the economies of countries based on their GNI in US dollars. The GNI per capita derived by this methodology provides the basis for classifying the world's economies by income level. Using yearly-variant thresholds, each country is classified into one of four income groups: low-income, lower-middle-income, upper-middle-income, or high-income. For the current 2023 fiscal year, the respective thresholds for classifying countries using 2021 data are as follows:

- Low-income ≤ US$1,085
- US$1,085 < Lower-middle-income ≤ US$4,255
- US$4,255 < Upper-middle-income ≤ US$13,205
- US$13,205 < High-income.

On the basis of this scale, Venezuela is currently classified as an upper-middle-income country. However, during 2013–2018, official data from the BCV show a decline in real GDP of about 49.3 percent and estimates from the International Monetary Fund (IMF) reveal a contraction of more than 70 percent during 2013–2021. Furthermore, in 2016 Venezuela entered hyperinflation. From then to the end of 2021, the BCV estimates an inflation rate of almost 30 billion percent. In this context, Olivo and Saboin (2020) warn us that the subsidy mechanism has prevailed in Venezuela endangered fiscal resources, deepening the distortion of relative prices and consequently the humanitarian crisis. In parallel, the country is experiencing the largest displacement crisis in LAC's recent history. According to the Inter-Agency Coordination Platform for Refugees and Migrants from Venezuela (R4V), the number of refugees and migrants has recently surpassed 7 million globally (September 2022).[2]

Economically speaking, Venezuela is an oil-dependent country. Its oil exports account for more than 95 percent of the total export revenue. Direct sources from the Venezuelan state-owned oil and natural gas company, Petróleos de Venezuela,

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[2] Inter-Agency Coordination Platform for Refugees and Migrants from Venezuela (R4V), https://www.r4v.info.

S.A. (PDVSA), indicate a sharp fall in average barrel-per-day oil production of around 77 percent between 2013 and 2021, mostly due to a lack of investment and maintenance; relatively low oil prices from early 2015 to the end of 2021 compounded the negative economic effect of this reduced production. PDVSA's results severely affect the country's external balance. The significant impacts of international shocks and domestic mismanagement led to socioeconomic and political turmoil with no precedent in Latin America (Vera, 2017; Abuelafia and Saboin, 2020), with severe adverse effects on local poverty (Maldonado, 2022) and an economic collapse described by Kurmanaev (2019) as "the worst outside of war in Decades."

Venezuela is still classified as an upper-middle-income country despite its economic situation. This paper seeks to correct this apparent mischaracterization by revisiting and estimating income data for the country. The WB data compilation methodology states that national accounts and balance of payment data come from two sources: (1) current reports produced by its Country Management Units and (2) data obtained from official sources. Currently, the WB does not have a portfolio of active loans in Venezuela, and over the past eight years it has yet to receive official data from Venezuelan authorities. Furthermore, the BCV has not even reported national account aggregates after 2018; for the period for which some data are available, 2015–2018, the quasi-fixed official exchange rate has been significantly overvalued, which complicates the conversion of macroeconomic aggregates from the local currency to US dollars.

Under this scenario, 2013 and 2014 are the last two years with calculated GNI per capita for Venezuela, with US$11,970 and US$13,080, respectively. The 2013 income data and the respective thresholds form the basis for including Venezuela in the upper-middle-income group and the 2014 income data place the country in the high-income group. The WB categorizes Venezuela following the 2013 GNI per capita, mainly due to the lack of a stable indicator of the exchange rate.

For example, the local currency should have been devalued by around 160 billion percent during 2016–2021 to keep the GNI per capita at the US$13,080 level, which is relatively low compared to the actual devaluation of about 3.2 trillion percent that

happened throughout the same period.[3] Furthermore, using the Atlas method and assuming the available macroeconomic aggregates reported by the BCV as well as the path of the official exchange rates (controlled by the Venezuelan regime since 2003), the GNI per capita should have exceeded US$60,000 in 2017. That value is only comparable to the GNI per capita of high-income countries such as Denmark, Iceland, Qatar, and the United States and is quadruple the GNI per capita of LAC countries such as Chile and Uruguay. This situation reflects the distortion of the market provoked by the fixed exchange rate.

Figure 1 shows how the GNI per capita used (as determined via the Atlas method) to classify Venezuela is similar to those of economies in LAC that are not in a state of collapse or do not have recent hyperinflation episodes (Costa Rica and Argentina) and is more than double those of Venezuela's Andean peers (Bolivia, Colombia, Ecuador, and Peru). This mischaracterization needs to be corrected.

FIGURE 1. GNI PER CAPITA: ATLAS METHOD, 2021 (US$)
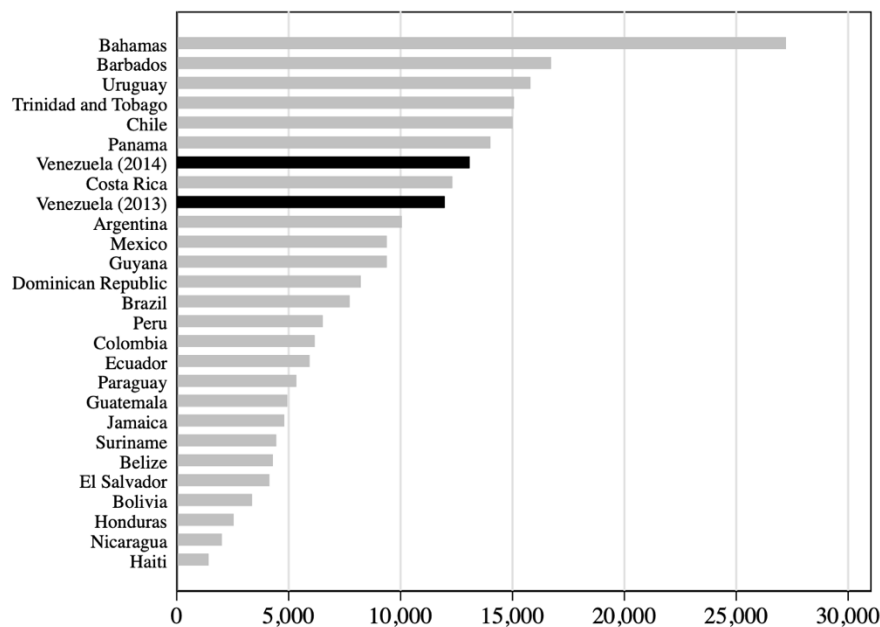
Source: World Bank.[4]

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[3] This result comes from a simple exploratory exercise of applying the Atlas method and assuming the exchange rate is the only yearly adjusting factor.

[4] WB's data of GNI per capita, https://data.worldbank.org/indicator/NY.GNP.PCAP.CD.

The country struggles to address its humanitarian and socioeconomic crisis, but Venezuelan authorities neither report nor share reliable data that would enable the updating of Venezuela's income classification. As a result, Venezuela does not meet the income requirements of multilateral organizations to be considered for massive humanitarian aid initiatives. It cannot request nonfinancial assistance through foreign support mechanisms and its income status makes the country ineligible for concessional financial aid or international debt relief programs.

Two recent examples show the unfavorable consequences of this misclassification. First, in May 2020 the G20 responded to a call from the IMF and the WB to set up the Debt Service Suspension Initiative (DSSI), under which eligible countries could receive a temporary suspension of their debt-service payments owed to their official bilateral creditors. As of February 2022, the DSSI had helped 48 out of 73 low-income and lower-middle-income countries to mitigate the impact of the COVID-19 pandemic before the DSSI expired at the end of December 2021. Unfortunately, Venezuela was not even eligible to participate in the debt relief program and receive potential DSSI savings, unlike Haiti, Honduras, and Nicaragua, which were eligible, although they did not participate. Second, Venezuela's participation in the COVAX advance market commitment was through a self-financing mechanism, with the country paying the full price per dose received. Simultaneously, 92 low-income and lower-middle-income countries were eligible to access the COVAX initiative via a separate financial mechanism funded mainly through official development assistance.[5]

The revisiting of the GNI per capita calculations for Venezuela should be seriously considered. Its income classification should be revised in light of the new reality of the country. While the BCV has released national accounts data and balance of payments records through 2018, the BCV neither promotes transparency concerning its macroeconomic aggregate data nor has it shared recent official reports. This paper attempts to put GNI per capita data into context for Venezuela, updating them

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[5] AMC-eligible countries in LAC were Bolivia, El Salvador, Guyana, Haiti, Honduras, and Nicaragua.

throughout 2015–2021 using the Atlas method with available information, an extrapolation procedure, and an adjusted deflator as alternative approaches.
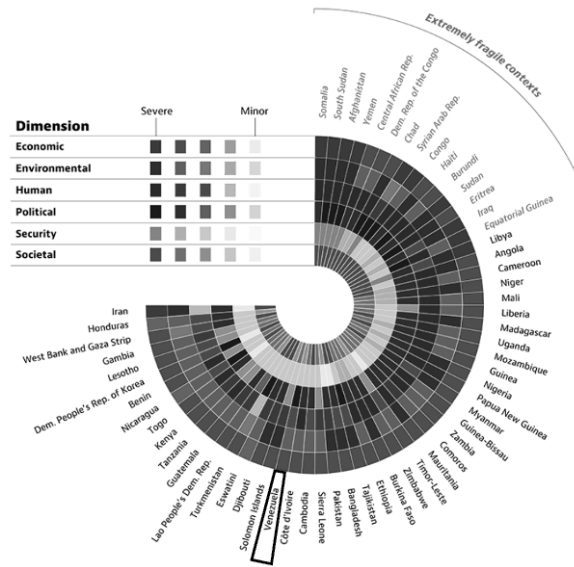
3. A Fragile Country

The classification of Venezuela as an upper-middle-income country is difficult to grasp, either in terms of the typical quantitative indicators derived from the aggregate output and income statistics or in terms of qualitative indicators. Several reports and indexes have documented the rapid qualitative deterioration of Venezuela's situation.

According to the list of fragile and conflict-affected situations (FCS) reported by the WB,[6] Venezuela is characterized by high institutional and social fragility. This means that the state is experiencing severe challenges in providing public services and controlling territory, frequently resorting to repression and political and socioeconomic exclusion.

This evaluation is seconded by the OECD, which produces a multidimensional fragility framework to identify contexts with high exposure to risk and insufficient coping capacities to manage, absorb, or mitigate those risks. The OECD has constructed a fragility index based on 57 indicators across 6 dimensions: economic, environmental, human, political, security, and societal. In the most recent classification, the OECD (2022a, 2022b) identifies 60 fragile contexts due to income levels, geography, political natures, and conflict status, of which Venezuela was one (Figure 2). The country appears as 18th out of 60 (the most fragile context). Excluding Haiti, Venezuela has the most fragile scenario within the Western Hemisphere; Guatemala, Nicaragua, and Honduras (the latter two were lower-middle-income countries in 2021; Guatemala was on the threshold of the upper-middle-income group) were classified as less-fragile contexts.

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[6] WB's list of FCS, https://thedocs.worldbank.org/en/doc/9b8fbdb62f7183cef819729cc9073671-0090082022/original/FCSList-FY06toFY22.pdf.

FIGURE 2. THE OECD'S MULTIDIMENSIONAL FRAGILITY FRAMEWORK, 2022

Source: OECD (2022a).

A third nongovernmental organization, the Fund for Peace (FFP), also produces a classification for fragile countries based on three sources: quantitative data from other institutions, content analysis of articles and reports, and qualitative analysis from experts.

FIGURE 3. FSI (120 = MOST FRAGILE)
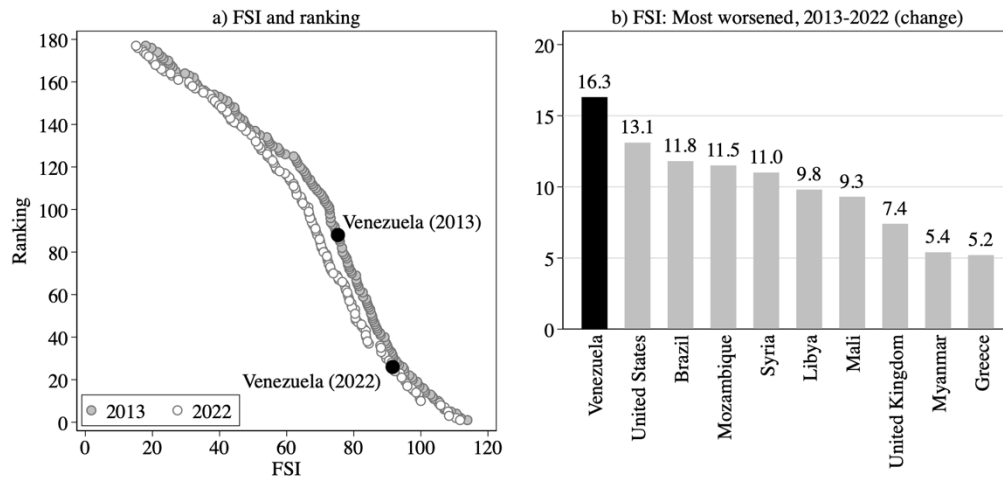
Source: FFP (2022).

According to the FFP Fragile State Index (FSI, which has a maximum level of 120 = most fragile), Venezuela has seen a rapid deepening of its fragility situation (Figure 3). Panel a clearly shows Venezuela's move from an FSI value of 75.3 in 2013

(ranking 89th out of 178 countries) to one of 91.6 in 2022 (ranking 26th among 179 countries). This resulted in Venezuela's being at the top of the list of countries in the world in terms of increased fragility between 2013 and 2022. Panel b shows that Venezuela's FSI value in 2022 was 16.3 points higher than its 2013 value, representing a increase of 22 percent.

Figure 4 exhibits that lower-income countries are associated on average to higher FSI values and thus higher levels of fragility. Since 2013, the conditions in Venezuela have worsened dramatically, represented by the FSI upward trend. In this case, Venezuela's level of fragility makes the country more comparable to low-income or lower-middle-income countries than to upper-middle-income or high-income ones.

FIGURE 4. FSI BY INCOME CLASSIFICATION OF 2021 (AVERAGE, 120 = MOST FRAGILE)
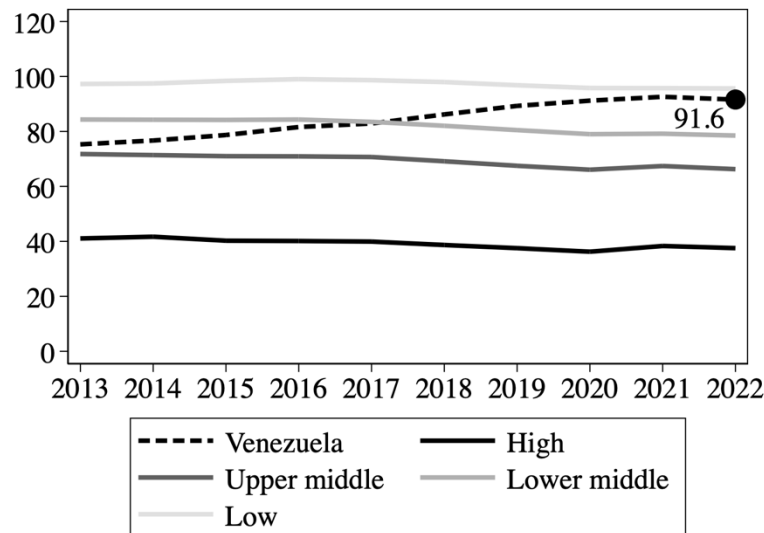
Source: FFP (2022).

Perhaps the most revealing gauge of the ongoing acute deterioration of the socioeconomic situation of Venezuela over the last eight years is the crisis generated in the region by the immense and sudden flow of Venezuelan migrants and refugees. Given its magnitude and velocity, this migration crisis has been openly compared with that occurring in Syria.

The World Migration Report 2022, published by the International Organization for Migration (IOM) of the United Nations (UN), states that 5.6 million Venezuelans were displaced globally as of June 2021 (85 percent of whom moved to another LAC

country, primarily Colombia, Peru, Chile, Ecuador, and Brazil). These figures are consistent with data reported by the R4V platform, which counts 7.1 million Venezuelan refugees, migrants, and asylum seekers for September 2022 (84 percent of whom were living in another LAC country).

These indicators capture Venezuela's rapid advancement toward a situation of fragility, which reinforces the need to update the measures of GNI per capita and revise the country's current income group classification.

4. Approaches and Data

In this paper, we follow three approaches to obtain 2015–2021 GNI per capita estimates: the Atlas method, extrapolation, and an adjusted deflator.[7]

1) *Atlas method.* The Atlas method relies on the exchange rate, which is the ratio between the nominal GDP in local currency and the nominal GDP in US dollars, as reported by the IMF. We use the rate to calculate the Atlas conversion factor that we apply to our estimates. In January 2008 the first of three monetary reconversions in Venezuela was implemented, in which three zeros were removed from the local currency.[8] From 2008 on, the nominal GDP data in terms of US dollars reported by the IMF started to diverge from that reported by the WB (the same happened with the exchange rate used during the GDP currency conversion to US dollars). Looking for robustness, we obtain the GNI proxy using the data from 1997 to 2021 of 26 LAC countries.[9] Then, we test for similarities between our estimates and those from the WB.

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[7] For details, see Appendixes A.1, A.2, and A.3, respectively.
[8] The second monetary reconversion was in August 2018, in which five zeros were removed from the national currency, and the third was in August 2021, when six more zeros were removed.
[9] The countries are Argentina, the Bahamas, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Trinidad and Tobago, Uruguay, and Venezuela.

2) *Extrapolation*. We apply a recursive extrapolation technique using the change in the ratio of domestic to international inflation (following the GDP deflator and the SDRs deflator, respectively) as a proxy for the exchange rate under different base years from 1997 to 2007. In this case, each base year represents a regular or stable period from which the extrapolation occurs. We begin in 1997, because this was the last base period used by the BCV in its national account statistics. We assume the years from 1997 to 2007 (before the first monetary reconversion) as reference periods for our calculations, but we exclude 2002 and 2003 as base years because of the political turmoil experienced during that period and the onset of exchange rate controls established by the Venezuelan regime in 2003.

3) *Adjusted deflator*. The overvalued official exchange rate and the years of hyperinflation have distorted Venezuela's nominal GDP. The adjusted deflator approach assumes "stable" conditions across LAC countries after 1997, with the exception of Venezuela, to estimate parameters that enable us to adjust the Venezuelan GDP deflator, accounting for the official exchange rate and assuming a constant rate after 2017. We calculate an adjusted nominal GDP, which is then used to estimate the GNI per capita. In this case, we consider four different samples to estimate the parameters through panel regressions and obtain adjusted deflators: a full panel of 25 LAC countries (the same as with the Atlas method, but excluding Venezuela); two panels considering countries in the same income groups as Venezuela in 1997 and 2013, respectively; and a panel with Venezuela's Andean peers.[10]

The variables and their sources used for the calculations are described in Table 1.

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[10] Venezuela was considered an upper-middle-income country in both 1997 and 2013. The LAC countries in the same income classification in 1997 were Argentina, Barbados, Brazil, Chile, Costa Rica, Mexico, Panama, Trinidad and Tobago, and Uruguay; in 2013 they were Belize, Colombia, Costa Rica, the Dominican Republic, Ecuador, Guyana, Jamaica, Mexico, Panama, Paraguay, Peru, and Suriname. The panel with Andean countries only considers Bolivia, Colombia, Ecuador, and Peru.

TABLE 1. DESCRIPTION OF VARIABLES

Variable	Description
Atlas method and extrapolation:	
GDP deflator	This is expressed in the base year of each country's national account. We use it to calculate the rate of domestic inflation. *Atlas method:* IMF-WEO (October 2022), NGDP_D. Venezuela: Same as reported by the BCV until 2011, inclusive. *Extrapolation:* WB-WDI, NY.GDP.DEFL.ZS. Venezuela: Same as reported by the BCV until 2017 and from that point on IMF WEO (October 2022).
Nominal GDP	*Atlas method:* IMF-WEO (October 2022), NGDP, and NGDPD. We use it in terms of both the local currency and US dollars. The local currency is the same as reported by the BCV until 2017, and then it is calculated using the real growth rate estimates from the IMF-WEO (October 2022) and the IMF GDP deflator. It is not reported by the BCV in US dollars. *Extrapolation:* WB-WDI, NY.GDP.MKTP.CN. The local currency is the same as reported by the BCV until 2017, and then it is calculated using the real growth rate estimates from the IMF-WEO (October 2022) and the BCV and IMF GDP deflator. It is not reported by the BCV in US dollars.
Exchange rate (calculated)	*Atlas method:* The exchange rate is calculated as the nominal GDP in local currency divided by the nominal GDP in US dollars. This is the conversion rate used by IMF staff; it often matches the exchange rate reported by official agencies, but sometimes is adjusted by IMF staff (as for Venezuela). *Extrapolation:* This is a recursive procedure from 1997 to 2007 (but excluding 2002–2003), using the change in the ratio of domestic to international inflation as a proxy for the exchange rate after each base year.
Adjusted deflator:	
Real GDP	Venezuela: BCV and IMF WEO (October 2022). This is expressed in constant prices 1997.
GNI per capita	WB-WDI, NY.GNP.PCAP.CD. This is based on the WB Atlas method and expressed in current US dollars. We use it in the different panel regressions.
Real exchange rate (calculated)	This is calculated as the official exchange rate multiplied by the ratio of the SDRs to the GDP deflators. We use it in the different panel regressions.
All approaches:	
Net primary income	This is expressed in current US dollars. IMF-BOP/IIP calculation: Primary income credits (BXIP_BP6_USD) minus primary income debits (BMIP_BP6_USD), and WB-WDI, NY.GSR.NFCY.CD. From the Venezuelan side, data from IMF-BOP/IIP match those reported by the BCV in its balance of payments until 2018 and from then on IMF WEO (October 2022).
Official exchange rate	WB-WDI, PA.NUS.FCRF. This is expressed as local currency per US dollars, period average in nominal terms. From the Venezuelan side, it is the annual average from the BCV.
SDR Deflator	We use this to calculate the rate of international inflation. Data calculated by the IMF but obtained from the WB repository.[11]
Population	WB-WDI, SP.POP.TOTL. This accounts for the vast migrant crisis experienced by Venezuela since 2015.

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[11] https://datahelpdesk.worldbank.org/knowledgebase/articles/378829-what-is-the-sdr-deflator.

5. Robustness Checks and Results

5.1. Atlas method approach: Estimates 1997–2014

First, we calculate the Atlas conversion factor using the exchange rate from the nominal GDP ratio of local currency to US dollars as reported by the IMF World Economic Outlook (October 2022). Then, we use that factor to convert the GNI in local currency to US dollars, which we divide by the population of Venezuela.

Figure 5 compares our GNI per capita estimates using the calculated factor with the observed values reported by the WB (benchmark for robustness checks). Panel a displays the estimates for all countries. The fit on the bisector is high for most countries and years. Our estimates seem consistent with the observed data. Among the high values, only two countries are significantly separated from the bisector: the Bahamas in the early periods (1997–1998) and Venezuela in 2014. The 2014 GNI per capita estimated for Venezuela was US$10,616, in contrast to the US$13,080 observed. This relationship is more evident in panels b and c. In these cases, our estimates show a GNI per capita of US$10,959 in 2013 versus the US$11,970 observed.[12] Although not the same, these values are close to the bisector and do classify Venezuela as an upper-middle-income country. However, in 2014 there was a higher disparity. Based on the observed values and the 2014 income threshold, Venezuela should have been classified as a high-income country, but it was not. Therefore, we can assume that WB classifies Venezuela based on the 2013 GNI per capita.

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[12] To check consistency among both methodology and estimates, we first replicate WB figures using similar sources and exchange rate series throughout the full sample. For Venezuela, this exercise led us to US$12,056 and US$12,963 for 2013 and 2014, respectively.

FIGURE 5. ESTIMATES VERSUS OBSERVED: ATLAS METHOD (US$)
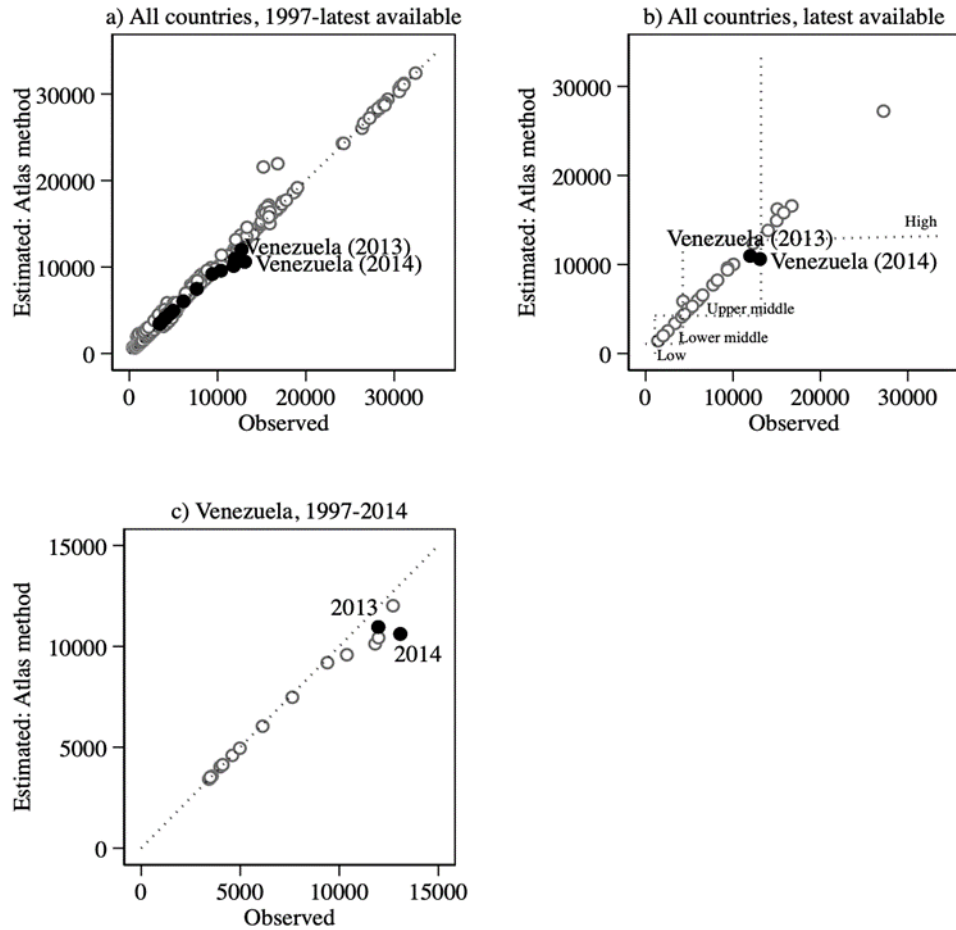
Sources: WB and own calculations.
Note: The bisector is used as a reference. In panel a and b black dots refer to Venezuela, in panel c black dots highlight years 2013 and 2014.

Table 2 shows mean and trend comparisons between the observed values and our estimates using the Atlas method by country. Regarding the mean comparison test in levels, 12 out of the 26 countries in the sample show statistical dissimilarities. However, when more-recent years are considered, several gaps have disappeared. The absolute difference for Venezuela is significant and positive, implying that eventual estimates may be below the observed values and likely downgrade its income classification. Moreover, in growth rates, the mean comparison could not reject closer values for almost all countries, suggesting similar paths.

TABLE 2. ESTIMATES VERSUS OBSERVED: ATLAS METHOD, MEAN AND TREND COMPARISON, 1997–LATEST AVAILABLE

Country	Mean comparison (Ho: difference = 0)		Trend comparison, Full sample			
			Pearson correlation			Mean comparison in growth rates (Ho: difference = 0)
	Full sample	2007– latest available	Level	Growth rate	In growth rates $GNI_t^{own} = \beta GNI_t^{WB} + v_t$ (Ho: $\beta = 1$), $\hat{\beta}$	
Argentina	-422.3***	-262.6**	0.9917	0.9759	0.9169	0.59
Bahamas	-489.6	-16.1	0.9567	0.8060	0.4929***	1.78
Barbados	-11.5	21.3	0.9999	0.9963	0.9697	0.10
Belize	-1,101***	-1,154***	0.9770	0.8871	0.9993	-0.25
Bolivia	-12.5***	-19***	1.0000	0.9931	0.9932	0.08
Brazil	0.8	1.6	1.0000	1.0000	1.0002	0.00
Chile	8.9**	11.9**	1.0000	0.9999	0.9976	0.03
Colombia	-50.9	33.5	0.9969	0.9778	1.0038	0.72
Costa Rica	1.3	-7.9	0.9999	0.8939	1.0109	-0.06
Dominican Republic	-8.9***	-10.1***	1.0000	0.9999	0.9962	-0.00
Ecuador	7.6	-2.4	0.9999	0.9989	0.9826	-0.20
El Salvador	0.4	0.9	1.0000	0.9990	0.9888	0.02
Guatemala	-30.4**	-38.4***	0.9980	0.8959	0.9518	-0.20
Guyana	-324.2**	186.1	0.9737	0.5156	0.3228***	4.45
Haiti	-51.7**	1.4	0.9675	0.6281	0.5625***	2.42
Honduras	3.1	5.6	0.9999	0.9938	0.9940	-0.00
Jamaica	-8.5	-13.9	0.9978	0.9711	1.0032	-0.24
Mexico	-9.7**	0.9	1.0000	0.9996	0.9927	0.01
Nicaragua	0.8	-1.2	0.9999	0.9929	0.9850	0.02
Panama	-19.5	4.6	0.9999	0.9926	0.9887	-0.01
Paraguay	-3.9	-6.9	1.0000	0.9996	1.0023	0.02
Peru	10.8	-20.8	0.9999	0.9974	1.0096	-0.20
Suriname	-590.8***	-359.8***	0.9908	0.9782	0.8342***	1.96***
Trinidad and Tobago	-100.8	-98.5	0.9981	0.9495	0.9755	-0.25
Uruguay	-657.8***	-707***	0.9961	0.9960	0.9853	0.55**
Venezuela	475.7**	1070.5***	0.9925	0.9302	0.9137	1.29

Note: ** = the Ho is rejected at the 5% significance level and *** = it is rejected at the 1% significance level. We use a paired t-test to evaluate the mean comparison. A positive difference implies observed values above our estimates.

Our estimates are closely related to the observed values. The linear association is clearly positive in levels and almost reaches one for all countries. In terms of growth rates, there is notable divergence in two cases, Guyana and Haiti; nevertheless, the estimates are still moderately correlated in both countries. Furthermore, considering the statistical relationships in growth rates, it is worth noting that only 4 of 26 countries show significant dissimilarities (excluding Venezuela). These results suggest

the possibility of using our estimates to shed light on Venezuela's GNI per capita trend in recent years and thus on its "real" current income classification.

## 5.2. Extrapolation approach: Estimates 1997–2014

In the presence of unreliable or distorted data, the WB suggests following an extrapolation technique as an alternative to calculate the GNI per capita in US dollars. In this paper, we make use of this alternative as well for Venezuela.

We apply a recursive extrapolation technique throughout different "normal" years or reference periods, such as 1997, 1998, 1999, 2000, 2001, 2004, 2005, 2006, and 2007. We started with 1997, because this was the last base period used by the BCV in its national account statistics, and we ended with 2007, because the following year the first monetary reconversion took place.

Figure 6 shows the relationship between these estimates and the observed data during 2000–2014. In particular, we highlight the results for the base year and 2013 and 2014. In contrast to our results using the Atlas method, the relationship between the observed data and the estimates we produce through extrapolation diverge. After the first monetary reconversion in 2008, the differences increase due to high inflation levels and local distortions in the foreign exchange market. Nevertheless, we observe that the results tend to the bisector near 2013 and 2014 for more-recent base years.

Figure 7 supports these findings by presenting two stories. On the one hand, from 1997 to 2008, the estimates differ between -30 and 20 percent at most from the observed values, but on average, the former are only 9 percent (US$440) below the latter. On the other, after 2008 the estimates notably diverge from -60 and -20 percent from the observed values, considerably below the average of the latter (-42 percent or about US$5,000 less). With this approach, the 2014 GNI per capita ranges between US$5,120 using 1997 as the base year and US$9,017 using 2007 as the base year.
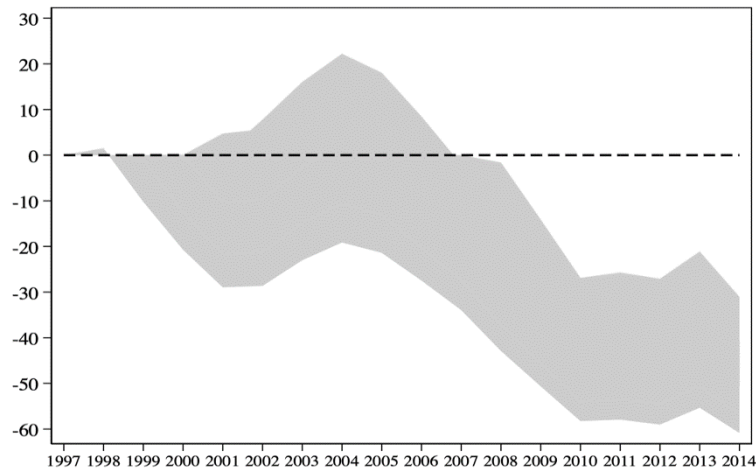
FIGURE 6. ESTIMATES VERSUS OBSERVED: EXTRAPOLATION BY BASE YEARS, VENEZUELA, 1997–2014 (US$)
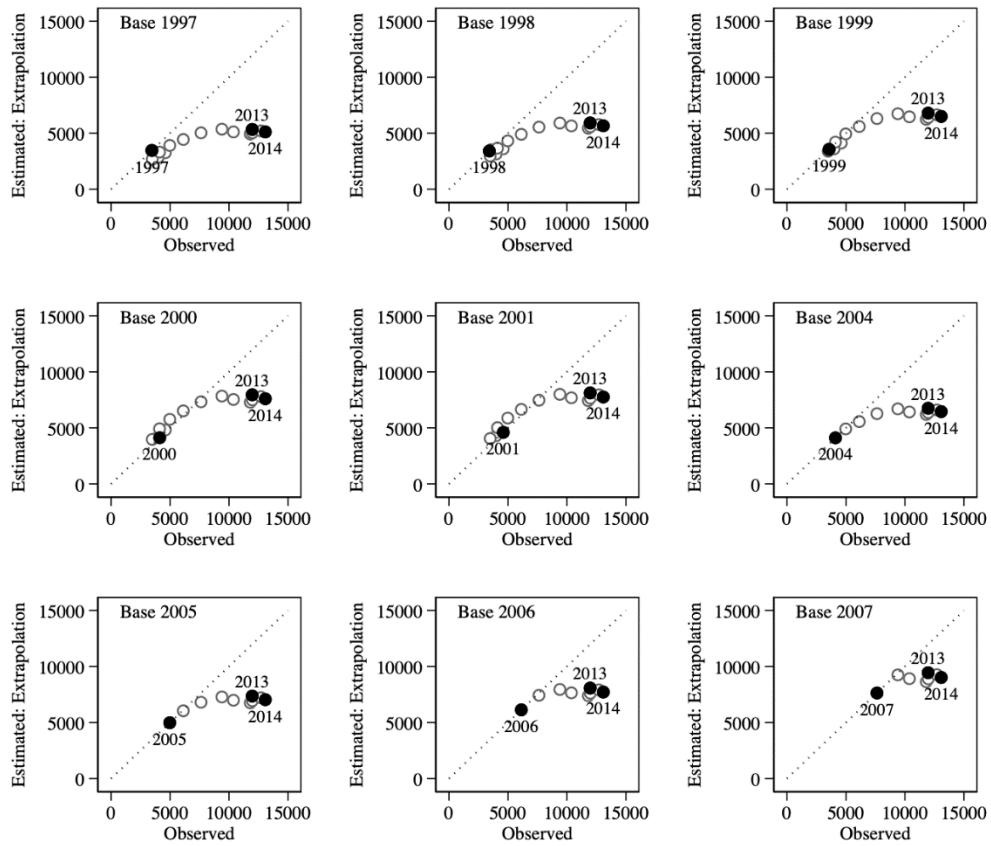
Sources: World Bank and own calculations.
Note: The bisector is used as a reference.

FIGURE 7. ENVELOPE EXTRAPOLATION DIFFERENCES WITH RESPECT TO OBSERVED, VENEZUELA (%)

Sources: World Bank and own calculations.
Note: The line at 0 represents the observed values (benchmark).

5.3. Adjusted deflator approach: Estimates 1997–2014

Venezuela's GDP deflator and nominal GDP are significantly distorted due to the overvalued levels of the official exchange rate and the years of hyperinflation. In this context, the real GDP should be the only "trustworthy" reference for estimating Venezuela's GNI. Here, we suggest adjusting the deflator index under the assumption that the official exchange rate is "stable" (not overvalued). If this is the case, the adjusted deflator and the nominal GDP should be lower than the observed.

First, in logarithm terms and using panels with different samples (excluding Venezuela), we regress the real exchange rate on the GNI per capita with interaction terms per year to estimate adjusted parameters from 1997 to 2021. Table 3 shows the estimated parameter for 1997.

TABLE 3. ESTIMATED PARAMETERS BY PANEL REGRESSION, EXCLUDING VENEZUELA, 1997– 2021

	$Log(Real\ exchange\ rate)$			
	Full sample	Same category in 1997	Same category in 2013	Andean countries
$Log(GNI\ per\ capita_{1997})$	0.2972***	0.2348***	0.3923***	0.4406*
	(0.0649)	(0.0886)	(0.1112)	(0.2409)
Interaction terms (1997 < t ≤ 2018): $D_t Log(GNI\ per\ capita_t)$	Yes	Yes	Yes	Yes
R^2	0.4366	0.4560	0.4728	0.4437
Observations	618	225	297	97

Note: * = significant at the 10% level; *** = significant at the 1% level. Robust standard errors are in parentheses.

Second, we use these parameters, the conventional relationships of the real exchange rate, official exchange rate, international inflation, and real GDP, to calculate newly adjusted GDP deflators for Venezuela. Figure 8 presents the adjusted deflators by sample from 1997 to 2014. As expected, in most cases the new deflators, or adjusted domestic inflation, are below what was reported by the BCV. In addition, the new deflators are consistent with the idea of nonovervalued official exchange rates. Finally, we obtain a scaled-down version of the nominal GDP based on the observed real GDP.

FIGURE 8. ADJUSTED GDP DEFLATORS BY SAMPLE, VENEZUELA
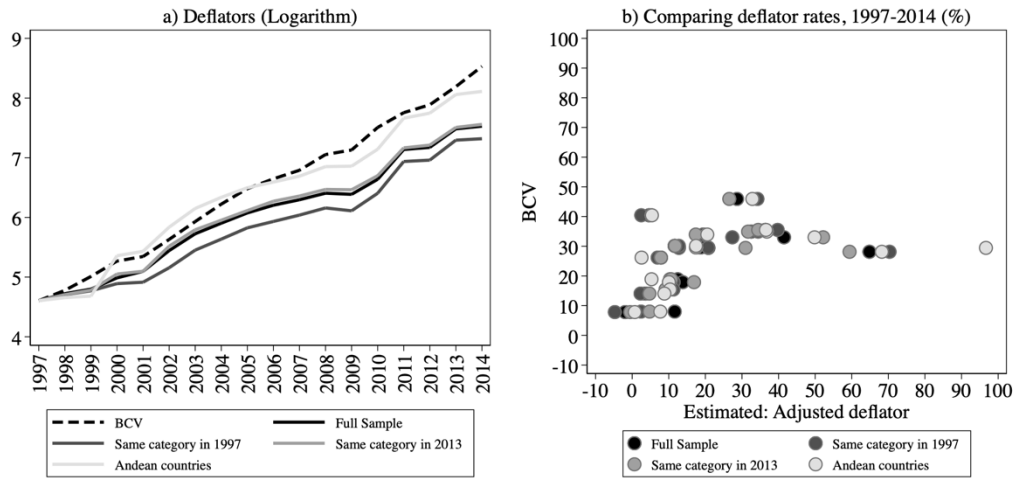
Sources: BCV and own calculations.

Figure 9 contrasts our averaged estimates following this approach with the observed values and the average result from the extrapolation procedure. In panel a we observe significant dissimilarities that are associated with the distorted nominal GDP. By contrast, panel b shows that the results are statistically similar to the averaged extrapolation estimates.[13]

FIGURE 9. AVERAGED ESTIMATES USING ADJUSTED DEFLATORS VS. OBSERVED AND AVERAGED EXTRAPOLATION ESTIMATES, VENEZUELA, 1997–2014 (US$)
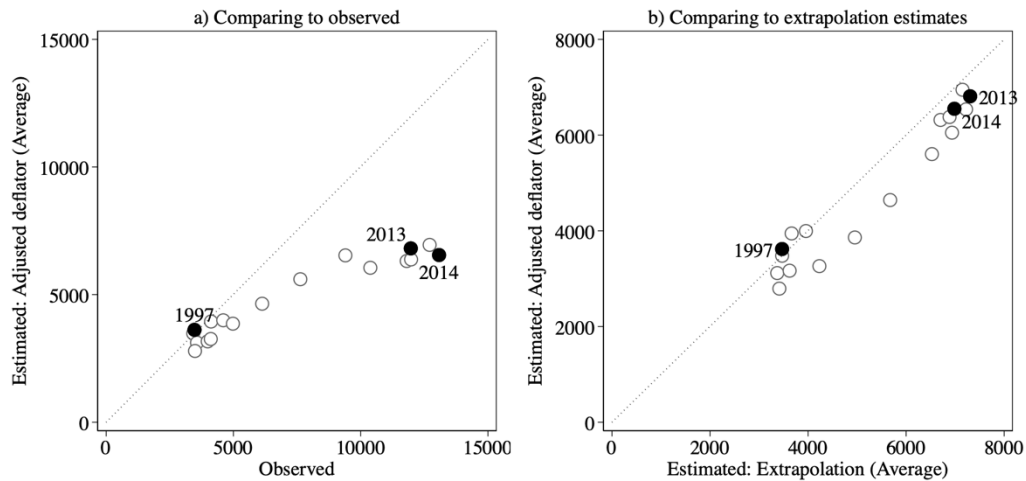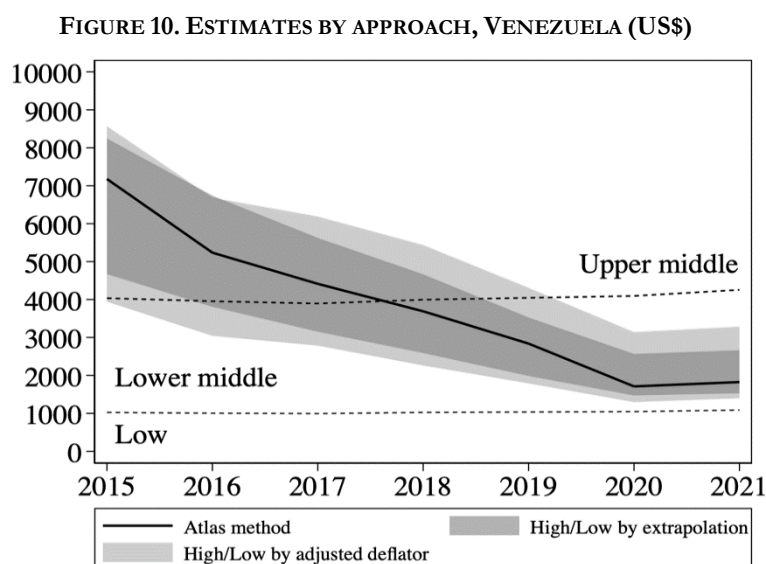

Sources: World Bank and own calculations.
Note: The bisector is used as a reference.

[13] This is verified with a mean comparison paired t-test between the growth rate of the averaged result using this approach and the growth rate of the averaged extrapolation estimates, which leads to a *p*-value of 0.9226, so that the null hypothesis of similar means is not rejected.

5.4. Results 2015–2021

Figure 10 shows our GNI per capita estimates from 2015 to 2021 by approach. In all cases, we observe a severe decline that is consistent in trend. The ranges grouping of the results from the extrapolation technique (with different base years) and the adjusted deflator exercises (using different samples) also narrow over time. In particular, the Atlas method leads us to a 2021 GNI per capita of US$1,826 (i.e., about 15.3 and 14 percent of Venezuela's observed GNI per capita in 2013 and 2014, respectively). The extrapolation approach estimates a GNI per capita between US$1,527 and US$2,662 for 2021, while with adjusted deflator approach it is between US$1,401 and US$3,284. Table 4 summarizes these results.

FIGURE 10. ESTIMATES BY APPROACH, VENEZUELA (US$)

Sources: World Bank and own calculations.
Note: The dotted lines represent the yearly-variant thresholds suggested by the WB.

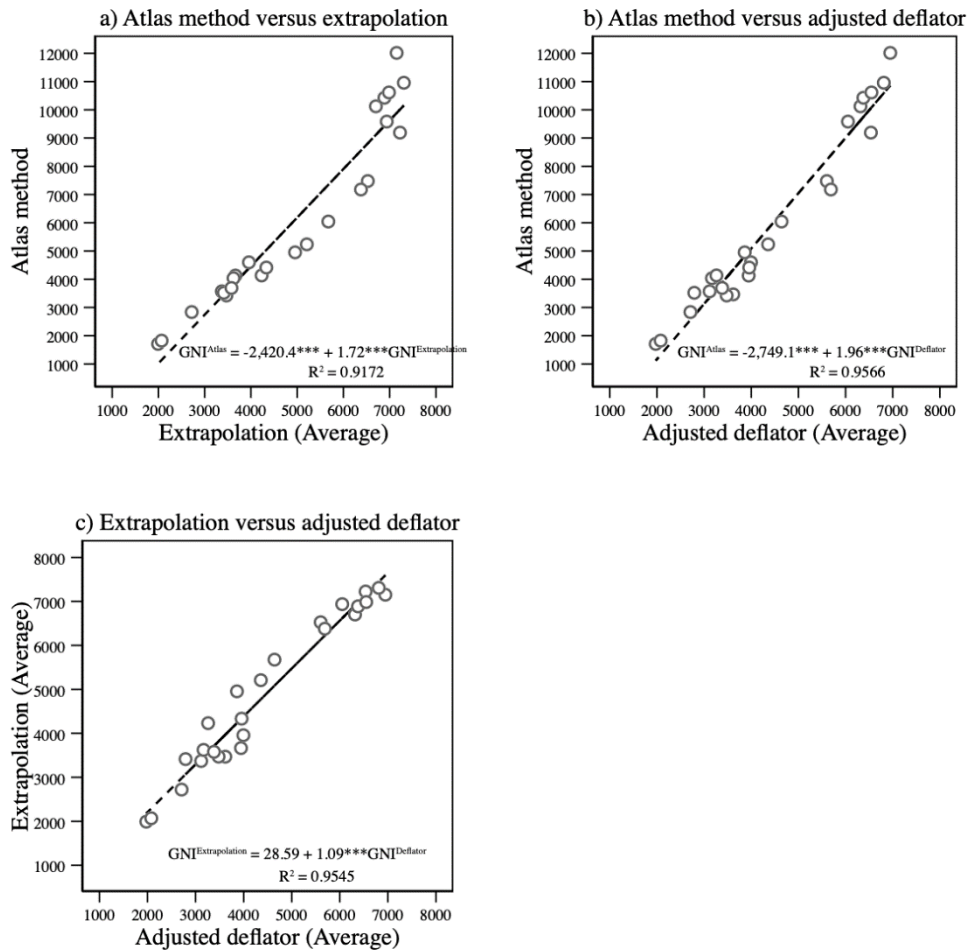**TABLE 4. SUMMARY OF RESULTS, VENEZUELA (US$)**

	Atlas method	Extrapolation, base years 1997–2007			Adjusted deflator, different samples*		
		Low	Average	High	Low	Average	High
2015	7,178	4,668	6,379	8,242	3,946	5,689	8,566
2016	5,237	3,806	5,209	6,737	3,043	4,358	6,682
2017	4,414	3,150	4,334	5,623	2,786	3,958	6,185
2018	3,691	2,586	3,580	4,664	2,263	3,383	5,433
2019	2,839	1,983	2,721	3,525	1,790	2,710	4,306
2020	1,711	1,469	1,994	2,565	1,298	1,975	3,138
2021	1,826	1,527	2,070	2,662	1,401	2,079	3,284

Note: *These are the samples used in the panel regressions: Full, Same category in 1997, Same category in 2013, and Andean countries. The results highlighted in gray classify Venezuela as a lower-middle-income country according to the respective thresholds.

If we compare our estimates, the prevailing significant positive association stands out. Figure 11 summarizes these relationships among our estimates and Figure 12 our results averaging the estimates from the extrapolations and the adjusted deflator approach. The methodology used does not matter: extrapolation and adjusted deflator procedures converge to figures similar to those of the Atlas method. The average of the extrapolation results yields a GNI per capita of US$2,070, which is virtually equivalent to the average of US$2,079 yielded by the adjusted deflators approach.

FIGURE 11. COMPARING OUR ESTIMATES, VENEZUELA (US$)

a) Atlas method versus extrapolation

$GNI^{Atlas} = -2,420.4^{***} + 1.72^{***}GNI^{Extrapolation}$
$R^2 = 0.9172$

b) Atlas method versus adjusted deflator

$GNI^{Atlas} = -2,749.1^{***} + 1.96^{***}GNI^{Deflator}$
$R^2 = 0.9566$

c) Extrapolation versus adjusted deflator

$GNI^{Extrapolation} = 28.59 + 1.09^{***}GNI^{Deflator}$
$R^2 = 0.9545$

Sources: World Bank and own calculations.
Note: *** = significant at the 1% level.

FIGURE 12. ESTIMATES BY APPROACH, VENEZUELA (US$)

This paper thus confirms that Venezuela did in general experience a GNI per capita increase until around 2012–2013, but then a sustained downward trend appeared, quickly losing significant ground compared to its peers in the upper-middle-income group. These results suggest that Venezuela has been a lower-middle-income country, at least since 2018.

We encourage using alternative sources and estimation procedures to obtain updated GNI per capita estimates so that Venezuela can be reclassify from the standpoint of income level. Furthermore, we urge the Venezuelan authorities to timely report and widely share reliable statistical information and national account aggregates to bring worldwide soundness and transparency to any analysis based on Venezuela's data.

6. Conclusion

The lack of timely, reliable, and complete national accounts data from Venezuela, coupled with the hyperinflation event that has brought about an enormous distortion in absolute and relative prices, has made it extremely difficult to obtain macroeconomic aggregates, such as GDP and GNI, expressed in US dollars. Due to these issues, the last valid observed calculations of Venezuela's GNI per capita using the Atlas method were for 2013 (US$11,970) and 2014 (US$13,080).

Despite multiple years of continuing massive deterioration of Venezuela's socioeconomic situation, the country is still classified as an upper-middle-income country based on 2013 income data. This situation has been and may still be a barrier to Venezuela's being considered for international aid policies, debt relief programs, and nonfinancial assistance through foreign assistance mechanisms. This paper has demonstrated what Venezuela's current income classification should be by updating the country's GNI per capita data for 2015–2021.

Here, we follow three approaches based on exchange rate assumptions to estimate the GNI per capita of Venezuela: the Atlas method, extrapolation, and the adjusted deflator method. After several robustness checks, our findings consistently suggest that Venezuela should have been classified as a lower-middle-income country beginning in 2018 and should still be. The results indicate a 2021 GNI per capita for Venezuela of US$1,826 using the Atlas method, US$2,070 applying extrapolation, and US$2,079 using an adjusted deflator.

This paper contributes to the discussion on the need to revisit GNI per capita calculations for Venezuela so that its income classification matches the country's new reality. Furthermore, it encourages the use of alternative sources and procedures to update the assessments of economies and then possibly reclassify them in the face of unreliable data or exchange rates that are not representative of the rates effectively applied to domestic and foreign transactions.

Venezuelan authorities must report and share current, reliable national account aggregates in order to ensure worldwide soundness and transparency in any analysis based on its official data.

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Appendix

A.1. World Bank Atlas approach: Details[14]

The World Bank (WB) calculates the GNI in terms of US dollars using the Atlas conversion factor to classify the world's economies by income. The WB does so in order to smooth the impact of exchange rate ups and downs in cross-country comparisons, reducing any exchange rate changes due to inflation.

The Atlas conversion factor e_t^A for a year t is the average of a country's average annual exchange rate (local currency to US dollars) in t, $t-1$, and $t-2$, adjusted by the GDP deflator rate of the preceding two years relative to t and by the special drawing rights (SDRs) deflator rate of the preceding two years relative to t.[15] The GDP deflator p_t rate is a proxy for the rate of inflation, while the SDRs deflator $SDR\$_t$ rate is a proxy for the rate of international inflation. Equation 1 represents the GDP deflator variation relative to $t-n$ (with n as the respective preceding year), and Equation 2 represents the SDRs deflator variation relative to $t-n$.

$$g_{p_t}^{t-n} = \frac{p_t}{p_{t-n}} \tag{1}$$

$$g_{SDR\$_t}^{t-n} = \frac{SDR\$_t}{SDR\$_{t-n}} \tag{2}$$

Therefore, the Atlas conversion factor is given by Equation 3.

$$e_t^A = \frac{1}{3}\left(e_t + e_{t-1}\frac{g_{p_t}^{t-1}}{g_{SDR\$_t}^{t-1}} + e_{t-2}\frac{g_{p_t}^{t-2}}{g_{SDR\$_t}^{t-2}} \right) \tag{3}$$

The main idea is to use the calculated factor to convert the GNI in local currency to US dollars and then divide it by the country's population. Together with the thresholds mentioned in Section 2, the result categorizes the country as a low-income, lower-middle-income, upper-middle-income, or high-income economy. To

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[14] See the World Bank Atlas method subsection at the Data compilation methodology section: https://datahelpdesk.worldbank.org/knowledgebase/articles/378832-the-world-bank-atlas-method-detailed-methodology

[15] The SDRs deflator is based on the IMF's unit of account; it is a weighted average of the GDP deflators in terms of the SDRs of China, Japan, the United Kingdom, the United States, and the euro area, converted to US dollars.

test for similarities between the WB observed results and ours using International Monetary Fund (IMF) data, we apply this approach for each of the 26 Latin American and Caribbean (LAC) countries in the sample.

The methodological report of the WB describes alternative methods for estimating the exchange rate when the rate is not being reported reliably or is unrepresentative of what is effectively applied to domestic and foreign transactions. For example, the DEC alternative conversion factor, which is the official exchange rate reported in the IMF's International Financial Statistics—or the refinement of it made by WB staff— could be used for the WB's Atlas method as the underlying annual exchange rate. Another alternative is extrapolating the exchange rate from a regular or stable period using the change in the ratio of domestic to international inflation (the latter again measured by the SDR deflator). This situation applies to Venezuela. However, neither the DEC alternative conversion factor with staff refinements nor extrapolation techniques have been used to estimate the GNI per capita for Venezuela.

A.2. Extrapolation approach: Details

This technique uses the change in the domestic to international inflation ratio to extrapolate the exchange rate after a reference "stable" period t^0 in the sample. In this case, the proxies for the rates of domestic and international inflation are the GDP deflator rate (Equation 1) and the SDR deflator rate (Equation 2), respectively. Equation 4 expresses how we estimate the exchange rate $\hat{e}_t$ or conversion rate in this paper.

$$\hat{e}_t = e_{t-1} \frac{g_{p_t}^{t-1}}{g_{SDR\$_t}^{t-1}} \quad \forall \ \ t > t^0 \tag{4}$$

The nominal GNI in local currency converts to US dollars using the new exchange rate. Finally, we divide by the country's midyear population to obtain the GNI per capita. This paper applies this approach only to Venezuela in a recursive fashion using different base years, such as 1997, 1998, 1999, 2000, 2001, 2004, 2005, 2006, and 2007.

A.3. Adjusted deflator approach: Details

We account for the significant distortion of Venezuela's nominal GDP due to the overvalued levels of the country's official exchange rate during its fixed and quasi-fixed regime and the years of hyperinflation. Therefore, we suggest deriving an adjusted deflator using the official data of exchange rate and real GDP of the Central Bank of Venezuela (Banco Central de Venezuela, BCV) as well as estimated parameters by year t obtained from panel regressions—including interaction terms for each year t' using the respective indicator $D_{t'}$—of the real exchange rate r_{jt} on the GNI per capita $\left(\frac{GNI_{jt}}{N_{jt}}\right)$ over j more-stable LAC countries. Equation 5 represents the general panel regression and Equation 6 the estimated parameter.

$$Log(r_{jt}) = \gamma_{1997} Log\left(\frac{GNI_{j1997}}{N_{j1997}}\right) + \sum_{t=1998}^{2018} \delta_t D_t Log\left(\frac{GNI_{jt}}{N_{jt}}\right) + u_{jt} \qquad [5]$$

$$\hat{\beta}_t = \begin{cases} \hat{\gamma}_{1997} & if & t = 1997 \\ \hat{\gamma}_{1997} + \hat{\delta}_t & if & 1997 < t \le 2018 \end{cases} \qquad [6]$$

For Venezuela, we can use the conventional relationships expressed in Equation 7 and Equation 8 together with Equation 9 to endogenize and solve for the GDP deflator. This procedure adjusts the domestic inflation by accounting for Venezuela's official exchange rate under conditions matching other countries in the sample, leading to an adjusted nominal GDP.

$$r_t = e_t \frac{SDR\$_t}{p_t} \qquad [7]$$

$$GDP_t^{Real} = \frac{GDP_t}{p_t} \qquad [8]$$

$$Log(r_t) = \hat{\beta}_t Log\left(\frac{GDP_t}{N_t}\right) \qquad [9]$$

Finally, Equation 10 shows the new deflator p_t^*.

$$p_t^* = \left[\frac{e_t \, SDR\$_t}{\left(\frac{GDP_t^{Real}}{N_t}\right)^{\hat{\beta}_t}}\right]^{\frac{1}{\hat{\beta}_t+1}} \qquad [10]$$