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Assessing the Current Account Gap in Colombia: A Normative Estimation Approach

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Abstract

The current account (CA) balance indicates a country's savings-investment position; sustained deficits require foreign capital. To monitor Colombia's external vulnerability risk, we estimate a normative CA level using an unbalanced panel model based on long-run fundamental structural variables. The difference between the observed CA and this normative level, termed the CA gap, signals potential macroeconomic imbalances and vulnerability, often precipitating sharp adjustments. Our results emphasize Colombia's oil balance as key to explaining this gap. We identify heightened vulnerability periods: 2010–2016 and 2021–2022. Recently (2023-2024), the gap narrowed due to monetary tightening, fiscal consolidation, resilient service exports, and rising remittances. Finally, we show this framework can generate quarterly, real-time CA gap nowcasts for timely policy signals

Keywords: Current account imbalance, Normative current account, Current account gap, External vulnerability, Global imbalances

JEL: F32, F41

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1 Introduction

The current account (CA) of the balance of payments is a key indicator of a country's savings–investment dynamics. A persistent CA deficit reflects insufficient domestic savings to meet investment needs, which must be financed through capital inflows (Allen et al., 2023; Phillips et al., 2014). In the case of Colombia, a small open economy that has historically recorded CA deficits, monitoring both the size of the deficit and the trajectory of the CA is essential to assess the risk of external debt accumulation.

A persistent deficit can increase vulnerability to sudden stops and repayment difficulties. Moreover, like many small open economies whose exports are predominantly commodities, Colombia's CA is particularly sensitive to external shocks (Ojeda-Joya, 2019). To assess the vulnerability associated with the CA deficit, several authors suggest comparing the observed CA balance with a benchmark level of the CA that is consistent with the fundamental structural variables that explain its long-run behavior (Allen et al., 2023; Coutinho et al., 2022; Devadas & Loayza, 2018). This benchmark is commonly referred to in the literature as the normative CA.

Deviations from the normative CA level are defined as the CA gap. This measure allows understanding of the presence of macroeconomic imbalances and signals potential vulnerabilities, which may lead to abrupt adjustments in domestic demand. The CA gap serves as a useful complement to traditional indicators used to monitor macroeconomic stability. Specifically, some authors use the CA gap as an input to estimate real exchange rate misalignment in line with the Fundamental Equilibrium Exchange Rate (FEER) methodology (Vdovychenko, 2021; Torres-Gorron & Cote-Barón, 2017; Isard, 2007). It has also been employed as a relevant variable for tracking potential macroeconomic imbalances more broadly (Arteaga-Cabrales et al., 2013).

Given the characteristics of Colombia's CA and its sensitivity to external shocks[1], this paper seeks to assess how vulnerable the CA deficit is by computing its deviation from its normative level. To address this question, we estimate an unbalanced pooled panel model that incorporates the fundamental variables commonly associated with the long-run behavior of the CA. The model is estimated using annual data from 1980 to 2024 and covers a sample of 50 countries, including both developed and developing economies.

We also propose constructing an empirical distribution of the normative CA and the CA gap using a bootstrap strategy to account for the unobservable nature of the normative CA. This approach allows us to explicitly incorporate estimation uncertainty. The median of the resulting distribution serves as the benchmark level consistent with the fundamental structural variables.

The main results suggest that, for Colombia, the most relevant variables explaining the behavior of the normative CA are GDP per worker and the oil balance. The former reflects Colombia's relatively lower productivity growth compared to the major developed economies

[1] As we analyze throughout the paper, there are two relevant periods during which the CA was vulnerable to external shocks: the period between 2010 and 2016, and the period from 2021 to 2022. The first is associated with a decline in oil prices, and the second with the post-COVID-19 recovery

in the sample, underscoring the country's need to finance investment through capital goods imports. The significance of the oil balance highlights Colombia's reliance on commodity exports, which directly affects the goods and services component of the CA. This also illustrates the sensitivity of the CA to fluctuations in international commodity prices.

We also highlight two periods during which Colombia's CA deficit exhibited heightened external vulnerability relative to its normative level: 2010–2016 and 2021–2022. These episodes reflect an increased reliance on capital inflows to sustain domestic spending, amplifying the country's exposure to sudden stops, exchange rate volatility, and overall external risk.

Finally, we propose a nowcast of the normative CA and the CA gap to monitor the behavior of this indicator on a quarterly basis before the year concludes. This approach allows for a more timely and accurate assessment of vulnerabilities that might be building up, which is particularly relevant given the sensitivity of Colombia's CA to external shocks.

This paper contributes to the literature that seeks to estimate the normative level of the CA. In particular, it relates to the work of authors such as Phillips et al. (2014), Cubeddu et al. (2019), and Lee & Chinn (2006), who estimate the normative CA based on demographic and productivity variables. These studies incorporate demographic indicators to capture the effect of population structure on savings: countries with a high dependency ratio tend to save less, thereby affecting the saving-investment balance and potentially leading to sustained CA deficits.

More recent contributions also include measures of the oil balance, typically defined as the difference between production and consumption, along with other variables capturing natural resource endowments such as natural gas. An increase in the oil balance tends to raise export income from goods and services, thus helping reduce the CA deficit, with potentially substantial long-term effects, as highlighted in the recent approaches of Allen et al. (2023) and Coutinho et al. (2022).

Our results relate closely to the existing literature that estimates CA gaps based on a normative benchmark, typically using panel data methodologies across a broad sample of developed and developing countries, as seen in Allen et al. (2023); Coutinho et al. (2022); Chinn & Ito (2022); Sarsenbayev & Gagnon (2021); Delgado-Téllez et al. (2020); Comunale (2018). More recently, some studies have included non-structural variables to account for cyclical and transitory factors that can cause deviations of the observed CA from its normative level, as shown in Allen et al. (2023) and Coutinho et al. (2022).

This paper also builds on previous estimations of Colombia's normative CA and analyses of its external balance over time. In particular, our findings are broadly consistent with earlier work by Torres-Gorron & Cote-Barón (2017), Ojeda-Joya (2019), and Arteaga et al. (2013). In line with the main literature, we include demographic and macroeconomic fundamentals in the model and also incorporate a set of non-structural variables at business-cycle frequencies to better capture short-run dynamics, as suggested by Allen et al. (2023) and Coutinho et al. (2022). Similar to their findings, we identify GDP per worker and variables related to the oil balance as key determinants of Colombia's normative CA.

This paper offers three main contributions. First, it updates the estimation of Colombia's normative CA and CA gap, incorporating recent post-COVID economic effects. Second, it proposes constructing an empirical distribution using bootstrap techniques to account for the uncertainty inherent in estimating an unobservable variable like the normative CA. Finally, it applies the panel data model framework to produce a quarterly nowcast of the CA gap, enabling a more timely and continuous monitoring of Colombia's external position throughout the year.

2 Evolution and dynamics of the Current Account in Colombia

The CA is composed of three main components: the goods and services balance, primary income, and current transfers. The historical trajectory of the CA exhibits two distinct phases. Prior to 2000, Colombia underwent several real exchange rate adjustments and the transition between external regimes of imports and exports given the commercial political changes. Following 2000, the country adopted an explicit monetary policy targeting and a flexible real exchange rate (Ojeda-Joya, 2019).

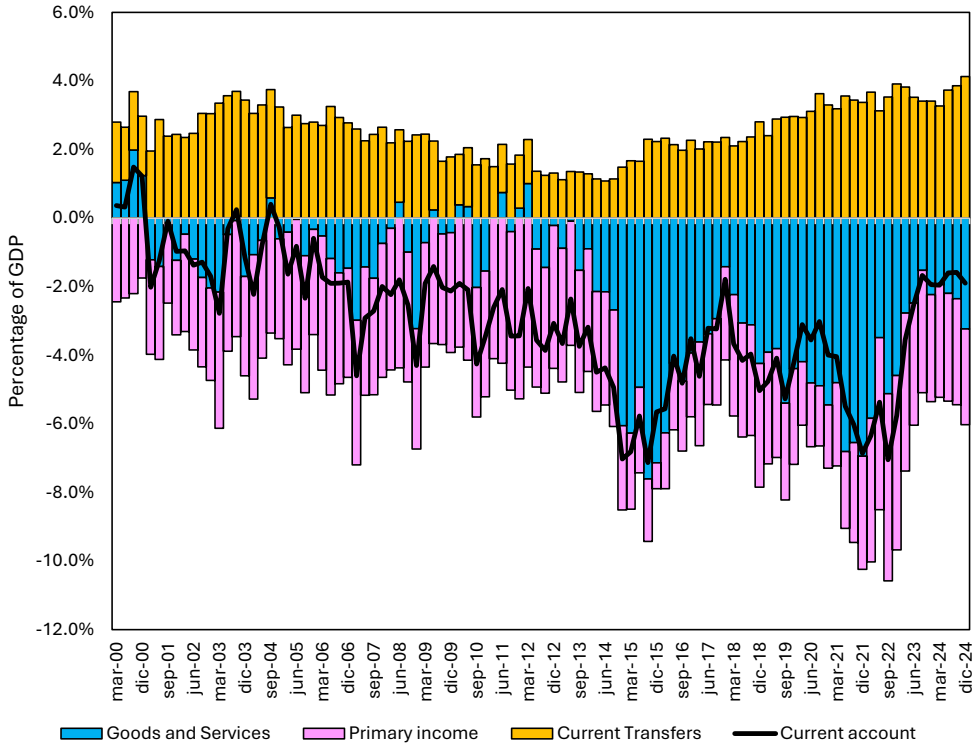

Figure 1: Current Account behavior as a percentage of GDP.

After this regime change, the CA has displayed two principal characteristics: First, as a small open economy, Colombia has historically sustained CA deficits, heightening its vulnerability

to sudden stops and repayment pressures. Second, Colombia's CA demonstrates high sensitivity to external shocks, reflecting its dependence on commodity exports and exposure to regional geopolitical dynamics. As shown in Figure (1), Colombia's external imbalances have been driven primarily by deficits in the goods and services and primary-income accounts, whereas the current transfers account has traditionally shown a surplus that partially offsets the overall current-account shortfall.

The goods and services account is linked to export revenues, which are influenced by the price dynamics of Colombia's primary commodity exports notably oil, coal, gold, and coffee whose prices are determined in global markets, limiting Colombia's ability to influence export revenues (Mahadeva & Gómez, 2010). Conversely, import expenditures are partially driven by domestic demand conditions[2].

Historically, the primary income account has contributed to the widening of Colombia's CA deficit, primarily attributable to profit repatriation by enterprises receiving foreign direct investment (FDI). In parallel, the current transfers account has persistently registered a structural surplus, driven predominantly by remittance inflows from Colombian emigrants abroad. This surplus has partially offset the aggregate CA deficit.

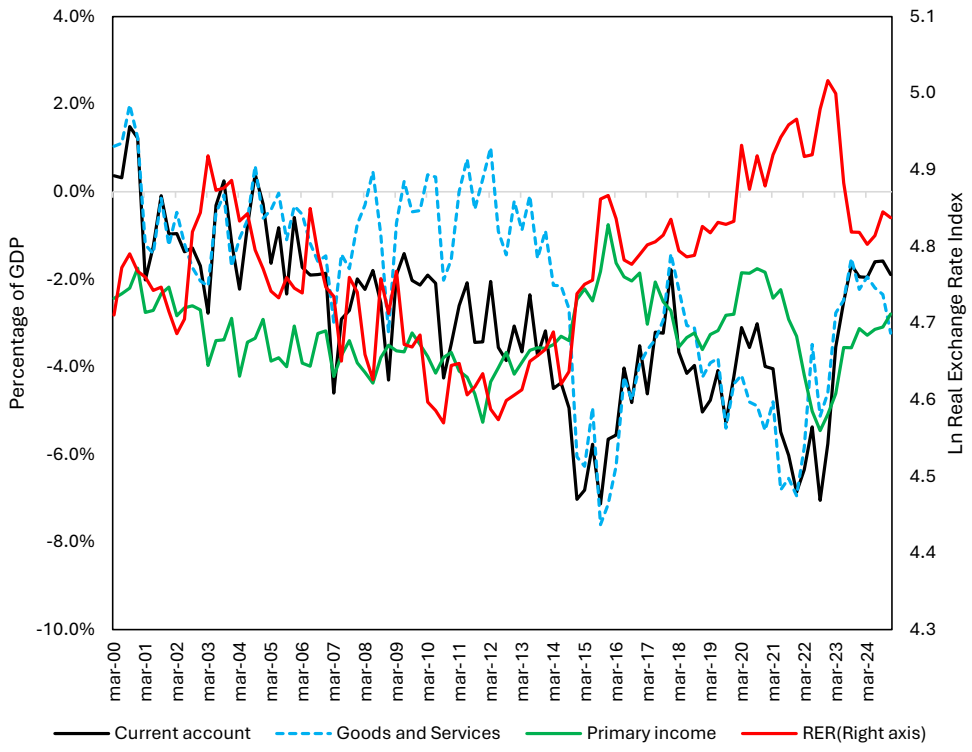

Figure 2: Relationship between Current Account as a percentage of GDP and components with Real Exchange Rate index

[2]Colombia's principal imports comprise intermediate, consumer, and capital goods (Mahadeva & Gómez, 2010).

After 2000 the CA balance has been significantly affected by three major external shocks: The 2012 breakdown in trade relations with Venezuela affected the amount of Colombian exports, the 2014 collapse in the international oil prices[3], that reduce the income received by the oil exports in our country, and the 2020 COVID-19 pandemic, which dampened global demand and further depressed oil prices, thereby contracting net export income in the goods and services account. Following this shock, the CA deficit widened substantially to -5.6% and -6.0% of GDP in 2021 and 2022, respectively. This widening of the deficit reflected the accelerated growth of imports driven by the country's economic recovery and higher freight costs amid global supply-chain challenges (Barbosa et al., 2024).

However, 2023 and 2024 witnessed a marked narrowing of the CA deficit to 2.2% and 1.7% of GDP, respectively, reaching the lowest level since 2010. This improvement reflected the impact of contractionary monetary policy, which moderated domestic demand and contributed to import contraction, against a backdrop of normalized global supply chains that facilitated lower freight rates. Additionally, increased tourism exports and a record-high surge in current transfers led predominantly by worker remittance inflows further supported the reduction in the CA deficit (Barbosa et al., 2024).

The above dynamics illustrates how structural and cyclical factors, including commodity price fluctuations, domestic demand dynamics, and policy measures affects the behavior of the CA deficit. This case highlights the critical role of macroeconomic policies and external sector influence in the CA balance. Figure (2) suggests a positive correlation between the Real Exchange Rate[4] (RER) index and the CA balance as a percentage of GDP prior to the 2014 oil price shock. During this period, the real depreciation of RER index are associated with improvements in the CA balance, consistent with the Marshall–Lerner condition that depreciation stimulates export volumes while curbing imports (Isard, 2007).

However after the shock, we can observe a change in the relationship between RER index and the CA deficit, in which we observe an increase in the deficit, which suggest decreased oil export revenues. This reduction in oil price, imply a reduction in the terms of trade index given the relevance in the oil in Colombia exports, consequently as Ajevskis et al. (2014) and Salazar-Díaz et al. (2023), the reduction in terms of trade lead to a depreciation in the RER index, and explain the change in the relationship between RER index and CA balance.

[3]The 2014 Brent oil price shock was characterized by a sharp decline, falling approximately 11% from the 2012 average peak price. This downward trend, largely driven by increased US oil production, continued until 2016, resulting in a cumulative decline of roughly 60% from the peaks

[4]The RER index, defined as the real peso-to-dollar exchange rate, increases when the peso depreciates (more pesos are required per dollar)

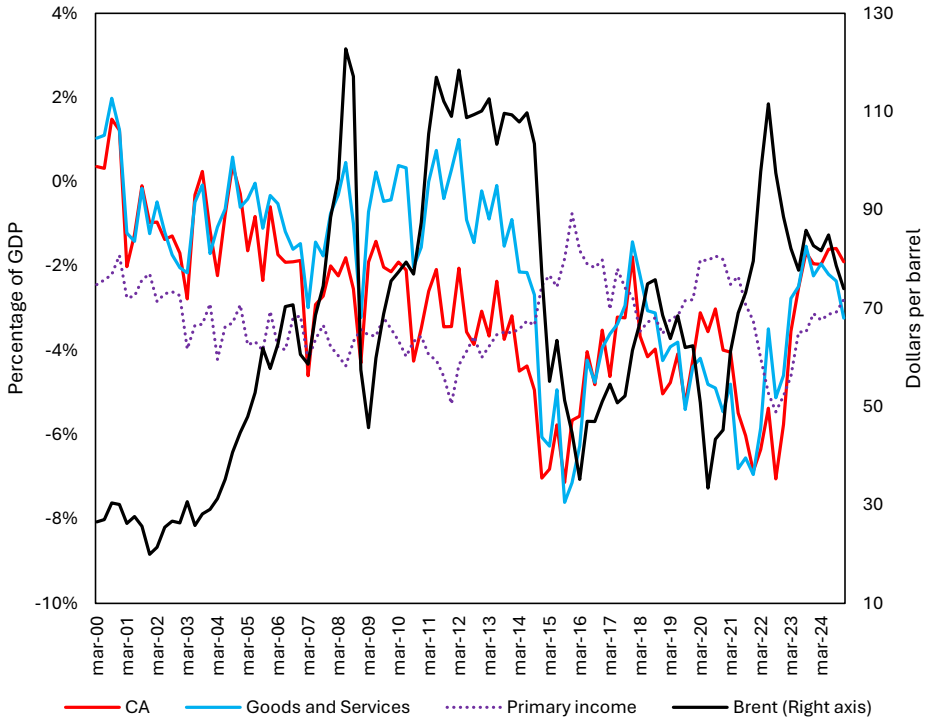

Figure 3: Relationship between Current Account as a percentage of GDP and components with oil Brent price

The preceding analysis underscores the persistent influence of Brent crude oil prices on Colombia's CA dynamics. Figure (3) reveals a significant correlation between the CA balance and oil price movements, primarily attributable to crude oil export revenues. However, this relationship underwent a structural shift following the COVID-19 shock. The pandemic-induced contraction in global oil demand precipitated a sharp decline in prices. Post-2020, recovering domestic demand fueled import growth, widening the CA deficit. This deficit expansion was subsequently mitigated by rising oil export revenues following the onset of the Russia-Ukraine conflict, which triggered a sharp increase in global oil prices.

Given the persistent nature of Colombia's CA deficit and its vulnerability to external shocks, we estimate a normative CA level as a long-run benchmark. By comparing the actual CA against this normative trajectory, we assess the country's external sector risk. Deviations from the benchmark may signal broader macroeconomic imbalances potentially triggering sharp adjustments in domestic demand, real wages, the real exchange rate, and other key variable and complement other indicators of external stress, such as real-exchange-rate misalignment and the credit gap.

The above episodes underscore Colombia's pronounced sensitivity to fluctuations in key export-commodity prices. To formally incorporate this channel and align with contemporary literature, our model integrates the Real Effective Exchange Rate (REER) index and an oil balance. This specification allows us to capture the overall relationship between oil income,

the CA and the exchange rate.

3 Data

To assess the CA's vulnerability relative to its normative benchmark, we follow an approach similar to Allen et al. (2023) and Coutinho et al. (2022) to estimate a normative CA consistent with specific long-run macroeconomic fundamental structural variables. Accordingly, we construct an unbalanced panel dataset spanning 1980–2024, incorporating the set of structural variables that the literature identifies as key determinants of the CA's long-run trajectory. In particular, we include demographic indicators to capture effects on national saving decisions, which structurally shape the CA over the long term.

Additionally, we incorporate macroeconomic variables identified as fundamental determinants of the long-run structural behavior of the CA. Furthermore, we include non-structural variables that allow us to capture the short-run dynamics of the CA, characterized by business-cycle fluctuations and temporal deviations from its long-run equilibrium. These non-structural variables are essential for understanding the transitory shocks and adjustments affecting the CA.

As is standard practice in recent literature, the variables are constructed, whenever economically meaningful, relative to the average across all sample countries. This relative transformation not only facilitates the interpretation of their effects and facilitates the interpretation of the estimated coefficients but also helps mitigate potential non-stationarity by removing common stochastic trends shared with global aggregates

Table (1) and (2) presents the set of variables included in our model, along with their theoretically expected signs and transmission mechanisms documented in the literature for modeling the normative level of the CA. The unbalanced panel dataset comprises 50 developed and developing economies. The full country list is provided in Appendix Table (A1)

Table 1: Description of fundamental variables

Type of variable	Variable	Description	Expected sign & transmission mechanism	Source
Fundamentals	Old-age dependency ratio	Population aged 65 and over divided by population aged 15–64, expressed relative to its average across all sample countries.	Negative; An increase in the dependent population suggests structurally lower saving, which in turn reduces the CA balance and widens the deficit (Allen et al., 2023; Dao & Jones, 2018).	UN ESA population projections
	Population growth rate	Annual population growth, expressed relative to its average across all sampled countries.	Negative; An increase suggests higher youth dependency, which leads to lower aggregate saving, exerts downward pressure on the CA balance, and widens the deficit (Allen et al., 2023; Coutinho et al., 2022).	UN ESA population projections
	Life expectancy	Age of life expectancy relative to world average.	Negative; Higher life expectancy raises elderly dissaving and fiscal spending, reducing national savings and widening the CA deficit. (Allen et al., 2023)	UN ESA population projections
	Public debt	Public debt as a percentage of GDP relative to world average.	Negative; Higher public debt creates fiscal pressures that may widen the CA deficit (Torres-Gorron & Cote-Barón, 2017).	WEO IMF
	Share of prime-age savers	Ratio population aged between 30 to 64 and population aged between 45 and 64 relative to world average	Positive; A larger labor-force share of peak-saving individuals boosts national savings, improving the CA balance and thereby reducing its deficit (Allen et al., 2023).	UN ESA population projections
	Oil balance	Dollar-value difference between domestic oil production and consumption as percentage of GDP relative to world average.	Positive; Higher oil exports improve the oil balance, raising revenues and strengthening the goods and services balance, which reduces the CA deficit (Allen et al., 2023; Torres-Gorron & Cote-Barón, 2017).	Energy Information Administration (EIA)
	Lagged Net Foreign Assets (NFA)	Net International Investment Position excluding gold holdings.	Positive; Positive NFA positions receive significant interest and dividend income from abroad reducing the CA (Allen et al., 2023; Torres-Gorron & Cote-Barón, 2017).	(Milesi-Ferretti, 2024; Lane & Milesi-Ferretti, 2018)
	Lagged GDP per worker in PPP	GDP in current PPP, divided by population between aged 15 to 64 relative to three major economies in the sample (Japan, Germany and United States) .	Positive; Rising national income drives capital exports seeking higher returns abroad, improving the CA balance by reducing deficits (Allen et al., 2023; Coutinho et al., 2022)	WEO IMF and UN ESA population projections

Table 2: Description of non-structural variables

Type of variable	Variable	Description	Expected sign & transmission mechanism	Source
Non-structural	Output gap	Percentage difference between actual GDP and its potential level.	Negative; Negative output gaps increase saving and reduce investment, thereby strengthening the CA balance (Allen et al., 2023; Coutinho et al., 2022).	OECD, IMF, or Hodrick-Prescott filter methods to estimate potential GDP when required
	Credit gap	Deviation of the private sector credit-to-GDP ratio from its long-term trend, expressed in percentage points.	Negative; A positive credit gap from credit booms typically leads to higher demand and imports, thereby weakening the CA balance (Allen et al., 2023; Bakker et al., 2012).	BIS or Hodrick-Prescott filter methods to estimate long-term trend
	Lagged Annual growth of the REER	Real effective exchange rate.	Negative; Changes in the REER negatively impact the trade balance, increasing the CA deficit (Allen et al., 2023; Coutinho et al., 2022).	BIS

4 Estimation of Normative Current Account and Current Account gap

As we mention before, we follow the approach based on Allen et al. (2023) and Coutinho et al. (2022) to estimate the normative CA. This approach is based on an unbalanced panel dataset and estimated using a pooled Generalized Least Squares (GLS) method that accounts for autocorrelation in the error term. The regression model is specified as follows:

$$CA_{i,t} = \alpha + \beta' F_{i,t} + \gamma' N_{i,t} + \varepsilon_{i,t} \tag{1}$$

Where $CA_{i,t}$ denotes the CA balance as a percentage of GDP for country i in the year t, while $F_{i,t}$ represents the set of fundamental structural explanatory variables that drive the long-run behavior of the CA, as detailed in Table (1), and $N_{i,t}$ includes non-structural variables, typically transitory or business-cyclical that may account for short-run deviations from the norm, presented in Table (2). The error term $\varepsilon_{i,t}$ is assumed to follow an AR(1) process.

Consistent with recent literature (Allen et al., 2023; Coutinho et al., 2022; Chinn & Ito, 2022; Sarsenbayev & Gagnon, 2021; Phillips et al., 2014) we omit country fixed effects from our model specification. This choice is driven by our objective of estimating the normative CA balance. Fixed effects primarily capture unobserved time-invariant heterogeneity across countries. While this heterogeneity may correlate with observed fundamentals, it does not provide a direct economic explanation for the CA based on changing macroeconomic fundamentals. Crucially, fixed effects would absorb cross-country differences attributable to factors that are largely constant over time, potentially confounding our estimates of the ef-

fects of the fundamental variables themselves, which are the primary focus for determining the long-run normative level.

The results of the estimation are presented in Table (A2), highlighting the importance of key fundamental variables such as the oil balance and lagged GDP per worker in PPP terms in explaining the behavior of the normative CA. The estimated coefficients exhibit signs that are consistent with the existing literature. In addition, several non-structural variables help account for short-term deviations from the normative level. In particular, the output gap and the lagged annual growth of the real effective exchange rate (REER) emerge as significant. The relevance of these variables aligns with previous empirical findings and corresponds closely to the patterns described in Section (2), where we emphasized the role of the real exchange rate, output gap dynamics influencing aggregate demand, relative income levels (as proxied by GDP per capita), and the oil balance closely linked to international oil prices, particularly Brent crude.

Following the estimation of equation (1), we obtain both the normative level of CA and its cyclical component. The cyclical influences on the CA are captured by the term $\hat{\gamma}' N_{i,t}$ which reflects the contribution of transitory or non-structural factors. In contrast, the estimated coefficients $\hat{\beta}'$ represent the long-run effects of the fundamental structural variables on the CA. Accordingly, the normative level of the CA is defined as:

$$CA_{i,t}^{N} = \hat{\alpha} + \hat{\beta} F_{i,t} \tag{2}$$

Given the above, the CA gap is defined as the difference between the observed CA and its normative level as we define in the equation (3). A negative CA gap suggest a level of observable CA lower than the normative CA, which could suggest a possible external vulnerability suggesting that the observed CA deviates from its fundamentals-based trajectory

This divergence could suggest an economy which is operating below its sustainable external position. In such cases, the country may be relying excessively on external financing to support domestic demand, increasing its exposure to sudden stops in capital flows or shifts in investor sentiment. Persistent negative gaps can lead to external debt accumulation, pressure on the exchange rate, and reduced policy space in the event of external shocks. Monitoring the CA gap is therefore essential for assessing external imbalances and identifying early warning signs of macroeconomic stress.

$$CA_{i,t}^{gap} = CA_{i,t} - CA_{i,t}^{N} \tag{3}$$

Since the normative level of the CA is, by definition, unobservable, we propose an empirical strategy to approximate its distribution. Specifically, we perform 1000 iterations of the following steps:

- In each iteration, five countries are randomly excluded from the sample.
- The panel regression model in equation (1) is re-estimated using the reduced dataset.

- This process is repeated until only 10% of the original sample (comprising 50 countries) remains.

These 1000 estimations yield an empirical distribution of the normative CA for each country-year observation. The median of this distribution is taken as the central estimate of the normative CA, while selected percentiles are used to construct confidence intervals, allowing us to account for estimation uncertainty.

Using this distribution, we calculate the CA gap by applying equation (3) to each of the 1000 normative CA estimates. The median of the resulting CA gap distribution is interpreted as the representative value of the external imbalance for each country-year. This approach provides a more robust measure of the CA gap by incorporating both parameter uncertainty and sample sensitivity

5 Evidence for Colombia

For the case of Colombia, Figure (4) compares the empirical distribution of the normative CA with the observed CA. Around 2010, the normative CA deficit showed a noticeable reduction. As shown previously in Figure (1), this period coincided with episodes of a positive goods and services balance, largely explained by a rise in oil revenues. The improvement in the normative CA continued until 2014. After the collapse in oil prices that year, the deficit initially narrowed in line with the decline in commodities export revenues, reflecting a terms-of-trade deterioration that exacerbated the CA deficit via a worsening goods and services balance. Thereafter, the normative CA indicates a widening deficit, consistent with sustained declines in oil revenues as oil prices remained low through 2016, as illustrated in Figure (3).

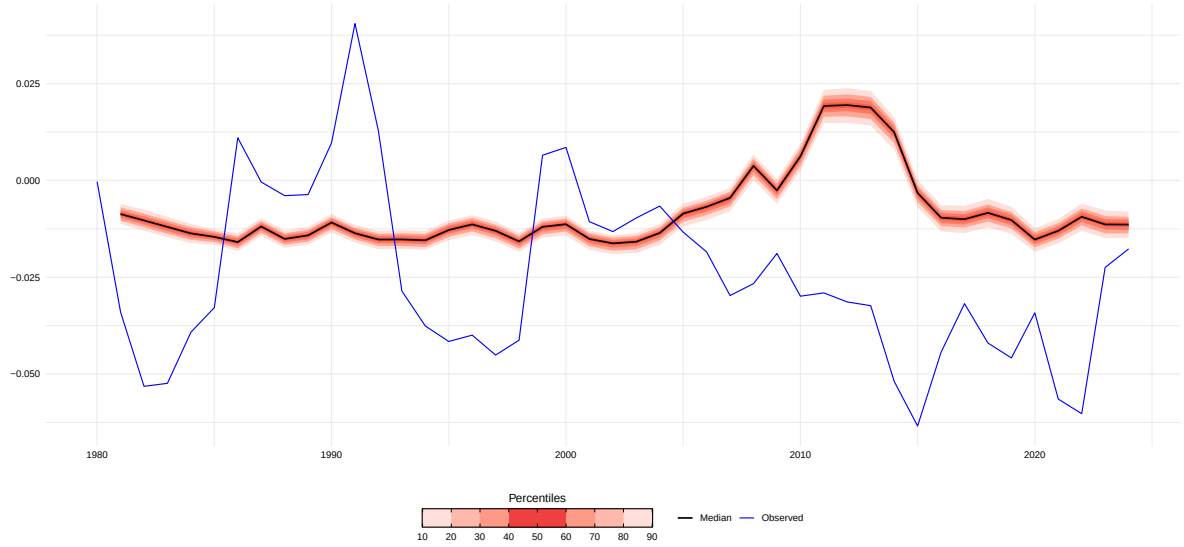

Figure 4: Empirical Distribution of the Normative CA – Bootstrap with 1000 Iterations. Observed CA (blue line) and median Normative CA (black line)

Based on equation (2), we decompose the contribution of each fundamental variable to Colombia's normative CA over time. Figure (5) illustrates this decomposition, revealing GDP per worker and the oil balance as the most significant drivers. Notably, GDP per worker exhibits a consistently negative contribution. This reflects Colombia's lower growth in this variable relative to the average levels observed in Japan, Germany, and the United States. The implication is that this relative shortfall contributes to Colombia's reliance on capital imports to finance investment and growth

Conversely, the oil balance acts to mitigate Colombia's normative CA deficit. Its contributions increased significantly during the 2010–2014 period, coinciding with rising oil revenues. However, this positive effect diminished following the subsequent decline in oil prices, which triggered a drop in the normative CA balance. By contrast, demographic factors most notably the share of prime-age savers and the population growth rate exert a widening effect on the deficit, reflecting Colombia's relatively low savings capacity given its age profile. Net foreign assets (NFA) also contribute positively to the normative CA, underscoring the country's continued reliance on external financing.

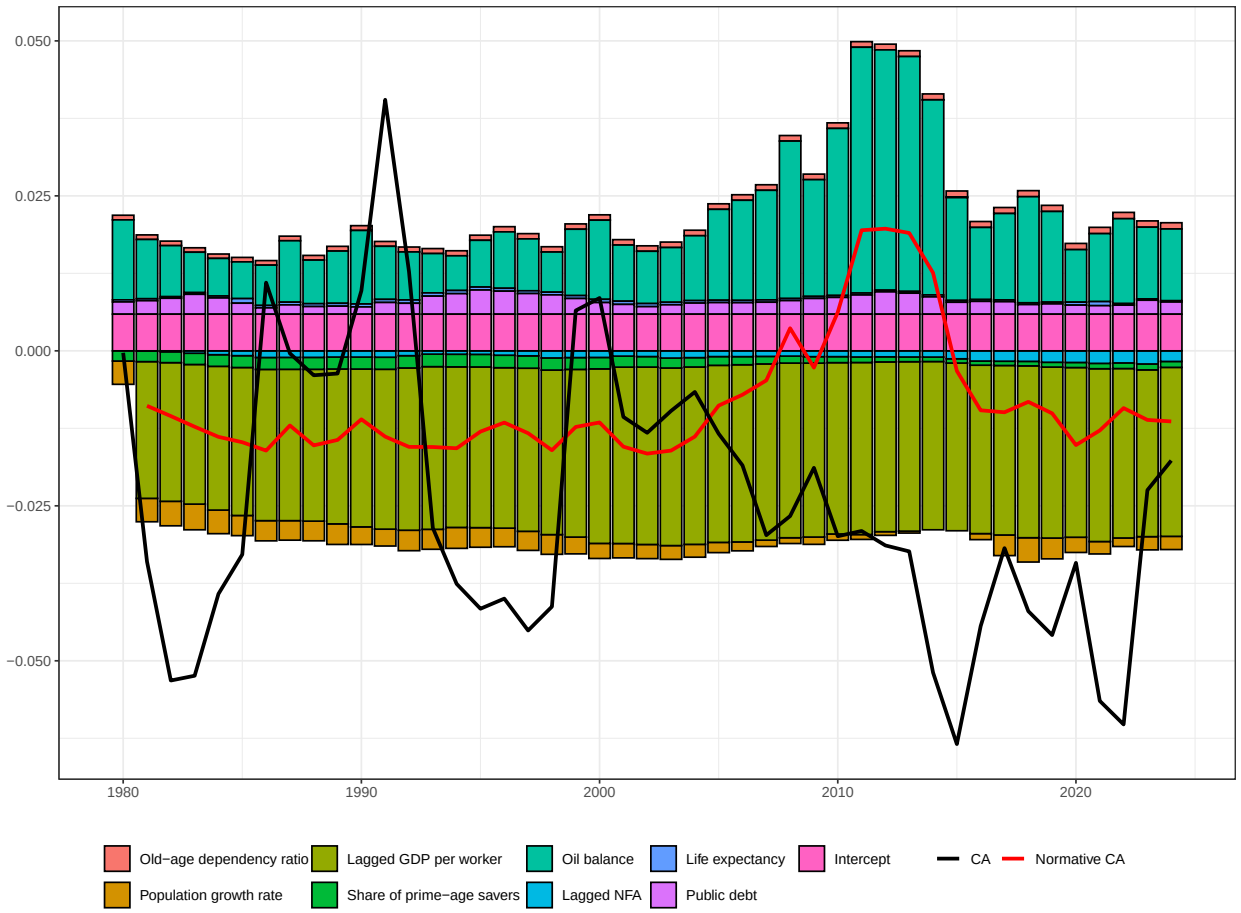

Figure 5: Determinants contributions of fitted Normative CA

Equation (3) defines the current-account (CA) gap, which is plotted in Figure (6). Since 2000, three episodes stand out for their deeply negative gaps. The first occurs in the early 2000s, coinciding with the sharp economic contraction at the turn of the century in Colombia. The second episode spans roughly 2010–2016. In the oil-boom years of 2010–2014, strong commodity prices improved the normative CA balance, yet observed deficits widened as export revenues fell first because of disrupted trade with Venezuela and then following the post-2014 decline in oil and other commodity prices.

This divergence between a rising normative benchmark and a deteriorating observed CA underscores how commodity-price swings can mask growing external imbalances and signaled heightened external vulnerability. The third notable widening of the CA gap appears in 2021–2022, driven by a post-COVID rebound in aggregate demand that fueled a surge in imports and further deteriorated the goods and services account. As household and business spending recovered, the CA deficit moved even farther below its sustainable level, signaling increased exposure to sudden stops in capital flows.

Both episodes generated markedly deeper negative CA gaps, signaling heightened external

vulnerability driven by an increased need for foreign savings to finance domestic investment. In both 2010–2016 and 2021–2022, the observed CA diverged sharply from its normative level reflecting an excessive reliance on external financing to sustain domestic absorption. This dependence not only magnified exposure to sudden stops in capital flows and adverse shifts in investor sentiment but also amplified exchange-rate pressures when inflows dried up.

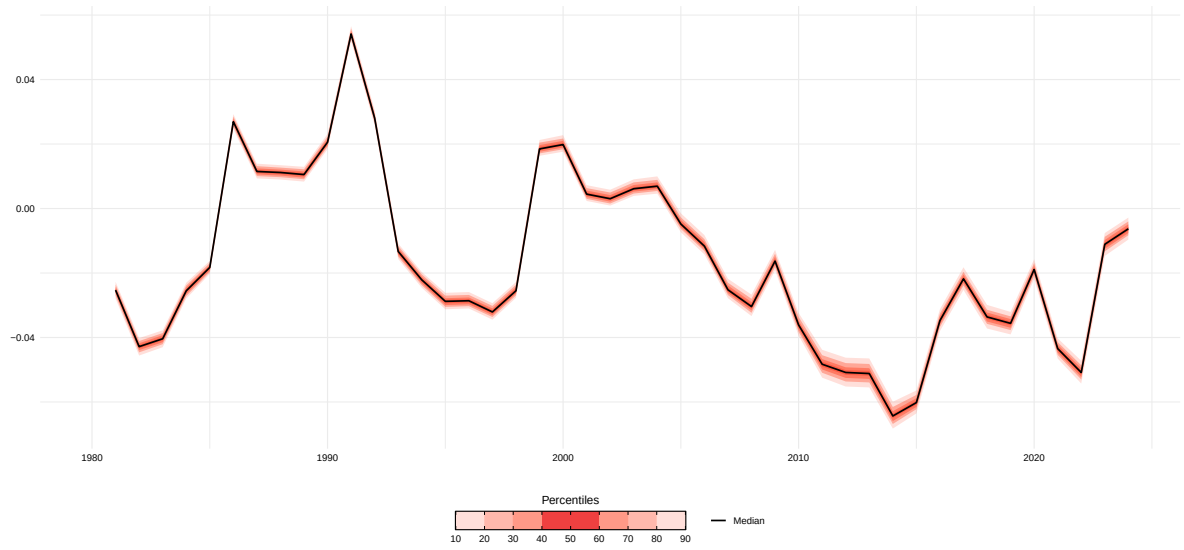

Figure 6: Empirical Distribution of the CA gap – Bootstrap with 1000 Iterations. Median CA gap (black line)

In practical terms, protracted negative gaps can erode the resilience of corporate and sovereign balance sheets: as external liabilities accumulate, rollover risks rise and debt-servicing costs climb, especially if the currency weakens. A depreciating exchange rate can in turn stoke inflation, forcing more aggressive monetary tightening that further dampens growth. Meanwhile, fiscal space dwindles as higher interest payments and potential contingent liabilities constrain public investment and social spending.

The 2010–2016 episode fueled by commodity dependence and trade disruptions illustrates how a sudden reversal in export earnings can heighten CA vulnerability, potentially triggering sharp adjustments in key macroeconomic variables. Likewise, the post-COVID rebound shows that even strong demand recovery can become a vulnerability if not matched by sustainable external financing and robust savings. Monitoring and addressing persistent negative CA gaps is therefore critical for safeguarding Colombia's macroeconomic stability.

More recently, the CA gap has returned close to zero reflecting the combined effects of monetary tightening and fiscal consolidation, which have tempered domestic demand, partially offset by resilient services exports (notably tourism) and rising remittance inflows. This

convergence is in line with previous analyses of Colombia's CA dynamics, as observed in Barbosa et al. (2024), Ojeda-Joya (2019) and Torres-Gorron & Cote-Barón (2017). In general, persistent negative deviations not only reveal episodes of external vulnerability but also presage balance-sheet pressures, exchange-rate volatility, and a shrinking buffer against future external shocks.

6 Nowcast estimation for Normative CA and CA gap

A real-time nowcast of the CA gap provides policymakers with a crucial early-warning mechanism for emerging external vulnerabilities. This framework estimates both the normative CA benchmark and the associated gap quarterly, overcoming the traditional reliance on lagged, fully revised annual data to assess external imbalances. In practice, as new high-frequency indicators are released, the model updates the normative CA and CA gap estimates at the end of each quarter. This timeliness enables timely detection of emerging external financing pressures.

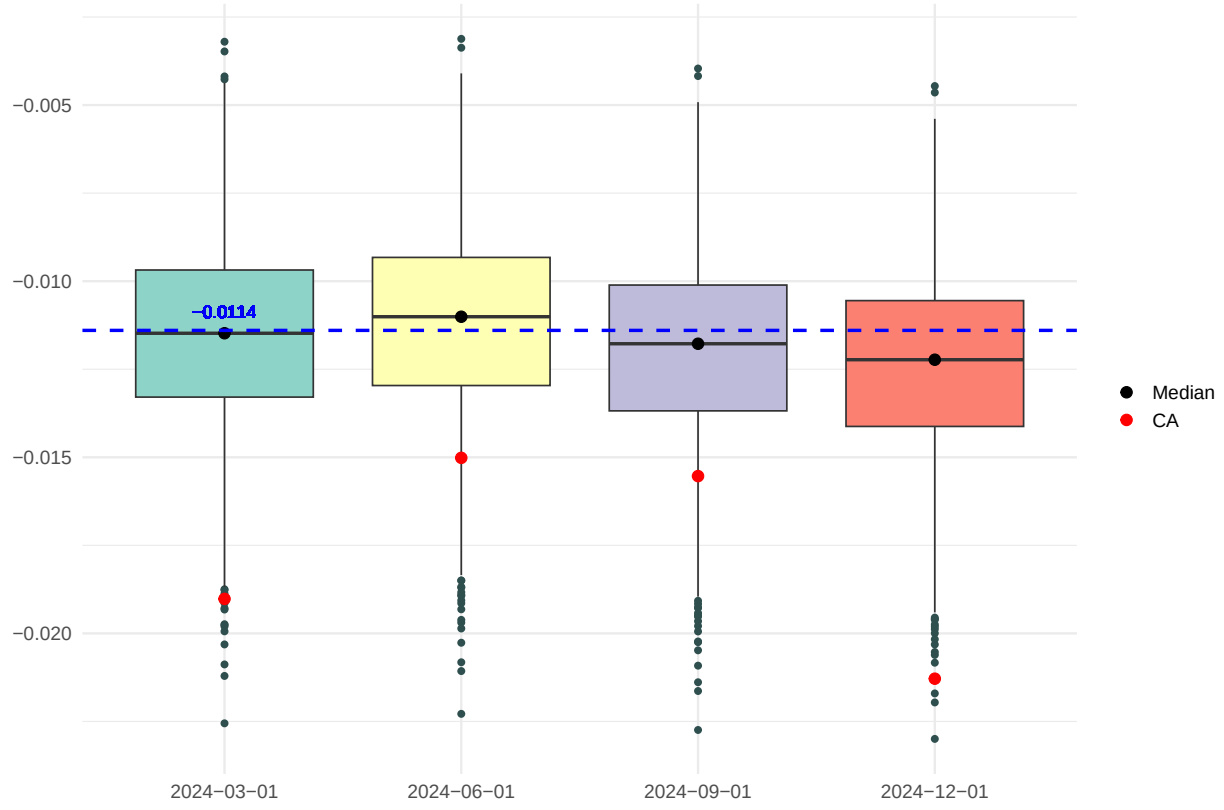

Figure 7: Nowcast of Normative CA by quarter in 2024. Official Normative CA estimate for 2024 (blue line)

To construct a nowcast indicator of the CA gap, we follow a multi-step procedure using the most recently available data. Consider the case where annual data is available up to 2023. The procedure is as follows:

- Estimate the long-run normative CA model using an unbalanced panel dataset that includes annual data up to 2023. This estimation yields the coefficients associated with both fundamental and non-structural variables.
- Gather quarterly data for the fundamental variables for the year 2024 (i.e., 2024Q1 to 2024Q4), using nowcasted or preliminary data as it becomes available.
- Apply the coefficients obtained from the normative CA model (based on annual data through 2023) to the quarterly data for 2024. This produces quarterly estimates of the normative CA level for each quarter of 2024
- Compute the CA gap for each quarter as the difference between the observed (or nowcasted) CA and the estimated normative CA. This provides a real-time assessment of external imbalances, and implement a bootstrap procedure to construct an empirical distribution of the normative CA and the CA gap. This involves generating multiple estimates by randomly excluding countries and re-estimating the model.
- Use the median of the empirical distribution as the nowcasted value for both the normative CA and the CA gap. This allows the estimation to reflect parameter uncertainty and improves the robustness of the nowcast.

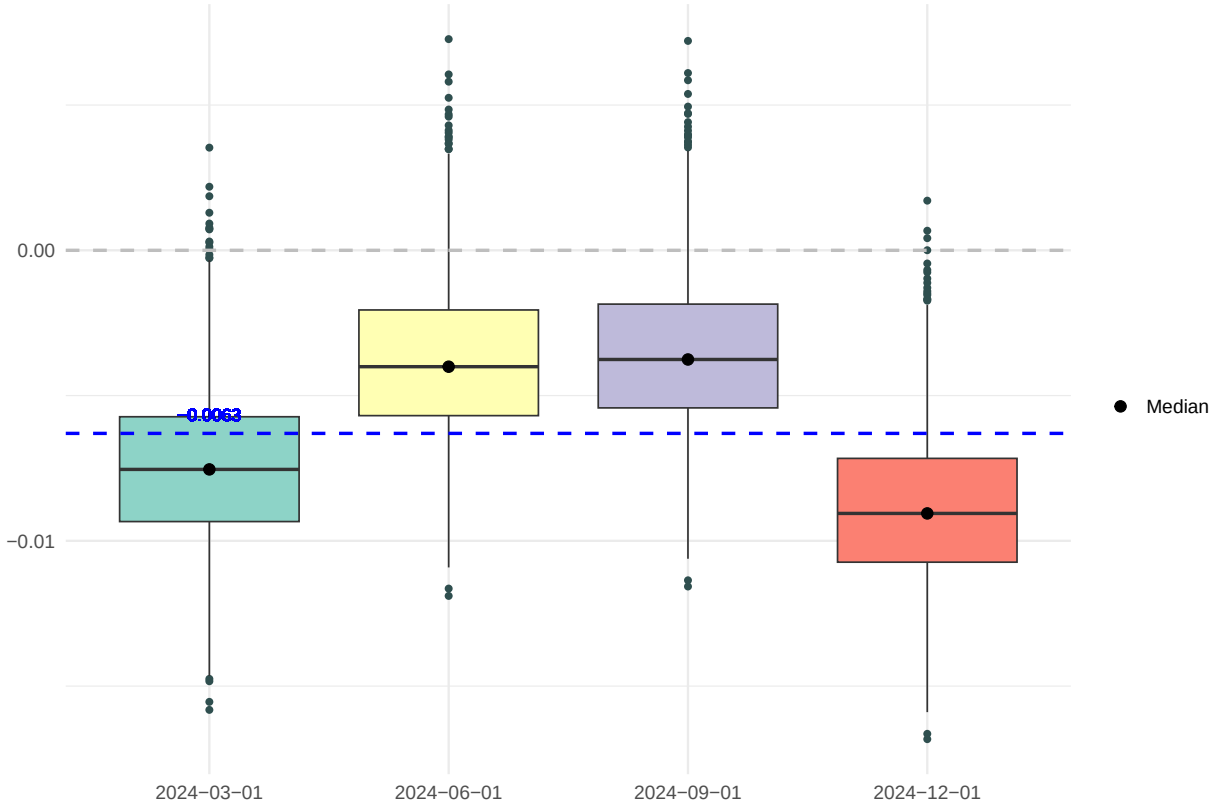

Figure 8: Nowcast of CA gap by quarter in 2024. Official CA gap estimate for 2024 (blue Line)

The results of this procedure are shown in Figures (7) and (8), which display our quarterly nowcasts of the normative CA and its gap for 2024. For each quarter, we construct empirical distributions of both the normative CA level and the corresponding gap; the blue dotted lines mark the official 2024 values. In most quarters, the median of our simulated distributions closely matches these official Figures, underscoring the reliability and precision of the nowcasting framework.

7 Conclusion

This article estimates a normative level of the CA that captures the long-run relationship between the CA and its specific fundamental structural determinants, as identified in the literature. These fundamentals are recognized as key drivers of the CA's long-term behavior. In addition, we compute the CA gap, defined as the difference between the observed CA and its estimated normative level. To estimate the normative CA, we employ an unbalanced

pooled panel model with an autoregressive correction in the error term, using GLS and annual data for 50 countries spanning the period 1980 to 2024. Our approach closely follows the methodology proposed by Allen et al. (2023) and Coutinho et al. (2022).

We also propose constructing an empirical distribution of the normative CA using a bootstrap approach that involves resampling by systematically dropping countries from the sample. The normative level of the CA is then defined as the median of this empirical distribution. This procedure allows us to construct confidence intervals and account for the estimation uncertainty inherent in identifying an unobservable variable such as the normative CA.

Using the empirical distribution of the normative CA, we also construct an empirical distribution of the CA gap and define its median as the representative value of this gap. The analysis focuses on Colombia, whose CA trajectory reveals significant structural dependencies that heighten external vulnerability. The decomposition of the normative CA determinants shows that oil revenues have played a temporary mitigating role during periods of high commodity prices. However, persistently negative contributions from GDP per worker, indicative of productivity gaps relative to advanced economies, and demographic factors underscore a chronic reliance on external capital inflows to finance domestic investment and growth.

Our findings underscore the key structural factors shaping Colombia's normative CA, with fluctuations in the oil balance and GDP per worker emerging as the most influential drivers. In particular, the analysis reveals a close relationship between the CA and Brent oil prices, highlighting the economy's sensitivity to commodity price cycles and the critical role of oil revenues in shaping external balances. Moreover, we find that the relationship between the CA and the real effective exchange rate (REER) has shifted since the 2014 oil price shock, suggesting a diminished responsiveness of the external balance to exchange rate movements in the post-shock period.

Crucially, episodic shocks have exacerbated Colombia's external vulnerabilities. During the 2010–2016 commodity boom, favorable terms of trade temporarily masked a deterioration in the observed CA, as trade disruptions and the post-2014 oil price collapse significantly widened the CA gap. Similarly, the post-COVID demand surge of 2021–2022 revealed a renewed dependence on external financing, driven by a sharp rise in domestic absorption unsupported by a corresponding increase in national saving. Both episodes reflect heightened reliance on capital inflows to sustain domestic spending, amplifying exposure to sudden stops, exchange rate volatility, and erosion of policy buffers.

The recent narrowing of the CA gap attributable to fiscal and monetary tightening measures and buoyant services exports suggests that external imbalances can be reversed. However, this adjustment does not eliminate the underlying structural risks. Continued monitoring of the fundamental drivers of the CA, together with timely and well-calibrated policy responses, remains essential to preserve macroeconomic stability and mitigate future external shocks. Finally, we show that applying the estimated long-run normative CA model to high-frequency data provides a valuable nowcasting tool. This approach facilitates real-time assessment of the CA gap, enabling policymakers to identify emerging imbalances and act proactively even before annual data are available.

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8 Appendix

Table A1: Selected Countries

Argentina	France	Mexico	Sweden
Australia	Germany	Morocco	Switzerland
Austria	Greece	Netherlands	Thailand
Belgium	Guatemala	New Zealand	Tunisia
Brazil	Hungary	Norway	Turkey
Canada	India	Peru	United Kingdom
Chile	Indonesia	Philippines	United States
China	Ireland	Poland	Uruguay
Colombia	Israel	Portugal	Bulgaria
Costa Rica	Italy	Romania	Cyprus
Denmark	Japan	South Africa	Iceland
Egypt	Korea, Republic	Spain	Luxembourg
Finland	Malaysia		

Table A2: Unbalanced pooled panel model

Type of variable	Variable	Coefficient	Std. Error	P-value
Fundamentals	Old-age dependency ratio	−0.009	0.069	0.89
	Population growth rate	−0.371	0.224	0.09
	Lagged GDP per worker in PPP	0.040	0.010	0.00
	Share of prime-age savers	0.022	0.074	0.76
	Oil balance	0.603	0.097	0.00
	Lagged NFA	0.004	0.004	0.37
	Life expectancy	0.000	0.001	0.81
	Public debt	−0.012	0.065	0.06
Non-structural	Output gap	−0.226	0.038	0.00
	Credit gap	−0.001	0.001	0.33
	Lagged annual growth of the REER	−0.027	0.007	0.00
	Intercept	0.006	0.004	0.12
R^2			0.13	
Obs.			1972	

Note: Unbalanced pooled panel model estimated by generalized least squares with an autoregressive correction in the error terms. Data cover 50 countries from 1980 to 2024.