Panama Viewpoint

Mine closure will likely hurt potential GDP

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Minera Panama: 2nd largest LatAm investor-state dispute

The cancellation of Minera Panama's contract (US$ 10bn investment, 12.3% of GDP) implies the 2nd largest investor-state dispute in LatAm in the 21st century, relative to the size of the domestic economy. It's a significant shock for a country historically viewed as investor-friendly and will likely have important negative short-term and long-term implications. We revise down our 2024 GDP forecasts to just 2% and now expect Panama's trend growth rate to be permanently lower by around 0.5 percentage points.

Inescapable corollary: Weaker private investment

Investor-state disputes are toxic for business sentiment (the impact of the cancellation of the Mexico City airport in 2019 is a recent example). They also increase the risk premium on government bonds which, in turn, bids up domestic interest rates and weighs down on private investment and growth. We believe Panama will suffer the same effects, including the loss of the investment-grade credit rating in 2024.

Investor disputes can lower investment by 3pp of GDP

Using the "Differences-in-Differences" methodology, we estimate that large investor-state disputes lower private investment rates on average by around 3 percentage points of GDP over the next ten years. Controlling for macro variables (interest rates, inflation, terms of trade, corporate taxes), the effect is larger (-4.3pp). In our analysis, we compare the private investment rates of countries with large disputes (Venezuela, Bolivia, Argentina, Ecuador, and Nicaragua), with a control group.

3pp fall in investment lowers potential growth by ~0.5%

We estimate that a 3pp fall in the average investment rate would reduce Panama's potential GDP growth by around 0.5pp over the next ten years. Hence, we foresee GDP growing on average around 3.6% in 2025 and thereafter, half a percentage point lower than our previous long-term (potential) estimate. If total factor productivity growth also weakens permanently, the impact would be larger. Labor productivity in the mining sector is 8.6x higher than in the other sectors of the economy.

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Mining shock will likely hit potential GDP

We see Minera Panama dispute as a structural shock

It's among the largest investor-state disputes in Latin American history

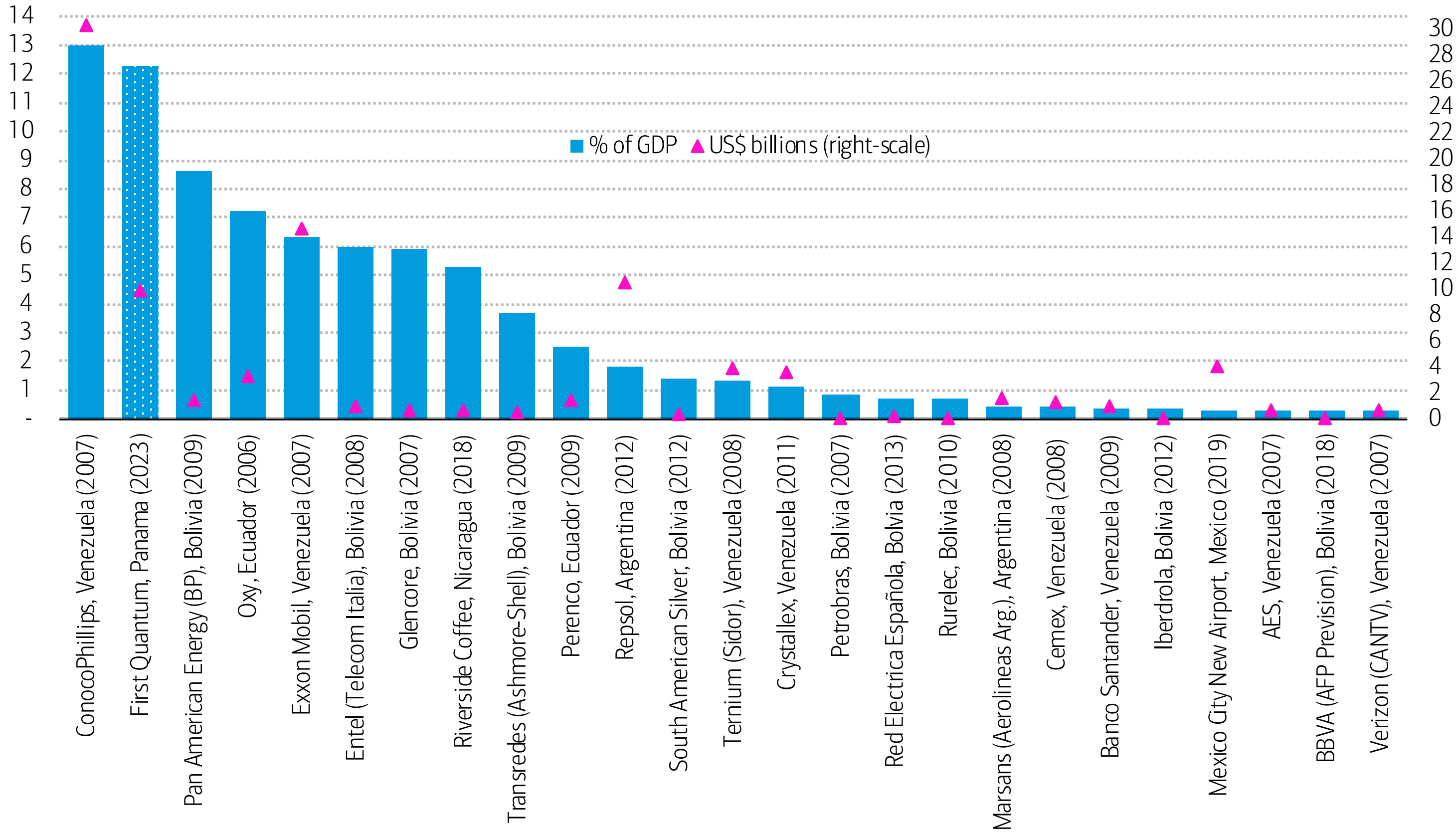
Looking at the history of investor-state disputes in LatAm in the 21st century (Exhibits 1 & 2), we only find one case – ConocoPhillips in Venezuela (2007) – where the amount at stake was larger than in Minera Panama, relative to the size of the host country's GDP. In our concept of investor-state disputes we include expropriations, nationalizations, cancellations of concession contracts, and other government actions that forced companies to stop operations (such as revocation of permits, binding referendums, and unilateral changes in contracts' terms).

Comparable (in size) to expropriation of ConocoPhillips' oil fields in Venezuela

The figure for ConocoPhillips in Exhibits 1 and 2 – US$ 30.3bn, 13% of Venezuela's GDP in 2007 (year of expropriation) – refers to the arbitration lawsuit. In contrast, for Minera Panama we are referring to the investment (US$ 10bn, equivalent 12.3% of Panama's GDP in 2023) because the arbitration claim is still unknown. If the claim is above US$ 10.6bn (13% of GDP), Minera Panama would surpass ConocoPhillips. Note that in 2013 the International Center for Settlement of Investment Disputes (ICSID) ruled in favor of ConocoPhillips, and in 2019 it ordered the Venezuelan government to pay US$ 8.7bn. Also, in 2018 the company was awarded US$ 2bn from another arbitration tribunal under the auspices of the International Chamber of Commerce (ICC).

Exhibit 1: Twenty-five largest investor-state disputes in Latin America during the 21st century (expressed in percent of host country's GDP)

The amount for each case is generally the size of the arbitration claim presented by the company. If that figure is not available, we use the investments, the value of the project estimated by the company, or the price at which the company had to (forcibly) sell the asset, whichever is larger



Source: BofA Global Research, International Center for Settlement of Investment Disputes (ICSID), UNCTAD Investment Policy Hub, Haver, BBC News (UK), Swiss Info (Switzerland), La Prensa (Panama), Capital Financiero (Panama), Revista Semana (Colombia), El Economista (Mexico), Aristegui Noticias (Mexico), Primicias (Ecuador), RTVE (Spain), El Correo (Spain), El Pais (Spain), El Confidencial (Spain), COPE (Spain), El Deber (Bolivia), Infobae (Argentina), La Nacion (Argentina), Clarin (Argentina), Agrofy (Argentina), Divergentes (Nicaragua), Confidencial (Nicaragua).

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First Quantum CEO suggests arbitration claim could exceed 12.3% of GDP
Most likely, the arbitration claim from Minera Panama, as a proportion of GDP, could surpass ConocoPhillips (13% of GDP) considering the guidance of First Quantum's CEO, Tristan Pascall, in an interview to local newspaper La Prensa. First Quantum is the parent company of Minera Panama.[1]

Claim = investment + asset's market value + profits + taxes + other aspects
When asked about the amount of the forthcoming arbitration lawsuit, Tristan Pascall answered *"it would not only include the investment (US$ 10bn) but also the market value of the asset, foregone future profits, taxes paid, and other aspects"*. Moreover, he argued Minera Panama cannot abandon the mining operations because that would risk an environmental hazard. In his view, an orderly shutdown of the mine would take between 15 and 20 years, with an annual cost between US$ 20mn to US$ 50mn.

Dominant narrative in Panama is that it's not an "expropriation"
Talking to Panamanian locals and reading the press, we note there is a tendency to argue the cancellation of Minera Panama's contract is anything but an expropriation or nationalization like the ones listed in Exhibits 1 and 2. At least 191 multinational companies have established their regional headquarters in Panama, and the country has a long tradition of being friendly to foreign investment.[2] Locals dislike the idea of Panama being compared to Venezuela, Bolivia, Argentina, Ecuador, and Nicaragua, where asset confiscation became a national policy, eroding macroeconomic stability. Their argument is that Panama's Supreme Court ruled the mining contract is unconstitutional, and therefore enforcing that decision strengthens – not weakens – the rule of law.

High courts also authorized asset confiscations in Venezuela, Bolivia, etc.
However, almost all the asset confiscations listed in Exhibits 1 & 2 were authorized by the Supreme Court, the Constitutional Court, the Constitution itself, or a Congress law in Venezuela, Bolivia, Argentina, Ecuador, Nicaragua, and Mexico. To the best of our knowledge, the only exception is the expropriation of Ciccone Calcografica (printing company) in Argentina in 2012, with the Supreme Court ruling in 2022 that the expropriation was illegal.

Inescapable corollary: shock will likely hit private investment in Panama
Arbitration courts would ultimately decide on whether Panama incurred a liability by cancelling the Minera Panama contract. From an economic point of view, historically investor-state disputes have been conducive to weaker private investment. They have been toxic for business sentiment, and increase the risk premium of economies which, in turn, bids up interest rates and weighs down on investment.

Even if arbitration courts later absolve Panama of a financial liability, we think investor sentiment could be permanently affected (in any case, arbitration proceedings could take years to resolve). Just like "one cannot un-ring a bell", there could be a permanent reputational harm from stopping a marquee project – that generated significant economic growth and employment – due to pressure from social protests.

[1] See https://www.prensa.com/economia/los-paises-reciben-a-los-inversionistas-que-se-merecen-tristan-pascall/, published on December 1st, 2023.
[2] See https://www.prensa.com/economia/en-2023-se-registraron-12-empresas-como-sede-multinacional-en-panama/.

Exhibit 2: Investor-State disputes in Latin America during the 21st century

Around 2007, a wave of assets confiscations began in Venezuela, Bolivia, Argentina, and Ecuador. Nicaragua caught up later, after social protests in 2018

Company	Economic sector	Country of company	Confiscation amount (US$ mn)	% of GDP	Year of confiscation	Country	Nominal GDP in year of confiscation (US$ mn)	Arbitration ruling, local court, or settlement	Comments
Minera Panama	Mining	Canada	10,000	12.26	2023	Panama	81,541	Pending	Cancellation of concession contract
Exxon Mobil	Oil & gas	US	14,679	6.30	2007	Venezuela	232,857	US$ 1,600mn (arbitration, 2014)	Expropriation
ConocoPhillips	Oil & gas	US	30,305	13.01	2007	Venezuela	232,857	US$ 10,700mn (arbitrations, 2018 and 2019)	Expropriation
Verizon (CANTV)	Telecom	US	677	0.29	2007	Venezuela	232,857	US$ 572mn (settlement, 2007)	Nationalization
AES	Electricity	US	739	0.32	2007	Venezuela	232,857	US$ 739mn (settlement, 2007)	Nationalization
Argos	Cement	Colombia	335	0.14	2007	Venezuela	232,857	Not available	Nationalization
Cemex	Cement	Mexico	1,300	0.42	2008	Venezuela	306,764	US$ 600mn (settlement, 2007)	Nationalization
Holcim	Cement	Switzerland	650	0.21	2008	Venezuela	306,764	US$ 650mn (settlement, 2010)	Nationalization
Lafarge	Cement	France	267	0.09	2008	Venezuela	306,764	US$ 119mn (settlement, 2009)	Nationalization
Ternium (Sidor)	Steel	Argentina	4,000	1.30	2008	Venezuela	306,764	US$ 1,970bn (settlement, 2009)	Nationalization
Santander (Banco de Venezuela)	Banking	Spain	1,050	0.39	2009	Venezuela	268,624	US$ 755mn (settlement, 2009)	Nationalization
Sidetur (Sivensa)	Steel	Venezuela	298	0.09	2010	Venezuela	318,281	US$ 298mn (settlement, 2012)	Nationalization
Owens-Illinois	Glass	US	1,033	0.32	2010	Venezuela	318,281	US$ 456mn (arbitration, 2015)	Expropriation
Exito (Casino)	Retail	France	690	0.22	2010	Venezuela	318,281	US$ 690mn (settlement, 2010)	Nationalization
Crystallex	Mining	Canada	3,600	1.14	2011	Venezuela	316,482	US$ 1,386mn (arbitration, 2016)	Cancellation of concession contract
Occidental (Oxy)	Oil & gas	US	3,370	7.20	2006	Ecuador	46,802	US$ 1770mn (arbitration, 2012)	Cancellation of concession contract
Perenco	Oil & gas	France	1,572	2.51	2009	Ecuador	62,520	US$ 391mn (arbitration, 2019)	Arbitrary change in legal framework
Petrobras	Oil & gas	Brazil	200	1.52	2007	Bolivia	13,130	US$ 112mn (settlement, 2007)	Nationalization
Glencore	Mining	Switzerland	778	5.93	2007	Bolivia	13,130	US$ 254mn (arbitration, 2023)	Nationalization
Entel (Telecom Italia)	Telecom	Italy	1,000	5.99	2008	Bolivia	16,696	US$ 100mn (settlement, 2010)	Nationalization
Transredes (Ashmore-Shell)	Natural gas	UK	620	3.71	2008	Bolivia	16,696	US$ 121mn (settlement, 2010)	Nationalization
Pan American Energy (BP)	Oil & gas	UK	1,500	8.65	2009	Bolivia	17,340	US$ 357mn (settlement, 2014)	Nationalization
Rurelec (Guaracachi)	Electricity	UK	142	0.72	2010	Bolivia	19,651	US$ 36mn (arbitration, 2014)	Nationalization
South American Silver (Mallku Kota)	Mining	Canada	386	1.42	2012	Bolivia	27,085	US$ 19mn (arbitration, 2018)	Cancellation of concession contract
Iberdrola	Electricity	Spain	100	0.37	2012	Bolivia	27,085	US$ 34mn (settlement, 2015)	Nationalization
Red Electrica Española (TDE)	Electricity	Spain	200	0.74	2013	Bolivia	27,085	US$ 37mn (settlement, 2014)	Nationalization
Sabsa (Abertis and Aena)	Airports	Spain	86	0.28	2013	Bolivia	30,659	US$ 23mn (settlement, 2017)	Nationalization
BBVA (AFP Prevision)	Pension funds	Spain	119	0.29	2018	Bolivia	40,287	US$ 105mn (arbitration, 2022)	Nationalization
Correo Oficial (SOCMA)	Postal service	Argentina	Not available	n.a.	2003	Argentina	145,604	Not available	Expropriation
Aguas Argentinas (Suez)	Water	France	258	0.11	2006	Argentina	234,369	US$ 226mn (arbitration, 2015)	Cancellation of concession contract
Tandanor	Shipbuilding	Argentina	Not available	n.a.	2007	Argentina	289,638	Not available	Expropriation

Exhibit 2: Investor-State disputes in Latin America during the 21st century

Around 2007, a wave of assets confiscations began in Venezuela, Bolivia, Argentina, and Ecuador. Nicaragua caught up later, after social protests in 2018

Company	Economic sector	Country of company	Confiscation amount (US$ mn)	% of GDP	Year of confiscation	Country	Nominal GDP in year of confiscation (US$ mn)	Arbitration ruling, local court, or settlement	Comments
Marsans (Aerolineas Argentinas)	Airline	Spain	1,590	0.43	2008	Argentina	366,093	US$ 321mn (arbitration, 2017)	Nationalization
Metlife (AFJP)	Pension funds	US	Not available	n.a.	2008	Argentina	366,093	Pending arbitration ruling	Nationalization
NN (AFJP Origenes)	Pension funds	Netherlands	500	0.14	2008	Argentina	366,093	Pending arbitration ruling	Nationalization
BBVA (AFJP)	Pension funds	Spain	Not available	n.a.	2008	Argentina	366,093	Not available	Nationalization
Lockheed Martin (Fadea)	Airplane manufacturing	US	110	0.03	2009	Argentina	335,998	US$ 110mn (settlement, 2009)	Nationalization
Repsol (YPF)	Oil & gas	Spain	10,500	1.81	2012	Argentina	580,851	US$ 5bn (settlement, 2014), US$ 1.5bn (NY court, 2023)	Nationalization
Ciccone Calcografica	Printing	Argentina	9	0.00	2012	Argentina	580,851	US$ 9mn (Supreme Court, 2022)	Expropriation
America Latina Logistica (Belgrano Cargas y Logistica)	Railway	Brazil	Not available	n.a.	2013	Argentina	613,040	Not available	Cancellation of concession contract
Riverside Coffee	Coffee	US	689	5.29	2018	Nicaragua	13,028	Pending arbitration ruling	Expropriation
TSK Melfosur	Electricity	Spain	58	0.46	2020	Nicaragua	12,676	Not available	Nationalization
Contractors: Carso, ICA, Hermes, Ángeles, GIA+A, Parsons, Acciona, FCC, Sacyr, Aldesa, among others	New airport of Mexico City	Mexico	4,125	0.32	2019	Mexico	1,305,203	Not available	Cancellation of contract through referendum
Constellation Brands	Beer manufacturing	US	900	0.08	2020	Mexico	1,130,430	Not available	Cancellation of permits through referendum
Grupo Mexico	Railway	Mexico	500	0.03	2023	Mexico	1,709,017	Not available	Cancellation of concession contract
Air Liquide	Hydrogen	France	55	0.00	2023	Mexico	1,709,017	Not available	Nationalization

Note: The amount for each case is generally the size of the arbitration claim presented by the company. If that figure is not available, we use the investments, the value of the project estimated by the company, or the price at which the company had to (forcibly) sell the asset, whichever is larger.

Source: BofA Global Research, International Center for Settlement of Investment Disputes (ICSID), UNCTAD Investment Policy Hub, Haver, BBC News (UK), Swiss Info (Switzerland), La Prensa (Panama), Capital Financiero (Panama), Revista Semana (Colombia), El Economista (Mexico), Aristegui Noticias (Mexico), Primicias (Ecuador), RTVE (Spain), El Correo (Spain), El Pais (Spain), El Confidencial (Spain), COPE (Spain), El Deber (Bolivia), Infobae (Argentina), La Nacion (Argentina), Clarin (Argentina), Agrofy (Argentina), Divergentes (Nicaragua), Confidencial (Nicaragua), Bloomberg.

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Estimating the impacts

Richness of LatAm experience to predict impact in Panama

Question in focus: How much would potential GDP growth decrease as a result?

The question we want to answer is how much the Minera Panama dispute would affect Panama's GDP growth in the long-term, defined as the next ten years. The existence of many observations, across LatAm countries and over time, allows for a rich characterization of the data and the comparison of the effects in countries where large investor-state disputes happened versus those in which they did not.

Two steps: estimate fall of investment rate, and plug it into production function

To answer the question, we follow a two-step approach, using two standard econometric techniques. First, we estimate the average impact that large investor-state disputes have had in the private investment rate (private investment-to-GDP) of LatAm countries, under the "Differences-in-Differences" framework. And second, we approximate the impact on Panama's potential GDP growth by plugging in the new long-term investment rate into Panama's Cobb-Douglas production function (standard economic methodology used to estimate long-term growth potential).

Size of Minera Panama makes it a significant shock

As shown in Exhibit 1, with a US$ 10bn investment (12.3% of GDP) Minera Panama already ranks as the second largest investor-state dispute in LatAm in the 21st century, relative to the size of the domestic economy. Hence, we believe it is large enough to make it comparable to the confiscation shocks in other countries.

"Differences-In-Differences" (DIDs) technique

"Differences-In-Differences", a robust estimator

We attempt to estimate the causal effect of large asset confiscations on private investment (in percent of GDP) using a technique called "Differences-In-Differences". It's a simple yet powerful framework.

The technique consists of comparing average private investment in two periods, before and after the asset confiscation shock (we define confiscations broadly as expropriations, nationalizations, cancellations of concession contracts, and other government actions that forced companies to stop operations); and taking a second difference between the averages of a "treatment group" (countries that implemented asset confiscations) and a "control group" (countries where confiscations did not happen).

Simultaneous occurrence of asset confiscation shocks in five countries

As shown in Exhibit 2, around 2007 a wave of asset confiscations began almost simultaneously in four LatAm countries (Venezuela, Bolivia, Argentina, Ecuador) and Nicaragua caught up a bit later. The coincidental timing of the confiscations facilitates the Differences-in-Differences analysis by defining the treatment group (Venezuela, Bolivia, Argentina, Ecuador, and Nicaragua). The control group is made from the other thirteen countries in the sample: Brazil, Chile, Colombia, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Mexico, Panama, Paraguay, Peru, and Uruguay.

Summary of the stories from the 5 countries in the treatment group

1) Venezuela, by far the largest shock

In Venezuela, in 2007 the Chavez administration expropriated and nationalized foreign firms in the oil & gas, electricity, telecom, and cement sectors for a total of US$ 47bn (20% of GDP). These policies continued actively until 2011 (Exhibit 2), two years before the death of Chavez. Asset confiscations during the Maduro administration (2013-present) have been much smaller (eg, General Motors in 2017). In fact, in 2022 Maduro launched a policy to return some confiscated assets to the private sector, turning to a more pragmatic approach.

2) Bolivia, another big perpetrator

In Bolivia, in 2007 Evo Morales forcibly nationalized Glencore's mining operations (US$ 0.8bn, 5.9% of GDP) and Petrobras' oil refineries (US$ 0.2bn, 1.5% of GDP). Akin to Venezuela, the confiscation policies were deepened in the following years. In 2009, the government nationalized Pan American Energy's (BP) oil & gas operations which the company claimed were worth US$ 1.5bn (8.7% of GDP). This was the largest case in Bolivia.

3) Ecuador, issues in the oil & gas sector

In mid-2006, Ecuador cancelled the concession contract of Occidental Petroleum, Oxy (US$ 3.4bn, 7.2% of GDP). A few years later, the Correa administration forced private oil companies to switch from production-sharing agreements to service-contracts whereby the state-owned company Petroecuador would pay them a fixed price for the oil (while the government kept all the upside when prices increased). The unilateral change in terms was considered a de-facto expropriation.

4) Argentina, a snowball of asset confiscations

The shock of large confiscations began in 2006 when the government terminated the contract of Aguas Argentinas (water services), owned by the French company Suez. The shock peaked in 2012 with the nationalization of YPF (oil & gas). The government forcibly acquired Repsol's 51% participation in YPF, paying US$ 5bn (in government bonds) for a stake that Repsol said was worth US$ 10.5bn (1.8% of GDP). Burford Capital acquired the claims of the remaining shareholders, and in 2023 won an arbitration award from a New York court for US$ 16bn. The press says Repsol is entitled to US$ 1.5bn of the US$ 16bn.

5) Nicaragua, relapse into habits from 1980s

Meanwhile, in Nicaragua the former Sandinista commander Daniel Ortega began his second period in power in 2007, which continues to the present. His first period was in 1979-90. Back then, Nicaragua was in civil war and expropriations were mostly related to the agrarian reform (equitable distribution of land). In the 1980s a corruption case known as "The Piñata" entailed the confiscation of private property and the partition of those assets among Sandinista supporters. In 2013 the State Attorney revealed the government spent US$ 1.3bn (11% of GDP) in legal compensations to victims of the Piñata.

Granted, in 2007 the Ortega administration began its mandate with a pragmatic economic model. But it all changed in 2018, amid social unrest. From that point, the government expropriated private firms (electricity, propane gas, coffee, media, universities), shut down the largest business association (COSEP), and confiscated real estate of the Taiwanese government, NGOs, businesspeople, and opposition leaders.

Countries need to be as similar as possible for "DIDs" methodology to work

We include 18 of the 20 Latin American countries in our private investment database that goes from 1993 to 2022 (see Annex 1). It includes all the Spanish-speaking countries – except for Cuba and Puerto Rico, because of lack of data – and Brazil.[3] The "Differences-in-Differences" framework assumes that the change over time in the Control Group (Brazil, Chile, Colombia, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Mexico, Panama, Paraguay, Peru, Uruguay) represents the change we would have observed in the Treatment Group (Venezuela, Bolivia, Argentina, Ecuador, Nicaragua) had there not been asset confiscations. In econometrics, this concept is known as the "counterfactual".

Differences-In-Differences controls for a lot of variables from the outset

One of the main strengths of the "Differences-in-Differences" approach is that it eliminates a lot of the omitted variable bias by construction. By taking the second difference, we can effectively control for variables that vary over time but affect countries in broadly the same way (for example, the 2020 pandemic, global interest rates, climate change, among others). Likewise, it also controls for characteristics that vary between countries but stay stable over time (for example, endowment of natural resources, economic informality, social preferences, among other conditions that can be assumed to be fixed in our sample period, 30 years).

[3] The panel database is unbalanced, meaning there are countries for which there are no observations for all years. For example, data for Brazil is available between 2000 and 2022. Data for Venezuela goes from 1997 to 2014.

Simple DIDs: Confiscation shocks reduce private investment by 3.3pp of GDP

The plain vanilla "Differences-in-Differences", which does not include any additional control variables, indicates that, on average, an asset confiscation shock reduces the private investment rate of a LatAm country by 3.3pp of GDP in the next 16 years (proxy for long-term). The calculation of the result is explained with detail in Exhibit 3. It is simple arithmetic, mean comparisons.

Exhibit 3: Simple "Differences-in-Differences" (mean comparisons)

The first cut of our analysis suggests that an asset confiscation shock reduces the private investment rate of a LatAm country by 3.3pp of GDP, on average, in the next 16 years (proxy for long-term)

Private investment rate (= Private investment/GDP)	Treatment group (5 countries which implemented large asset confiscations)	Control group (13 countries which did NOT implement large asset confiscations)	Difference: Treatment - Control
Before confiscation: 1993-2006 (t1)	Mean investment rate of Treatment Group in period "t1" = (Argentina_mean$_{t1}$ + Bolivia_mean$_{t1}$ + Ecuador_mean$_{t1}$ + Nicaragua_mean$_{t1}$ + Venezuela_mean$_{t1}$)/5 = 14.5607	Mean investment rate of Control Group in period "t1" = (Brazil_mean$_{t1}$ + Chile_mean$_{t1}$ + Colombia_mean$_{t1}$ + Costa_Rica_mean$_{t1}$ + Dominican_Republic_mean$_{t1}$ + El_Salvador_mean$_{t1}$ + Guatemala_mean$_{t1}$ + Honduras_mean$_{t1}$ + Mexico_mean$_{t1}$ + Panama_mean$_{t1}$ + Paraguay_mean$_{t1}$ + Peru_mean$_{t1}$ + Uruguay_mean$_{t1}$)/13 = 17.9066	Investment_rate_TG$_{t1}$ - Investment_rate_CG$_{t1}$ = -3.3459
After confiscation: 2007-2022 (t2)	Mean investment rate of Treatment Group in period "t2" = (Argentina_mean$_{t2}$ + Bolivia_mean$_{t2}$ + Ecuador_mean$_{t2}$ + Nicaragua_mean$_{t2}$ + Venezuela_mean$_{t2}$)/5 = 12.8231	Mean investment rate of Control Group in period "t2" = (Brazil_mean$_{t1}$ + Chile_mean$_{t2}$ + Colombia_mean$_{t2}$ + Costa_Rica_mean$_{t2}$ + Dominican_Republic_mean$_{t2}$ + El_Salvador_mean$_{t2}$ + Guatemala_mean$_{t2}$ + Honduras_mean$_{t2}$ + Mexico_mean$_{t2}$ + Panama_mean$_{t2}$ + Paraguay_mean$_{t2}$ + Peru_mean$_{t2}$ + Uruguay_mean$_{t2}$)/13 = 19.5084	Investment_rate_TG$_{t2}$ - Investment_rate_CG$_{t2}$ = -6.6853
Difference: After - Before	Investment_rate_TG$_{t2}$ - Investment_rate_TG$_{t1}$ = -1.7376	Investment_rate_CG$_{t2}$ - Investment_rate_CG$_{t1}$ = 1.6018	**Differences-in-Differences** (Investment_rate_TGt2 - Investment_rate_CGt2) - (Investment_rate_TGt1 - Investment_rate_CGt1) or (Investment_rate_TGt2 - Investment_rate_TGt1) - (Investment_rate_CGt2 - Investment_rate_CGt1) **= - 3.3394**

Note: See Appendix 1 for details of data.

Source: BofA Global Research, IMF, World Bank, OECD, Haver. IMF, World Bank, OECD, Haver, Ministry of Finance of Argentina (Hacienda), Brazilian Institute of Geography and Statistics (IBGE), Ministry of Finance of Bolivia (MEFP), Ministry of Finance of Chile (Hacienda), Ministry of Finance of Colombia (Hacienda), Ministry of Finance of Costa Rica (Hacienda), Ministry of Finance of the Dominican Republic (Hacienda), Central Bank of Ecuador (BCE), Central Bank of El Salvador (BCR), Ministry of Finance of Guatemala (MinFin), Ministry of Finance of Honduras (SEFIN), Ministry of Finance of Mexico (SHCP), Central Bank of Nicaragua (BCN), Ministry of Finance of Panama (MEF), Central Bank of Paraguay (BCP), Central Bank of Peru (BCRP), Ministry of Finance of Uruguay (MEF), Ministry of Finance of Venezuela (MPPEFCE).

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DIDs controlling for macroeconomic conditions: effect increases to 4.3pp of GDP

The "Differences-in-Differences" framework can easily be transformed into a simple regression using this equation:

Private Investment$_{ct}$ = β_1 + β_2 *Asset Confiscation + β_3*After + β_4*Asset Confiscation*After + μ

Where subscript "c" refers to the country, and subscript "t" refers to time (before or after the asset confiscation shock occurred). "Asset Confiscation" is a dummy variable that takes the value of one if the country belongs to the treatment group or zero if it's part of the control group. "After" is also a dummy variable, with a value of one for the period after the asset confiscation shock (2007-2022) or zero if before (1993-2006).

The coefficients estimated in the regression (β_1, β_2, β_3, β_4) can be used to construct Exhibit 3, the Differences-in-Differences "mean comparisons". Exhibit 4 shows how to order the coefficients to make them match with the results in Exhibit 3.

The "Differences-in-Differences" estimator (-3.3394 in Exhibit 3) is equal to the coefficient of the interaction between the variables "Asset Confiscation" and "After"

("β_4"). Exhibit 5 summarizes our regression analysis. In column (2) – which has the same specification as the equation above – "β_4" is equal to -3.3394.[4]

Exhibit 4: Relation between coefficients in regression and the plan vanilla "Differences-in-Differences" shown in Exhibit 3
The estimated value of the coefficients (betas) can be used to do the mean comparisons exercise

Private investment rate (= Private investment/GDP)	Treatment group (5 countries which implemented large asset confiscations)	Control group (13 countries which did NOT implement large asset confiscations)	Difference: Treatment - Control
Before confiscation: 1993-2006 (t1)	$\beta_1 + \beta_2$	β_1	β_2
After confiscation: 2007-2022 (t2)	$\beta_1 + \beta_2 + \beta_3 + \beta_4$	$\beta_1 + \beta_3$	$\beta_2 + \beta_4$
Difference: After - Before	$\beta_3 + \beta_4$	β_3	**Differences-in-Differences =** β_4

Source: BofA Global Research

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Controlling for four variables: inflation, interest rates, terms of trade, taxes

The advantage of carrying out a regression analysis is that it allows to control for variables that vary both across countries and over time and may impact the difference in the private investment rates between the treatment and control groups.

Four obvious distortions for private investment are: 1) very high inflation in Venezuela and Argentina, that likely hindered private investment; 2) different levels of interest rates, which are drivers of investment; 3) variations in the terms of trade (ratio of export to import prices), that have a powerful effect on GDP; and 4) changes in corporate income tax rates, that may have influenced investment decisions.

Thus, controlling for the average real interest rate (ie, nominal rate minus inflation), the average annual variation in the terms of trade, and the average corporate income tax rate – column (5) in Exhibit 5 – we estimate that an asset confiscation shock reduces private investment by 4.3pp of GDP, on average, in the next 16 years (proxy for long-term).[5]

The p-value of the "Differences-in-Differences" coefficient ("β_4") improves to 0.17 compared to the plain vanilla estimate's p-value of 0.31, almost statistically significant at the 90% confidence level. We consider the practical significance of the "Differences-in-Differences" estimator to be high, considering it is consistently negative across specifications (as we will show in the next sensitivity analysis).

[4] The p-value (measure of statistical significance) of this estimate is 0.31, suggesting a large range of uncertainty. Nonetheless, the p-value improves after we include control variables.
[5] By including the real interest rate as a covariate we can control for both the level of nominal interest rates and inflation in a single variable. This helps to preserve degrees of freedom which are equal to the sample size minus the number of parameters (beta coefficients) to be estimated.

Exhibit 5: Regression analysis

Controlling for macroeconomic conditions (real interest rate, terms of trade, corporate income taxes), we estimate that – on average – an asset confiscation shock reduces the private investment rate of a LatAm country by 4.3pp of GDP in the next 16 years. This figure is the coefficient of the interaction in column (5)

Dependent variable	Private investment (% of GDP)				
Estimation method	"Differences-in-Differences" with Panel least squares				
Sample	18 countries, 2 periods (36 observations)				
Periods	Period 1 (before wave of asset confiscations): 1993-2006 Period 2 (after wave of asset confiscations): 2007-2022				
Treatment and Control groups	Treatment: Argentina, Bolivia, Ecuador, Nicaragua, Venezuela Control: Brazil, Chile, Colombia, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Mexico, Panama, Paraguay, Peru, Uruguay				
Regression	(1)	(2)	(3)	(4)	(5)
Explanatory variables	P-values are in parenthesis under coefficients. Individual coefficients are statistically significant at *90%, **95%, and ***99% confidence levels				
Intercept	18.3704 *** (0.0000)	17.9066 *** (0.0000)	19.4497 *** (0.0000)	20.2727 *** (0.0000)	23.7765 *** (0.0000)
Asset confiscation	-5.0156 *** (0.0040)	-3.3459 (0.1534)	-4.5677 * (0.0662)	-2.2769 (0.3519)	-2.2557 (0.3595)
After	0.6741 (0.6452)	1.6018 (0.3547)	0.7817 (0.6613)	0.2964 (0.8586)	-0.0285 (0.9868)
Asset confiscation * After		-3.3394 (0.3098)	-2.9136 (0.3686)	-4.4419 (0.1521)	-4.2974 (0.1690)
Average real interest rate			-0.1169 (0.1533)	-0.1659 ** (0.0384)	-0.1807 ** (0.0301)
Average variation in terms of trade				-0.5862 ** (0.0194)	-0.5783 ** (0.0220)
Average corporate income tax rate					-0.1146 (0.4288)
R-squared (%)	22.9074	25.3902	30.2137	42.0125	43.2719
Adjusted R-squared (%)	18.2351	18.3955	21.2090	32.3479	31.5351
Joint significance test (Prob, F-statistic)	0.0137 **	0.0232 **	0.0215 **	0.0043 ***	0.0076 ***

Note: See Appendix 1 for details of data.

Source: BofA Global Research, IMF, World Bank, OECD, Haver, Tax Foundation, Ministry of Finance of Argentina (Hacienda), Brazilian Institute of Geography and Statistics (IBGE), Ministry of Finance of Bolivia (MEFP), Ministry of Finance of Chile (Hacienda), Ministry of Finance of Colombia (Hacienda), Ministry of Finance of Costa Rica (Hacienda), Ministry of Finance of the Dominican Republic (Hacienda), Central Bank of Ecuador (BCE), Central Bank of El Salvador (BCR), Ministry of Finance of Guatemala (MinFin), Ministry of Finance of Honduras (SEFIN), Ministry of Finance of Mexico (SHCP), Central Bank of Nicaragua (BCN), Ministry of Finance of Panama (MEF), Central Bank of Paraguay (BCP), Central Bank of Peru (BCRP), Ministry of Finance of Uruguay (MEF), Ministry of Finance of Venezuela (MPPEFCE).

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Sensitivity analysis: Negative impact is consistent across all specifications

In the sensitivity analysis we test each country from the treatment group (those that carried out large asset confiscations) individually. We do three main specifications for each: i) the response to the wave of asset confiscations that began in LatAm in 2007; ii) the response to the largest or first huge asset confiscation (>6% of GDP); and iii) the response in symmetric samples. By symmetric we mean that period 1 (before) and period 2 (after) must have the same number of years.[6]

Tellingly, the "Differences-in-Differences" estimator is consistently negative in all variations, ranging from -0.2pp of GDP in Argentina's symmetric sample (after the nationalization of Repsol) to -8.5pp of GDP in Nicaragua's symmetric sample (after the expropriation of Riverside Coffee). The median result among these alternative estimates is about 3pp, close to our plain vanilla estimate.

We believe there is a good reason to explain why the result for Argentina in the symmetric sample (11 years before and after 2012) is low. As shown in Appendix 1, private investment in 2001, 2002 and 2003 was severely affected by a full-blown banking and debt crisis, unlike the countries in the control group. Our analysis does not control for that event.

[6] Symmetric samples make the data in the panel more balanced. As shown in Appendix 1, our dataset of private investment is unbalanced. Some countries lack data for some years. For instance, Venezuela only has data between 1997 and 2014. By using symmetric samples we reduce the bias that can emanate from unbalanced data.

Exhibit 6: Sensitivity analysis
The "Differences-in-Differences" estimator (β 4) is consistently negative in all nineteen variations

Model specifications 1/	Asset confiscation shock	Periods (Period 1 is "before", Period 2 is "after")	Treatment group	Control Group	Differences-in-differences estimator (mean comparisons, same as Exhibit 3)	Differences-in-differences estimator, controlling for real interest rate, terms of trade, and corporate income tax rate
Main model (Exhibits 3, 4, 5)	Wave of asset confiscations that began in Latam in 2007	P1: 1993-2006 P2: 2007-2022	Argentina, Bolivia, Ecuador, Nicaragua, Venezuela	Bra, Chi, Col, Cos, Dom, Els, Gua, Hon, Mex, Pan, Par, Per, Uru	-3.3394	-4.2974
Different specifications to test sensitivity						
Main model excluding Mexico from Control Group	Wave of asset confiscations that began in Latam in 2007	P1: 1993-2006 P2: 2007-2022	Argentina, Bolivia, Ecuador, Nicaragua, Venezuela	Bra, Chi, Col, Cos, Dom, Els, Gua, Hon, Pan, Par, Per, Uru	-3.4953	-4.6309
Argentina, wave	Wave of asset confiscations that began in Latam in 2007	P1: 1993-2006 P2: 2007-2022	Argentina	Bra, Chi, Col, Cos, Dom, Els, Gua, Hon, Mex, Pan, Par, Per, Uru	-1.4159	28 observations, insufficient for regression
Argentina, largest asset confiscation	Largest asset confiscation, nationalization of Repsol in 2012 (1.8% of GDP)	P1: 1993-2011 P2: 2012-2022	Argentina	Bra, Chi, Col, Cos, Dom, Els, Gua, Hon, Mex, Pan, Par, Per, Uru	-0.8407	28 observations, insufficient for regression
Argentina, symmetric sample	Largest asset confiscation, nationalization of Repsol in 2012 (1.8% of GDP)	Symmetric sample (11 years before and after) P1: 2001-2011 P2: 2012-2022	Argentina	Bra, Chi, Col, Cos, Dom, Els, Gua, Hon, Mex, Pan, Par, Per, Uru	-0.2036	28 observations, insufficient for regression
Bolivia, wave	Wave of asset confiscations that began in Latam in 2007	P1: 2000-2006 P2: 2007-2022	Bolivia	Bra, Chi, Col, Cos, Dom, Els, Gua, Hon, Mex, Pan, Par, Per, Uru	-1.886	28 observations, insufficient for regression
Bolivia, first year of large asset confiscations	Nationalization of Glencore's mining operations (5.9% of GDP) and Petrobras' refineries (1.5% of GDP)	P1: 2000-2006 P2: 2007-2022	Bolivia	Bra, Chi, Col, Cos, Dom, Els, Gua, Hon, Mex, Pan, Par, Per, Uru	-1.886	28 observations, insufficient for regression
Bolivia, symmetric sample	Nationalization of Glencore's mining operations (5.9% of GDP) and Petrobras' refineries (1.5% of GDP)	Symmetric sample (7 years before and after) P1: 2000-2006 P2: 2007-2013	Bolivia	Bra, Chi, Col, Cos, Dom, Els, Gua, Hon, Mex, Pan, Par, Per, Uru	-3.5722	28 observations, insufficient for regression
Ecuador, wave	Wave of asset confiscations that began in Latam in 2007	P1: 2000-2006 P2: 2007-2022	Ecuador	Bra, Chi, Col, Cos, Dom, Els, Gua, Hon, Mex, Pan, Par, Per, Uru	-2.8346	28 observations, insufficient for regression
Ecuador, largest asset confiscation	Cancellation of Occidental Petroleum's concession contract in 2006 (7.2% of GDP)	P1: 2000-2005 P2: 2006-2022	Ecuador	Bra, Chi, Col, Dom, Els, Gua, Hon, Mex, Pan, Par, Per, Uru	-3.1122	26 observations, insufficient for regression
Ecuador, symmetric sample	Cancellation of Occidental Petroleum's concession contract in 2006 (7.2% of GDP)	Symmetric sample (6 years before and after) P1: 2000-2005 P2: 2006-2011	Ecuador	Bra, Chi, Col, Dom, Els, Gua, Hon, Mex, Pan, Par, Per, Uru	-2.9163	26 observations, insufficient for regression
Nicaragua, wave	Wave of asset confiscations that began in Latam in 2007	P1: 2006 P2: 2007-2022	Nicaragua	Bra, Chi, Col, Cos, Dom, Els, Gua, Hon, Mex, Pan, Par, Per, Uru	-2.9499	28 observations, insufficient for regression
Nicaragua, largest asset confiscation	Expropriation of Riverside Coffee in 2018 (5.3% of GDP)	P1: 2006-2017 P2: 2018-2022	Nicaragua	Bra, Chi, Col, Cos, Dom, Els, Gua, Hon, Mex, Pan, Par, Per, Uru	-7.1565	28 observations, insufficient for regression
Nicaragua, symmetric sample	Expropriation of Riverside Coffee in 2018 (5.3% of GDP)	Symmetric sample (5 years before and after) P1: 2013-2017 P2: 2018-2022	Nicaragua	Bra, Chi, Col, Cos, Dom, Els, Gua, Hon, Mex, Pan, Par, Per, Uru	-8.4759	28 observations, insufficient for regression
Venezuela	Wave of asset confiscations that began in Latam in 2007	P1: 1997-2006 P2: 2007-2014	Venezuela	Bra, Chi, Col, Cos, Dom, Els, Gua,	-7.3731	28 observations, insufficient for regression

Exhibit 6: Sensitivity analysis

The "Differences-in-Differences" estimator (β 4) is consistently negative in all nineteen variations

Model specifications 1/	Asset confiscation shock	Periods (Period 1 is "before", Period 2 is "after")	Treatment group	Control Group	Differences-in-differences estimator (mean comparisons, same as Exhibit 3)	Differences-in-differences estimator, controlling for real interest rate, terms of trade, and corporate income tax rate
				Hon, Mex, Pan, Par, Per, Uru		
Venezuela, first year of large asset confiscations	Expropriation and nationalization of oil & gas, electricity, telecom, and cement companies in 2007 (20% of GDP)	P1: 1997-2006 P2: 2007-2014	Venezuela	Bra, Chi, Col, Cos, Dom, Els, Gua, Hon, Mex, Pan, Par, Per, Uru	-7.3731	28 observations, insufficient for regression
Venezuela	Expropriation and nationalization of oil & gas, electricity, telecom, and cement companies in 2007 (20% of GDP)	Symmetric sample (8 years before and after) P1: 1999-2006 P2: 2007-2014	Venezuela	Bra, Chi, Col, Cos, Dom, Els, Gua, Hon, Mex, Pan, Par, Per, Uru	-6.8001	28 observations, insufficient for regression
Mexico, largest asset confiscation	Cancellation of Mexico City's new airport in 2019, after referendum (0.3% of GDP)	P1: 1993-2018 P2: 2019-2022	Mexico	Bra, Chi, Col, Cos, Dom, Els, Gua, Hon, Pan, Par, Per, Uru	-1.2292	26 observations, insufficient for regression
Mexico, symmetric sample	Cancellation of Mexico City's new airport in 2019, after referendum (0.3% of GDP)	Symmetric sample (4 years before and after) P1: 2015-2018 P2: 2019-2022	Mexico	Bra, Chi, Col, Cos, Dom, Els, Gua, Hon, Pan, Par, Per, Uru	-1.4992	26 observations, insufficient for regression
Median					-3.031	

Source: BofA Global Research, IMF, World Bank, OECD, Haver, Tax Foundation, Ministry of Finance of Argentina (Hacienda), Brazilian Institute of Geography and Statistics (IBGE), Ministry of Finance of Bolivia (MEFP), Ministry of Finance of Chile (Hacienda), Ministry of Finance of Colombia (Hacienda), Ministry of Finance of Costa Rica (Hacienda), Ministry of Finance of the Dominican Republic (Hacienda), Central Bank of Ecuador (BCE), Central Bank of El Salvador (BCR), Ministry of Finance of Guatemala (MinFin), Ministry of Finance of Honduras (SEFIN), Ministry of Finance of Mexico (SHCP), Central Bank of Nicaragua (BCN), Ministry of Finance of Panama (MEF), Central Bank of Paraguay (BCP), Central Bank of Peru (BCRP), Ministry of Finance of Uruguay (MEF), Ministry of Finance of Venezuela (MPPEFCE). 1/ Note: Data for Argentina, Bolivia, Ecuador, Nicaragua, Venezuela, and Mexico start in 1993, 2000, 2000, 2006, 1997, and 1993, respectively. Data from Venezuela ends in 2014. See Appendix 1 for details of data.

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Mexico: Less hostile form of asset confiscation, both in size and form

Mexico is another country that had large investor-state disputes in our study period (1993-2022). Although they happened in the final years, from 2019 to present. That's why in our main analysis (Latam's asset confiscation wave that began in 2007) we include Mexico in the control group, rather than the treatment group.

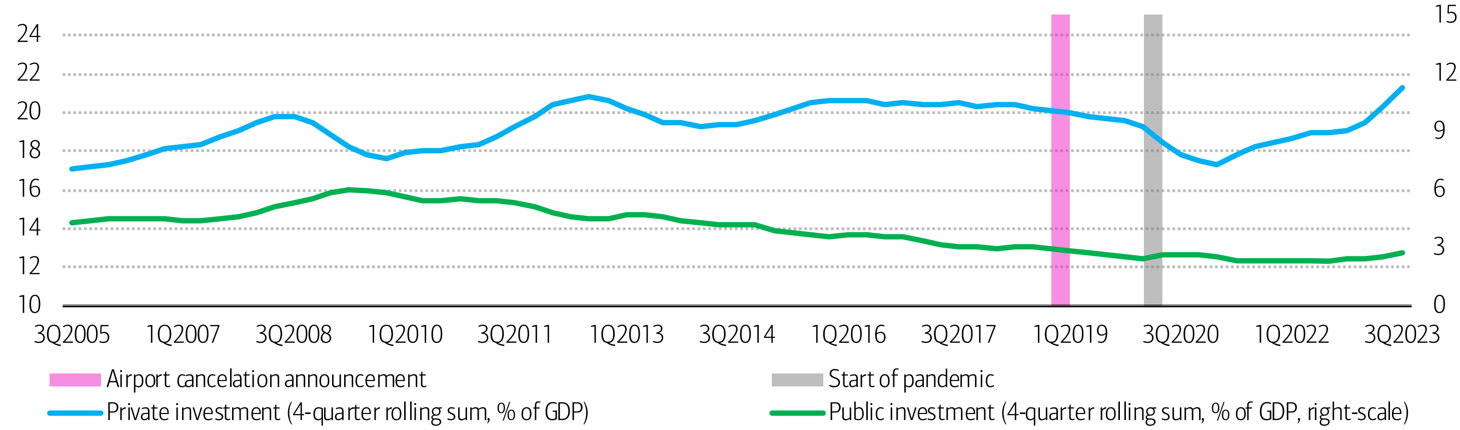
Tellingly, if we exclude Mexico from the regression (reducing the number of observations from 36 to 34) the coefficient of the "Differences-in-Differences" estimator ("β_4") – controlling for macro conditions (real interest rate, terms of trade, corporate income taxes) – increases in absolute value, from -4.3pp to -4.6pp of GDP. The negative effect of asset confiscations on investment becomes larger. This is shown in the second row and last column of Exhibit 6.

There are at least four investor-state disputes in Mexico that are worth mentioning, all of them during the Lopez Obrador administration. The cancellation of Mexico City's new airport in 2019, after a referendum, which (at the outset) affected many companies that had contracts with the operator. These companies, however, were rewarded with other contracts from the government, and the bondholders that financed the airport (purchasing securities issued by a trust fund) were paid in full.

The second case in point is the forced relocation of Constellation Brand's beer manufacturing operations in 2020, from northern to southern Mexico, also after a referendum. The third is the cancellation of a 120km railway concession contract to Ferrosur (owned by Grupo Mexico) for the purpose of facilitating AMLO's Inter-Oceanic (Tehuantepec) Corridor project. And the fourth – the most recent (December 2023) – is the takeover of a hydrogen plant owned by the French company Air Liquide. Air Liquide had acquired the plant from Pemex in 2017, paying around US$ 55mn.

Arguably, these asset confiscations seem less hostile – both in size and in form – compared to the outright expropriations, nationalizations, and other events that happened in Venezuela, Bolivia, Argentina, Nicaragua, and Ecuador (Exhibit 2). Nonetheless, that it is not to say business sentiment and investment were not impacted. In fact, the "Differences-in-Differences" estimator indicate a negative effect in Mexico's private investment rate, ranging between -1.2pp and -1.5pp of GDP in the years following the cancellation of Mexico City's new airport. The results are shown in Exhibit 6.

Exhibit 7: Mexico's private investment weakened substantially between the cancellation of the airport and the beginning of the pandemic
But then rebounded, driven by nearshoring of US investments and (to lesser extent) government capex



Note: Investment is in real values (2018 Mexican Pesos) for both the private and public components, divided by GDP.
Source: Mexico's National Institute of Statistics and Geography (INEGI), BofA Global Research

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Moreover, like the case of Argentina's 2001 banking & debt crisis, our "Differences-in-Differences" framework does not control for the nearshoring of US investments that is evidently supporting investment in Mexico in the post-pandemic years. In other words, had there been no nearshoring, investment in the post-asset confiscation period (2019 to present) would have likely fallen more. If that is the case, the -1.5pp-of-GDP estimate may be an underestimation.

It is a relevant point for Panama, considering that both Mexico and Panama are countries that historically have been quite friendly to foreign investment, but are now experiencing meaningful investor-state dispute shocks. Another similarity between Mexico and Panama is that they have investment-grade credit ratings. Conversely, Argentina's, Bolivia's, Venezuela's, Ecuador's, and Nicaragua's sovereign debt are rated as highly speculative or of risk of imminent default.

From investment rate to potential GDP

Base-case: Impact on potential GDP growth, around -0.5pp

The last step of our analysis is mechanical. First, we define a conventional Cobb-Douglas production function where physical capital and human capital are adjusted for both usage and quality (see Annex 2). Cobb-Douglas production functions are a standard approach to decomposing GDP growth from the contributions of labor, capital, and total factor productivity.

Exhibit 8: Impact on potential GDP growth in next 10 years associated to declines in Gross Investment and Total Factor Productivity

Holding everything else constant, if the investor-state dispute shock causes Panama's private investment rate to fall by around 3pp of GDP – as our analysis suggest (Exhibit 6) – then potential GDP growth would drop 0.44pp

Impact on potential GDP growth (pp)		Decline in average Gross Investment over next 10 years (% of GDP)				
		-1	-2	-3	-4	-5
Decline in average TFP over next 10 years (%)	0	-0.15	-0.29	-0.44	-0.60	-0.75
	-0.1	-0.25	-0.39	-0.54	-0.70	-0.85
	-0.2	-0.35	-0.49	-0.64	-0.80	-0.95
	-0.3	-0.45	-0.59	-0.74	-0.90	-1.05
	-0.4	-0.55	-0.69	-0.84	-1.00	-1.15
	-0.5	-0.65	-0.79	-0.94	-1.10	-1.25

Source: BofA Global Research, Statistics Institute (INEC), IMF, Barro Lee database, ECLAC-CELADE

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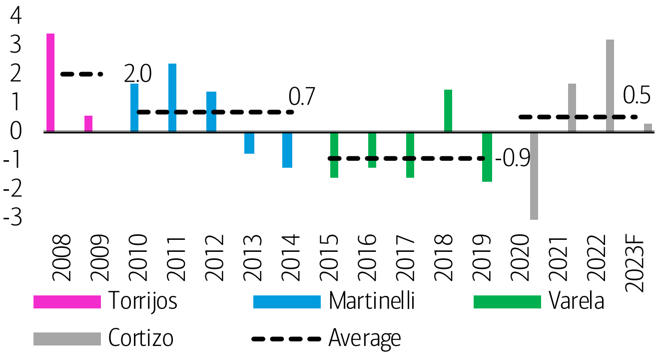
Exhibit 9: Total Factor Productivity (TFP) growth (%)

We use the new GDP time series (2018 base year) to back out TFP



Source: BofA Global Research, Statistics Institute (INEC), IMF, Barro Lee database, ECLAC-CELADE

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Second, we estimate how much would potential GDP growth fall in the next 10 years if the average gross investment rate declines (by 1 percentage point, 2pp, 3pp, 4pp, and 5pp) compared to the average of the period 2007-2022 (36.4% of GDP). The results are shown in Exhibit 8. The main caveat about the estimate is that we are assuming everything else remains constant.

We use the period 2007-2022 because Panama's newly published GDP time series (2018 base year) begin in 2007. See Appendix 2 for more details.

Physical capital has been the major engine of growth

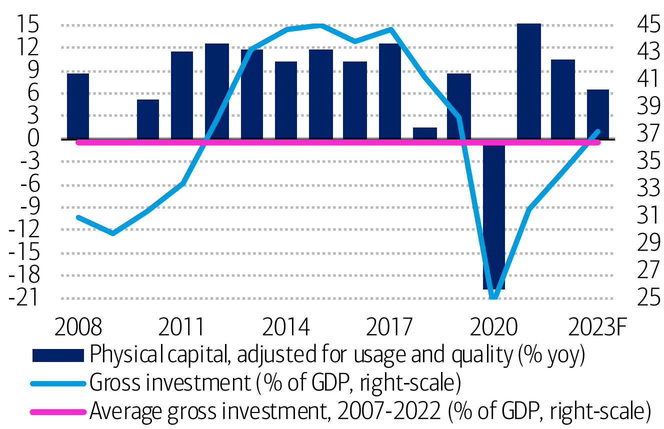
Our production function exercise indicates that between 2007 and 2022, 67.3% of economic growth was attributable to the accumulation of physical capital, 26.9% to human capital, and 5.8% to total factor productivity. Against this backdrop, having weaker investment in future years can make a significant difference for GDP dynamics.

Growth hovering around 3.6%, from 2025 and thereafter

Previously, we estimated that the median impact of large investor-state disputes on private investment is around -3 percentage points of GDP (Exhibit 6). Using that value as a reference, the effect on potential growth would be -0.44pp (Exhibit 8). We round up to -0.5pp, assuming total factor productivity would also be negatively affected, considering mining is among the most productive sectors in Panama. Thus, we foresee GDP growing around 3.6% from 2025 and thereafter, -0.5pp lower than our previous estimate of potential GDP growth (4.1%).

Exhibit 10: Growth of physical capital has been supported by Panama's high investment to GDP ratio which could fall in coming years

Investment-to-GDP likely increased in 2023, boosted by construction activity



Note: For more detail on how we calculate physical capital, see Annex 2.
Source: BofA Global Research, Statistics Institute (INEC), IMF

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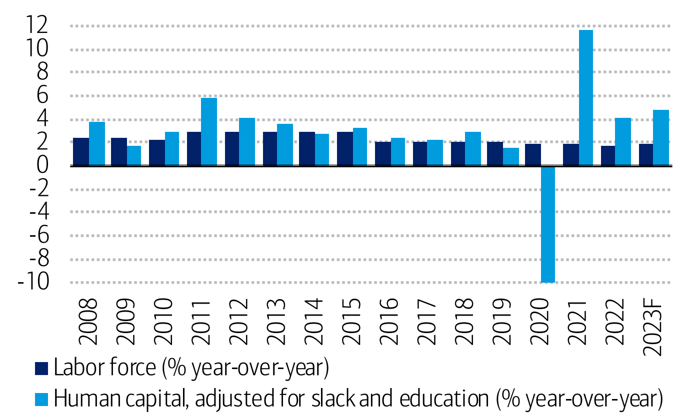
Exhibit 11: Human capital is growing faster than labor force

Educational attainment and decrease of unemployment rate are more than offsetting slower growth in labor force (associated to population aging)



Note: For more detail on how we calculate human capital, see Annex 2.
Source: BofA Global Research, Statistics Institute (INEC), Barro Lee database, ECLAC-CELADE

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Weaker TFP could make the negative impact bigger

Exhibit 8 summarizes the impact on potential GDP growth resulting from the combination of two variables: the gross investment rate and total factor productivity (TFP) which basically measures how technology contributes to growth. In the initial sections of the report, we analyzed how investor-state disputes can lower the investment rate. Space constraints preclude us from doing the same for TFP.

Nevertheless, we must say that mining is currently one of Panama's most productive sectors. In the rolling four quarters ended 2Q2023 (latest available data) the mining sector produced a gross value added of 3012.4mn Balboas (in 2018 chained values), employing 9,363 workers. That is an output of 321,734 Balboas per worker, per year; 8.6 times higher than the productivity (output per worker) of the other sectors in the Panamanian economy. Ceteris Paribus, the closure of the mining industry would make the level of labor productivity fall by 3.5%. Of course, this is a one-off. It's not the same as saying that the growth of labor productivity will be -3.5% in the next 10 years.

Updating our macroeconomic forecasts

Because of stronger than expected GDP and activity data, we have revised up our growth forecast for 2023, to 6% (from 5%). Nevertheless, we have cut the forecast for 2024 to 2% (from 3%), assuming a permanent shutdown of Minera Panama's mine. Given the negative shock to business confidence and other indirect effects (labor market, credit rating, productivity, among others) we expect GDP to hover around 3.6% in 2025 and thereafter. Slower than what was recently viewed as the Panamanian economy's goldilocks speed (between 4% and 5%).

On the fiscal side, we think the fiscal deficit was close to the 3%-of-GDP target in 2023, despite of the social protests observed in Q4. Our forecast is 3.3%. But we wouldn't be surprised if the government ends up meeting the target, considering the recent news about the extension of the fiscal year (which allows them to record part of 1Q2024 tax revenues as 4Q2023) and US$ 121 (0.15pp of GDP) in tax collections from an amnesty. In addition to extraordinary mining revenues (US$ 567mn) and a record-high Canal dividend (US$ 2.544mn) collected between November and December.

The fiscal outlook for 2024 is more challenging, with the expectation of mining revenues going to zero (taxes and social security contributions), weaker economic activity, and the impact of the drought on Canal revenues. We forecast the fiscal deficit widening to 4.5% of GDP and public debt surpassing 60% of GDP. In that scenario, we believe it's likely that Panama could lose the investment grade, from at least one rating agency, in 2024. The widening of the current account deficit, associated to the mine, will likely also matter for the rating agencies because it's a permanent deterioration in the external position (US$ 3bn of mining exports disappearing at the stroke of a pen, partly offset by smaller primary income payments and lower demand for imports).

Exhibit 12: BofA's macroeconomic forecasts for Panama

We foresee GDP growth hovering around 3.6% in 2025 and thereafter, hindered by the investor-state dispute shock

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023f	2024f	2025f
Nominal GDP (US$ bn)	55.2	59.8	64.0	68.8	67.3	69.7	57.1	67.4	76.5	82.2	85.3	89.8
GDP growth (%)	5.1	5.7	5.0	5.6	-2.4	3.3	-17.7	15.8	10.8	6.0	2.0	3.6
Inflation (end-of-period, %)	1.0	0.3	1.5	0.5	0.2	-0.1	-1.6	2.6	2.1	1.9	1.7	1.5
Non-Financial Public Sector primary balance (% of GDP)	-1.3	-0.4	-0.1	-0.1	-1.0	-0.9	-7.2	-4.2	-2.2	-0.8	-1.8	-1.3
Non-Financial Public Sector overall balance (% of GDP)	-2.8	-2.0	-1.6	-1.7	-2.8	-2.7	-9.7	-6.4	-3.9	-3.3	-4.5	-4.0
Non-Financial Public Sector gross debt (% of GDP)	37.1	37.4	37.3	37.6	38.2	44.5	64.7	60.1	57.9	57.5	60.3	61.5
Current account balance (% of GDP)	-12.2	-7.1	-7.2	-5.4	-7.4	-4.8	-0.3	-3.0	-3.9	-3.1	-4.9	-5.4
Gross international reserves (US$ bn) 1/	5.0	5.1	5.7	4.7	4.0	6.5	11.8	9.2	8.1	7.0	7.4	7.9

1/ **Note:** Panama doesn't have a central bank. International reserves are not reported. However, we estimate a proxy by adding the financial assets of the Non-Financial Public Sector and the liquid external assets of the National Bank of Panama (government-owned commercial bank).

Source: Statistics Institute (INEC), Ministry of Finance (MEF), Superintendence of Banks of Panama (SBP), Haver, BofA Global Research

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Annex 1: Private investment data

Exhibit 13: Nominal gross private investment (% of GDP)

We built the database by taking gross investment and subtracting public investment, using a variety of sources (IMF, World Bank, OECD, and government agencies of each country). See note below for details

	Arg	Bra	Bol	Chi	Col	Cos	Dom	Ecu	Els	Gua	Hon	Mex	Nic	Pan	Par	Per	Uru	Ven
1993	16.36		.	26.32	.	.	.	.	.	13.37	.	20.28	.	17.79	.	.	10.82	.
1994	16.54		.	24.04	27.20	.	.	.	15.99	11.67	.	21.59	.	18.68	.	.	10.45	.
1995	15.28		.	26.20	27.18	.	.	.	16.51	12.02	.	16.89	.	19.56	.	17.32	10.43	.
1996	16.23		.	26.10	23.40	.	.	.	10.44	10.85	.	16.93	.	20.52	.	15.87	11.10	.
1997	17.26		.	26.09	21.70	.	.	.	10.74	12.06	.	18.50	.	20.75	.	17.26	12.68	14.87
1998	17.42		.	24.81	21.13	.	.	.	14.48	13.65	.	20.48	.	23.57	.	17.28	12.86	17.46
1999	14.55		.	18.87	13.62	.	.	.	13.72	12.78	.	20.13	.	24.91	.	14.60	15.28	16.01
2000	14.42	16.69	11.06	20.67	14.53	.	24.68	17.80	13.97	12.54	20.28	20.18	.	22.78	.	14.45	15.01	14.23
2001	12.76	16.31	5.92	20.98	15.75	.	21.87	18.40	12.67	14.60	18.46	18.25	.	16.27	.	14.14	14.79	17.05
2002	9.34	14.98	7.87	21.00	17.13	.	21.85	20.49	11.49	15.16	18.14	17.88	.	14.55	.	14.60	12.67	12.27
2003	12.12	14.95	5.13	20.52	18.80	.	13.57	16.54	14.28	15.15	18.04	18.46	.	18.74	18.37	15.23	13.28	8.01
2004	16.36	15.82	1.90	18.77	19.65	.	16.67	17.29	15.45	15.94	21.12	19.27	.	18.86	17.65	14.22	14.55	10.20
2005	17.17	15.09	4.20	20.82	20.36	.	20.85	18.64	15.33	15.79	20.44	18.79	.	19.10	18.72	13.39	15.33	12.05
2006	16.38	15.41	3.65	19.88	21.51	20.17	23.21	19.80	16.45	17.29	23.37	19.70	20.23	20.48	19.86	16.71	17.35	10.99
2007	17.88	17.31	2.53	19.74	21.51	22.02	23.95	17.79	17.46	16.26	28.15	19.71	21.18	30.80	19.63	20.01	17.41	12.89
2008	17.52	18.77	4.92	26.01	21.53	22.91	25.03	15.92	16.49	15.02	29.35	20.01	21.79	35.00	21.09	24.50	20.85	9.82
2009	13.17	15.82	4.12	19.56	19.73	16.74	19.97	17.22	10.40	11.55	18.03	18.50	14.48	24.98	17.05	16.76	17.32	11.14
2010	14.96	18.57	6.32	21.92	19.81	17.57	22.52	20.06	13.00	11.86	18.23	18.61	15.98	29.91	22.08	20.13	17.17	7.36
2011	15.94	19.00	7.42	23.77	20.58	18.64	21.57	18.33	14.49	12.33	21.06	19.64	19.32	30.20	22.93	20.11	18.91	6.06
2012	14.16	18.69	4.18	26.02	19.29	18.46	17.83	17.23	14.04	13.12	21.41	19.89	22.54	35.18	19.31	19.85	21.26	6.02
2013	14.60	19.00	2.75	24.79	19.05	18.02	18.45	16.30	13.43	13.20	19.70	17.52	22.32	34.86	20.26	21.22	21.28	6.59
2014	14.40	17.58	1.61	22.42	21.02	17.56	20.17	16.68	13.35	13.12	19.34	17.35	21.31	36.52	20.83	20.39	19.89	6.41
2015	14.37	15.14	2.63	22.53	20.78	17.11	20.17	16.63	12.98	13.27	21.14	18.87	21.77	36.03	19.89	19.65	18.55	.
2016	15.45	13.04	4.01	20.83	20.90	17.11	19.94	14.42	12.59	12.88	18.83	18.65	20.23	33.77	17.61	18.89	16.44	.
2017	16.26	12.97	6.50	19.86	19.48	16.17	19.07	17.88	13.70	12.54	19.55	20.38	18.81	35.30	18.16	17.32	15.05	.
2018	15.19	13.39	7.51	21.69	19.68	17.04	23.14	19.64	15.04	12.19	21.30	20.49	14.79	34.82	20.75	18.60	13.61	.
2019	12.86	13.88	8.65	22.29	19.53	14.16	23.68	20.63	15.15	12.48	19.71	19.20	9.40	32.90	18.69	17.87	13.00	.
2020	15.42	14.28	9.15	18.50	16.82	14.95	22.44	16.82	14.34	12.42	16.23	16.91	9.81	18.11	16.43	16.01	15.12	.
2021	16.80	17.38	9.33	21.91	16.81	18.09	28.83	15.37	17.26	14.67	19.61	17.06	12.91	26.66	21.09	17.49	18.16	.
2022	16.52	16.07	8.24	23.26	18.69	17.25	32.14	17.71	17.33	15.21	19.29	18.42	12.62	29.00	21.39	17.19	17.24	.

Note: To calculate private investment for most countries (Argentina, Bolivia, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Mexico, Panama, Paraguay, Peru, Uruguay), we took the total investment rate reported in the IMF's latest World Economic Outlook (October 2023), which includes changes in inventories, and subtracted the broadest measure of public investment that we found (published by the ministry of finance or the central bank of each country).

For Guatemala, Honduras, Nicaragua, and Venezuela, we used the time series of private investment (measured as a percent of GDP) published in the World Bank's World Development Indicators. See https://data.worldbank.org/indicator/NE.GDI.FPRV.ZS. These time series are only published for a limited group of LatAm countries. We also used this source to fill some data gaps: Panama (1993 to 2002) and Uruguay (1993 to 1998).

For Brazil, we did something different. It was challenging to construct the private investment indicator because we couldn't find a long and broad time series of public investment. The longest (from 2000 to 2020) and broadest (General Government) is published by the OECD, to the best of our knowledge. See https://data.oecd.org/gdp/investment-by-sector.htm#indicator-chart. It is expressed in percent of gross fixed capital formation. Hence, to calculate public investment we took gross fixed investment – reported by the Brazilian statistics agency (IBGE) – and multiplied it by the percentage shown in the OECD statistics. Then, we subtracted the (computed) public investment times series from gross investment, to obtain the private investment indicator. Finally, given that the OECD only shows values of Brazil's public investment until 2020, we assume growth rates of 16.3% in 2021 and 10.1% in 2022, in line with the IMF's statistics (International Financial Statistics / Brazil / Government Finance / General Government Operations / consumption of fixed capital). Once we got the figures of public investment for 2021 and 2022, we repeated the same exercise to complete the private investment time series.

Source: IMF, World Bank, OECD, Haver, Ministry of Finance of Argentina (Hacienda), Brazilian Institute of Geography and Statistics (IBGE), Ministry of Finance of Bolivia (MEFP), Ministry of Finance of Chile (Hacienda), Ministry of Finance of Colombia (Hacienda), Ministry of Finance of Costa Rica (Hacienda), Ministry of Finance of the Dominican Republic (Hacienda), Central Bank of Ecuador (BCE), Central Bank of El Salvador (BCR), Ministry of Finance of Guatemala (MinFin), Ministry of Finance of Honduras (SEFIN), Ministry of Finance of Mexico (SHCP), Central Bank of Nicaragua (BCN), Ministry of Finance of Panama (MEF), Central Bank of Paraguay (BCP), Central Bank of Peru (BCRP), Ministry of Finance of Uruguay (MEF), Ministry of Finance of Venezuela (MPPEFCE), BofA Global Research.

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Annex 2: Production Function

Solow growth accounting, tailored for Panama

The Solow growth accounting methodology that we utilize is the standard one. A simple Cobb Douglas production function, equal to:

$Y = A\ N^{\alpha}\ K^{1-\alpha}$

- "Y" is Panama's GDP expressed in millions of chained 2018 Balboas, from the Statistics Institute (INEC).
- "N" is the labor force in thousands of persons, as reported by the United Nations Economic Commission for Latin America (ECLAC)[7], including their projections up to the year 2035.
- "K" is the capital stock expressed in millions of chained 2018 Balboas, calculated with the perpetual inventory method. To back out "K", we divide gross investment in the following year (t+1) by the addition of a depreciation rate and long-term GDP growth. We assume a depreciation rate of 7% and a long-run GDP growth rate of 4.7% (average of 1980-2022).
- "A" is total factor productivity (TFP), calculated as the residual.
- α and $1-\alpha$ represent the shares of labor income and capital income in national output, respectively. We assume they are both 0.5 (adding up to 100%).

Our human capital (N) and physical capital (K) variables are adjusted for both usage and quality. In human capital (N), usage is incorporated by assuming a declining participation rate, given population aging, in line with UN/ECLAC's projections, and a long-term unemployment rate of 8.1%.

For quality, we piggyback on the Barro Lee Global Educational Attainment database and their projections.[8] Also, we weight each of the educational achievement groups shown in the Barro Lee database by the social return indices estimated in Psacharopoulos, G. (1994), "Returns to Investment in Education: A Global Update".[9]

Exhibit 14: Final step to calculate the effective labor force – employment adjusted for education – which is our measure of human capital (N)

Social return weights multiplied by Barro-Lee educational attainment projections

Category	Social return index
No education	1.00
Incomplete primary education	1.68
Complete primary education	2.69
Incomplete secondary education	3.91
Complete secondary education	5.53
Incomplete college education	5.87
Complete college education	8.80

Source: Psacharopoulos, G. (1994), "Returns to Investment in Education: A Global Update".

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To control for the usage of physical capital (K), we use the output gap. That is, the deviation of GDP with respect to its trend (Hodrick Prescott filter). Quality is approximated by an investment-specific technological progress factor, defined as the inverse of the relative price of investment in terms of consumption. This factor is calculated from the GDP demand-breakdown statistics. The computation consists of dividing the investment deflator (i.e.: nominal gross investment divided by real gross investment) by the consumption deflator (i.e.: nominal consumption divided by real consumption) and taking the inverse.

[7] See https://barrolee.github.io/BarroLeeDataSet/OUPProj.html.
https://estadisticas.cepal.org/cepalstat/WEB_CEPALSTAT/estadisticasIndicadores.asp?idioma=e.
[8] See http://www.barrolee.com/data/selection.htm.
[9] Psacharopoulos, George, 1994. "Returns to investment in education: A global update," World Development, Elsevier, vol. 22(9), pages 1325-1343, September.

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