

Online Annex 1.1. EBA 2026 Methodology Refinements¹

The External Balance Assessment (EBA) methodology is the tool used by the IMF to evaluate and monitor the external economic positions of countries. The EBA methodology measures “desirable” CA balances, thus identifying when external imbalances are excessive, to support policy recommendations to address excess imbalances, with findings presented annually in Article IV reports and the External Sector Report (ESR). By identifying and addressing excessive external imbalances, the EBA methodology helps ensure that countries maintain stable and sustainable external positions. Excessive imbalances can lead to financial crises, trade disruptions, and economic instability, making the EBA a vital component of the IMF’s efforts to foster a stable and resilient global economy.

Since its launch in 2012, the EBA methodology has undergone three reviews, primarily for the EBA CA model, which is its workhorse model. The 2015 and 2018 reviews strengthened the modeling of some key fundamentals (e.g., demographics), while the 2022 review streamlined the model, for instance, by excluding non-robust variables.²

This annex summarizes refinements to the EBA CA model, implemented in the 2026 ESR. As in previous refinements, the goal of the revisions is to improve the conceptual framework by drawing from lessons learned during its past implementation, as well as by incorporating the feedback received from various stakeholders. The refinements to the CA model, described in Section 1, include: (i) update and extension of data; (ii) improvement to the calculation of commodity terms-of-trade gaps; (iii) revision of the demographic bloc; (iv) update and extension of complementary toolboxes; (v) introduction of an excess-adjusted NFA in two stages: introducing first the concept in a box in the 2026 ESR and implementing the new NFA methodology in the 2027 ESR; (vi) re-evaluation of the role of trade barriers. In addition, for CA model refinements that affect EBA results for 2025—items (i), (ii), and (iii) above—analysis in Section 1.4 examines implications for CA norms in 2025. The refinements also include an update and extension of data for REER models, detailed in Online Annex Section 2.

1. EBA CA Model Refinements

1.1. Data Update and Extensions

The current EBA model estimates are based on data for the 1986–2019 period. As in the previous refinements, data updates include: (1) extending all series by four additional years to cover 1986–2023; (2) adding coverage for certain variables in selected countries by incorporating historical data revisions³; and (3) updating to the latest vintages of periodically revised variables—for example, demographic variables now reflect the 2024 revision of the UN World Population Prospects.

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² See “2022 Update of the External Balance Methodology” WP/23/47 for a summary of past reviews.

³ These include the health spending variable for Australia, Austria, Canada, Denmark, Finland, Germany, the Netherlands, New Zealand, Norway, Portugal, Spain, Korea, and Sweden for the year 1986; the NFA variable for South Africa for the years 1987–1993; and the REER variable for Egypt, Hungary, and Poland for 1992.

The updated dataset applies the same variables and definitions as the 2022 update of the External Balance Assessment (EBA) methodology, except for the commodity terms-of-trade (TOT) variable (see Online Annex Section 1.2 for details). It covers a sample of 52 economies with annual data spanning 1986–2023, based on information available as of October 2024. Online Annex Table 1.1.1 lists the updated data and the corresponding sources for all variables.

Online Annex Table 1.1.1. Updated Data and Sources

	Variables	Sources
CURRENT ACCOUNT	Current Account	World Economic Outlook
	Output Gap	World Economic Outlook
	Commodity Terms of Trade	World Economic Outlook and World Integrated Trade Solution(WITS)
	Real Effective Exchange Rate	Information Notice System (INS)
	Net Foreign Assets (NFA) position	EWN: Lane, Milesi Ferretti and World Economic Outlook
	Output per worker, relative to top 3 economies	World Economic Outlook
	Expected real GDP growth (5 years ahead)	World Economic Outlook
	Demographic variables	UN World Population Prospects, 2024 Vintage
	Institutional Quality	International Country Risk Guide (ICRG)
	Exhaustible Resources of Oil and Natural Gas	World Economic Outlook, WITS and BP Statistical Review of World Energy
	Fiscal Policy	World Economic Outlook
	Health Spending	OECD, and WDI
	Foreign Exchange Intervention (FXI)	World Economic Outlook, Data Template on International Reserves and Foreign Currency Liquidity
	Capital Account Openness	IMF (Baba and others, 2026)
	Credit Gap	BIS (Credit statistics) and World Bank (Global Financial Development Database)

Note: Dependent variables in each model are in bold font.

To ensure the robustness of the results and evaluate their sensitivity to adding any particular year from 2020–2023, including the COVID-19 pandemic, we conducted a series of robustness checks. These included: (1) leave-one-year-out regressions to assess sensitivity to individual years (see Online Annex Table 1.1.2); and (2) rolling regressions starting in 2019, adding one year at a time, to evaluate the stability of the estimated coefficients (see Online Annex Table 1.1.3). Overall, the findings indicate that incorporating the COVID years has a limited impact on estimation results—the estimated coefficients remain broadly stable and robust.

Overall, as in previous refinement rounds, data updates and extensions significantly impact the assessed CA gaps, driven mostly by the updated and extended data series. The changes resulting from the data update alone do not stand out relative to previous refinements in the model specification.⁴ Relative to the 2024 EBA assessment, for an average ESR country,⁵ the data update alone accounts for about 50 percent of the change in the absolute EBA current account (CA) gaps (0.27 percentage points out of 0.51). When combining the data update with coefficients re-estimated using data through 2019, roughly 75 percent of the change is explained (0.34 compared with 0.51). Extending the sample from 2019 to 2023 and re-estimating coefficients accounts for the remaining 25 percent (Online Annex Table 1.1.4).

⁴ In the 2026 refinement, the data update and coefficient re-estimation result in an average absolute change in EBA gaps of about 0.51 (as a percent of GDP) for ESR countries and 0.57 for non-ESR EBA countries. By comparison, in the 2022 refinement, the data update and coefficient re-estimation led to average absolute changes of 0.67 for ESR countries and 1.03 for non-ESR EBA countries.

⁵ ESR countries in this context refer to the 26 countries included in both the EBA CA regression and Chapter 2.

Online Annex Table 1.1.2 Leave-One-Year-Out Regression Using the EBA 2022 CA Refinement Model

VARIABLES	(1) full sample	(2) drop2020	(3) drop2021	(4) drop2022	(5) drop2023
Output gap	-0.256*** (0.03)	-0.282*** (0.031)	-0.262*** (0.030)	-0.237*** (0.031)	-0.245*** (0.030)
Commodity ToT x trade openness	0.381*** (0.041)	0.353*** (0.045)	0.416*** (0.070)	0.427*** (0.068)	0.389*** (0.047)
NFA	0.029*** (0.005)	0.034*** (0.004)	0.032*** (0.004)	0.029*** (0.005)	0.030*** (0.005)
Oil and gas reserves	0.307*** (0.069)	0.278*** (0.063)	0.265*** (0.064)	0.292*** (0.072)	0.290*** (0.071)
Expected GDP growth	-0.344*** (0.102)	-0.356*** (0.097)	-0.345*** (0.100)	-0.324*** (0.109)	-0.302*** (0.104)
Institutional quality	-0.048*** (0.019)	-0.040** (0.018)	-0.039** (0.018)	-0.056*** (0.019)	-0.051*** (0.019)
Output per worker	0.050*** (0.014)	0.048*** (0.012)	0.048*** (0.012)	0.054*** (0.014)	0.053*** (0.014)
Dependency Ratio (relative to World average)	-0.118*** (0.037)	-0.094*** (0.034)	-0.094*** (0.034)	-0.112*** (0.039)	-0.113*** (0.038)
Population growth	-0.468* (0.011)	-0.391 (0.268)	-0.433 (0.273)	-0.615** (0.305)	-0.572** (0.288)
Credit gap	-0.084*** (0.011)	-0.079*** (0.011)	-0.085*** (0.011)	-0.086*** (0.012)	-0.086*** (0.011)
Health spending	-0.364*** (0.13)	-0.444*** (0.125)	-0.420*** (0.133)	-0.324** (0.142)	-0.363*** (0.137)
Fiscal policy, instr.	0.281*** (0.079)	0.228*** (0.068)	0.242*** (0.069)	0.269*** (0.075)	0.286*** (0.074)
FXI x K controls, instr.	0.641*** (0.191)	0.779*** (0.189)	0.734*** (0.220)	0.692*** (0.234)	0.571*** (0.197)
Share of prime-aged savers	0.151*** (0.055)	0.151*** (0.051)	0.130** (0.051)	0.130** (0.056)	0.146*** (0.055)
Life expectancy	-0.004*** (0.001)	-0.005*** (0.001)	-0.004*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)
Life expectancy x OAD	0.013*** (0.003)	0.013*** (0.003)	0.011*** (0.003)	0.015*** (0.004)	0.015*** (0.003)
REER annual log-change (lagged)	-0.013** (0.006)	-0.014** (0.006)	-0.015** (0.006)	-0.012** (0.006)	-0.014** (0.006)
Constant	-0.009*** (0.003)	-0.008*** (0.003)	-0.008*** (0.003)	-0.010*** (0.003)	-0.010*** (0.003)
Observations	1,713	1,609	1,609	1,609	1,661
Number of ifs_code	52	52	52	52	52
R-squared IV	0.489	0.501	0.476	0.469	0.488
R-squared fit	0.523	0.531	0.506	0.502	0.524
Root MSE	0.032	0.031	0.031	0.032	0.032

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

1.2. Improved Commodity Terms-of-Trade Gap

The construction of the commodity terms-of-trade (ToT) gap was improved, to better capture extreme price variations, such as the natural gas price spike in 2022. First, log-approximation of the gaps were replaced by the exact calculation formula, as the log-approximation is not suited when commodity price movements are abnormally large. Second, the calculation of commodity trade weights was made more consistent between exports and imports, by using the same denominator. While resulting changes are small in "normal times," the new specification is more suitable when commodity price changes are large. Online Annex Section 1.2.1 describes the 2022 EBA methodology for calculating the commodity terms-of-trade gap. Online Annex Sections 1.2.2 and 1.2.3 lay out the refined calculations of price gaps and commodity trade weights, while Online Annex Section 1.2.4 discusses alternative approaches to calculating commodity trade weights.

Online Annex Table 1.1.3. Rolling Regression Using the EBA 2022 CA Refinement Model

VARIABLES	(1) 1986-2019	(2) 1986-2020	(3) 1986-2021	(4) 1986-2022	(5) 1986-2023
Output gap	-0.278*** (0.031)	-0.262*** (0.031)	-0.237*** (0.031)	-0.245*** (0.030)	-0.256*** (0.030)
Commodity ToT x trade openness	0.440*** (0.070)	0.441*** (0.070)	0.427*** (0.068)	0.389*** (0.047)	0.381*** (0.041)
NFA	0.032*** (0.005)	0.030*** (0.005)	0.029*** (0.005)	0.030*** (0.005)	0.029*** (0.005)
Oil and gas reserves	0.323*** (0.072)	0.293*** (0.074)	0.292*** (0.072)	0.290*** (0.071)	0.307*** (0.069)
Expected GDP growth	-0.358*** (0.104)	-0.365*** (0.105)	-0.324*** (0.109)	-0.302*** (0.104)	-0.344*** (0.102)
Institutional quality	-0.036* (0.019)	-0.039** (0.019)	-0.056*** (0.019)	-0.051*** (0.019)	-0.048*** (0.019)
Output per worker	0.034*** (0.013)	0.042*** (0.014)	0.054*** (0.014)	0.053*** (0.014)	0.050*** (0.014)
Dependency Ratio (relative to World average)	-0.089** (0.040)	-0.101** (0.040)	-0.112*** (0.039)	-0.113*** (0.038)	-0.118*** (0.037)
Population growth	-0.581** (0.294)	-0.612** (0.297)	-0.615** (0.305)	-0.572** (0.288)	-0.468* (0.283)
Credit gap	-0.082*** (0.012)	-0.086*** (0.012)	-0.086*** (0.012)	-0.086*** (0.011)	-0.084*** (0.011)
Health spending	-0.342** (0.147)	-0.355** (0.149)	-0.324** (0.142)	-0.363*** (0.137)	-0.364*** (0.130)
Fiscal policy, instr.	0.199*** (0.071)	0.218*** (0.073)	0.269*** (0.075)	0.286*** (0.074)	0.281*** (0.073)
FXI x K controls, instr.	0.703*** (0.226)	0.698*** (0.227)	0.692*** (0.234)	0.571*** (0.197)	0.641*** (0.191)
Share of prime-aged savers	0.152*** (0.056)	0.136** (0.057)	0.130** (0.056)	0.146*** (0.055)	0.151*** (0.055)
Life expectancy	-0.004*** (0.001)	-0.004*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.004*** (0.001)
Life expectancy x OAD	0.013*** (0.004)	0.011*** (0.004)	0.015*** (0.004)	0.015*** (0.003)	0.013*** (0.003)
REER annual log-change (lagged)	-0.014** (0.006)	-0.014** (0.006)	-0.012** (0.006)	-0.014** (0.006)	-0.013** (0.006)
Constant	-0.006* (0.003)	-0.008** (0.003)	-0.010*** (0.003)	-0.010*** (0.003)	-0.009*** (0.003)
Observations	1,505	1,557	1,609	1,661	1,713
Number of ifs_code	52	52	52	52	52
R-squared IV	0.472	0.464	0.469	0.488	0.489
R-squared fit	0.505	0.497	0.502	0.524	0.523
Root MSE	0.032	0.032	0.032	0.031	0.032

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Online Annex Table 1.1.4. The Contribution of Components of the Data Update and Extension to the Change in CA Gaps, Relative to 2024 Assessment
(Percent of GDP)

Compared with the 2024 assessment, the absolute changes in EBA CA gaps	Average	Percentile				
		p10	p25	p50	p75	p90
ESR Sample						
data update + coeffs re-estimated up to 23	0.51	0.08	0.23	0.39	0.65	1.15
data update + 2022 coeffs	0.27	0.02	0.12	0.20	0.41	0.61
data update + coeffs re-estimated up to 19	0.34	0.04	0.11	0.29	0.45	0.79
Non-ESR EBA Sample						
data update + coeffs re-estimated up to 23	0.57	0.09	0.21	0.56	0.78	1.17
due to data update + 2022 coeffs	0.39	0.07	0.17	0.33	0.50	0.89
data update + coeffs re-estimated up to 19	0.45	0.08	0.27	0.41	0.63	0.81

Note: Compared with the 2024 assessment, the table shows absolute changes in EBA CA gaps for 2024 (percent of GDP, EBA sample). 2024 Assessment refers to EBA gaps published in 2025 ESR. "Data update + coeffs re-estimated up to 23" refers to changes in EBA CA gaps relative to the 2024 assessment, reflecting both updated/extended data and coefficients re-estimated using data through 2023. "Data update + 2022 coeffs" refers to changes due to updated /extended data only, using coefficients from the 2022 refinement. "Data update + coeffs re-estimated up to 19" refers to changes due to updated /extended data and coefficients re-estimated using data through 2019.

1.2.1. 2022 EBA Methodology

Commodity terms-of-trade (ToT) shocks are constructed in five steps (refer to Allen and others 2022 for details). First, commodity-specific export and import weights are computed for each country and year using UN Comtrade data, defined as nominal trade shares of each commodity in total goods exports (or imports) for 42 commodities across 52 EBA countries. Second, net export weights are calculated as the difference between export and import weights, capturing countries' exposure to commodity price movements. Third, commodity price gaps are extracted following the 2022 EBA refinement by filtering log commodity price series to remove long-term trends; the resulting gap combines medium-frequency super-cycle and short-term components. Fourth, country-specific commodity ToT gaps are constructed by aggregating commodity price gaps using the corresponding net export weights. Finally, the commodity ToT gap is scaled by a trade openness ratio—defined as the average of exports and imports relative to GDP—to obtain the commodity ToT variable used in the EBA current account regression. All trade and GDP variables are measured in nominal terms.

1.2.2. Revised Calculation of the Commodity Price Gaps

The revised specification computes the exact commodity price gap, rather than relying on a log approximation, which can be inaccurate during episodes of large commodity price swings. Denoting by $lngap_{k,t}$ the old price gap:

$$lngap_{k,t} = CSC2070_{k,t} + STF_{k,t} = \ln P_{k,t} - LTT_{k,t} \quad (1)$$

The new price gap $gap_{k,t}$ is computed as follows:

- a. Define the long-term price trend as:

$$P_{k,t}^T = \exp(LTT_{k,t}) \quad (2)$$

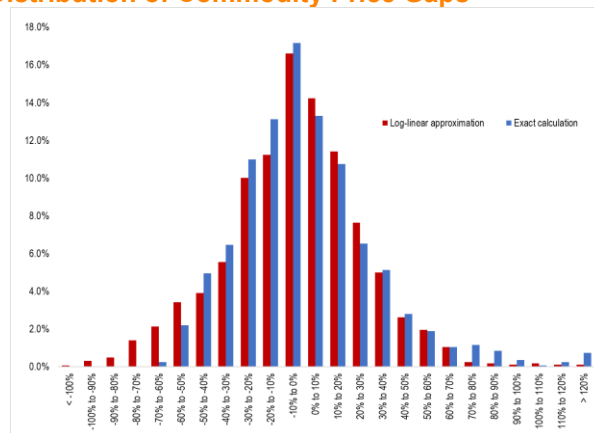
- b. Express the price gap as:

$$gap_{k,t} = \frac{P_{k,t} - P_{k,t}^T}{P_{k,t}^T} = \frac{P_{k,t}}{P_{k,t}^T} - 1 = \exp(\ln P_{k,t} - \ln P_{k,t}^T) - 1 = \exp(lngap_{k,t}) - 1 \quad (3)$$

Comparison of the old and revised EBA commodity price gaps in Online Annex Figure 1.2.1 shows that in most cases, changes are minimal: indeed, in “normal times” (e.g., 81.7% of commodity price gaps over 1986-2024 were in the [-40%; +40%] range) the log-approximation is close to the exact value.⁶ However, differences increase when commodity price movements are larger than usual. In particular, by construction the switch to the exact calculation formula prohibits commodity price gaps smaller than -100%, and de facto limits the occurrence of very low commodity price gaps; on the other side, the occurrence of very large and positive gaps becomes somewhat more frequent.

⁶ Mathematically: $\exp(x) - 1 \approx x$ when x is “close enough” to zero.

Online Annex Figure 1.2.1. Distribution of Commodity Price Gaps



Sources: IMF WEO, World Bank, Pfaffenzeller and others (2007), Jacks (2013), Schwerhoff and Stuermer (2015), and IMF staff calculations.

Note: Over the 1986-2024 period and 42 commodities, 1.2% of price gaps fell within the 70-80% range when using the exact calculation, compared to 0.2% when using the log-linear approximation.

1.2.3. Revised Calculation of Export and Import Weights

The 2022 EBA vintage commodity export and import weights are calculated as shares of total exports or imports, respectively, which are then subtracted from each other. After some intermediate steps (multiplying by commodity price gaps and aggregating), the resulting variable is then multiplied by the openness ratio.

However, in countries with large trade imbalances (for example, commodity exporters in times of large commodity price increases), the subtraction between export and import weights involves two fractions that do not have the same denominator, which can bias the calculation.⁷ To address this issue, the formula is reformulated with the sum of total exports and imports as a common denominator:

$$\omega_{k,i,t}^{Comtrade,X} = \frac{X_{k,i,t}^{Comtrade}}{X_{i,t}^{Comtrade} + M_{i,t}^{Comtrade}} \text{ and } \omega_{k,i,t}^{Comtrade,M} = \frac{M_{k,i,t}^{Comtrade}}{X_{i,t}^{Comtrade} + M_{i,t}^{Comtrade}} \quad (4)$$

As the new denominators are roughly twice their previous values, the definition of trade openness is revised accordingly:

$$TradeOpenness_{i,t} = \frac{X_{i,t} + M_{i,t}}{GDP_{i,t}} \text{ instead of } \frac{X_{i,t} + M_{i,t}}{2 * GDP_{i,t}} \quad (5)$$

Note that the new construction methodology is equivalent to:

$$\omega_{k,i,t}^{Comtrade,X} = \frac{X_{k,i,t}^{Comtrade}}{GDP_{i,t}} \text{ and } \omega_{k,i,t}^{Comtrade,M} = \frac{M_{k,i,t}^{Comtrade}}{GDP_{i,t}} \quad (6)$$

Indeed, the final variable is now:

$$commoToTvar_{i,t} = \frac{X_{i,t} + M_{i,t}}{GDP_{i,t}} \cdot \sum_k \left(\frac{X_{k,i,t}^{Comtrade}}{X_{i,t}^{Comtrade} + M_{i,t}^{Comtrade}} - \frac{M_{k,i,t}^{Comtrade}}{X_{i,t}^{Comtrade} + M_{i,t}^{Comtrade}} \right) \cdot gap_{k,t} \quad (7)$$

which simplifies into:

⁷ As an illustration, let us consider two countries that only export oil (and import everything else, including food and manufactured products). Let us also assume that oil represents 5% of country 1's GDP, and 20% of country 2's GDP. Obviously, the current account balance of country 2 will be more affected by oil price fluctuations than the current account balance of country 1. However, under the current methodology, both countries have the same net oil export weight, which is 100%.

$$commoToTvar_{i,t} = \sum_k \left(\frac{X_{k,i,t}^{Comtrade}}{GDP_{i,t}} - \frac{M_{k,i,t}^{Comtrade}}{GDP_{i,t}} \right) \cdot gap_{k,t} \quad (8)$$

1.2.4. Double-Counting of Commodity Price Fluctuations: An Attempt to Introduce Volume Weights

As shown in step 1 of the construction methodology for the 2022 EBA vintage, commodity trade weights are derived using Comtrade data, which is nominal. Consequently, weights are impacted by commodity price fluctuations. This raises two issues:

- **Commodity price fluctuations are double-counted in the ToT gap variable**, once in nominal commodity weights and once in commodity price gaps. As a first approximation, this would lead to larger fluctuations in the ToT gap variable, which are likely partly offset by a smaller EBA coefficient. However, there are non-linearities:

$$commoToTvar_{i,t} = \sum_k \left(\frac{X_{k,i,t}^{nominal} - M_{k,i,t}^{nominal}}{GDP_{i,t}} \right) \cdot gap_{k,t} = \sum_k \left(\frac{X_{k,i,t}^{volume} - M_{k,i,t}^{volume}}{GDP_{i,t}} \right) \cdot \frac{P_{k,t}}{P_{k,t0}} \cdot \left(\frac{P_{k,t}}{P_{k,t}^T} - 1 \right) \quad (9)$$

- **Nominal commodity trade weights are more difficult to extrapolate for the assessment year.** The relevant weights are usually missing at the time the ESR is being prepared. Such weights cannot be assumed to be constant (which would be the standard assumption if weights were in volume terms). Instead, the methodology relies on (renormalized) price changes to estimate the missing weights. However, there are many uncertainties associated with this calculation (e.g., which price to use to estimate missing weights).

To address these issues, refinements explored an alternative that computes volume weights as follows:

- Deflate the numerators of weights ($X_{k,i,t}^{Comtrade}$ and $M_{k,i,t}^{Comtrade}$, which are nominal, in US dollars) using the global price of the corresponding commodity ($P_{k,t}$, which is also in US dollars), to obtain numerators in volume terms (constant USD).
- The difficulty is then to deflate the denominators of weights ($GDP_{i,t}$, which is also nominal, in US dollars), as we were unable to find GDP deflators in US dollars country by country. Thus, the approach relied on the US CPI index to deflate GDP.

Results are presented in the Online Annex Table 1.2.1 (columns 4-8). In all specifications volume weights (volume weights as described above in columns 4-5; constant volumes in columns 6-7; and smoothed volumes in column 8), the fit of the EBA CA regression worsened compared to our preferred specification (column 3: weights using the common X+M denominator; and exact formula of commodity price gaps). The attempt to switch to volume weights was therefore dropped.

Online Annex Table 1.2.1. EBA Current Account Regression Results

(Introducing the exact formula for commodity price gaps and commodity trade weights in volume)

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Period	Current	Updated data	Updated data	Updated data	Updated data	Updated data	Updated data	Updated data
Commodity ToT Gaps	1986-2019	1986-2023	1986-2023	1986-2023	1986-2023	1986-2023	1986-2023	1986-2023
Commodity ToT Weights	Log-approx.	Log-approx.	Exact (exp)	Log-approx.	Exact (exp)	Exact (exp)	Exact (exp)	Exact (exp)
	Nominal	Nominal (X+M)	Nominal (X+M)	Volume	Volume	Volume (constant 2015)	Volume (average)	Volume (11-year M.A.)
Output gap	-0.297*** (0.035)	-0.252*** (0.030)	-0.254*** (0.030)	-0.260*** (0.031)	-0.262*** (0.030)	-0.261*** (0.030)	-0.254*** (0.030)	-0.259*** (0.030)
Commodity ToT x trade openness	0.291*** (0.047)	0.343*** (0.037)	0.392*** (0.042)	0.209*** (0.029)	0.269*** (0.031)	0.260*** (0.031)	0.247*** (0.031)	0.270*** (0.029)
NFA	0.036*** (0.005)	0.029*** (0.005)	0.029*** (0.005)	0.028*** (0.005)	0.028*** (0.005)	0.029*** (0.005)	0.028*** (0.005)	0.027*** (0.005)
Oil and gas reserves	0.305*** (0.074)	0.334*** (0.066)	0.309*** (0.069)	0.370*** (0.075)	0.360*** (0.069)	0.320*** (0.070)	0.327*** (0.072)	0.354*** (0.066)
Expected GDP growth	-0.296*** (0.108)	-0.354*** (0.103)	-0.345*** (0.103)	-0.352*** (0.104)	-0.341*** (0.103)	-0.347*** (0.102)	-0.353*** (0.102)	-0.345*** (0.102)
Institutional quality	-0.046*** (0.020)	-0.052*** (0.019)	-0.049*** (0.019)	-0.061*** (0.019)	-0.060*** (0.019)	-0.052*** (0.019)	-0.057*** (0.019)	-0.060*** (0.019)
Output per worker	0.034*** (0.013)	0.053*** (0.014)	0.050*** (0.014)	0.058*** (0.014)	0.056*** (0.014)	0.054*** (0.014)	0.056*** (0.014)	0.055*** (0.014)
Old-age dependency	-0.096** (0.042)	-0.116*** (0.038)	-0.116*** (0.038)	-0.124*** (0.037)	-0.121*** (0.037)	-0.120*** (0.037)	-0.122*** (0.037)	-0.121*** (0.037)
Population growth	-0.797*** (0.364)	-0.465 (0.284)	-0.470* (0.283)	-0.548* (0.284)	-0.541* (0.282)	-0.521* (0.283)	-0.547* (0.284)	-0.539* (0.283)
Share of prime-aged savers	0.124** (0.056)	0.143*** (0.055)	0.150*** (0.055)	0.131** (0.055)	0.135** (0.055)	0.141*** (0.054)	0.137** (0.055)	0.135** (0.054)
Life expectancy	-0.004*** (0.001)	-0.005*** (0.001)	-0.004*** (0.001)	-0.005*** (0.001)	-0.004*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)
Life expectancy x OAD	0.013*** (0.004)	0.013*** (0.003)	0.013*** (0.003)	0.013*** (0.003)	0.013*** (0.003)	0.013*** (0.003)	0.014*** (0.003)	0.014*** (0.003)
Credit gap	-0.096*** (0.014)	-0.082*** (0.011)	-0.084*** (0.011)	-0.089*** (0.011)	-0.085*** (0.011)	-0.084*** (0.011)	-0.084*** (0.011)	-0.082*** (0.011)
Health spending	-0.298** (0.143)	-0.370*** (0.131)	-0.363*** (0.130)	-0.348*** (0.132)	-0.347*** (0.131)	-0.360*** (0.130)	-0.340*** (0.130)	-0.331** (0.131)
REER annual log-change (lagged)	-0.015*** (0.006)	-0.011* (0.006)	-0.013** (0.006)	-0.010* (0.006)	-0.011* (0.006)	-0.012** (0.006)	-0.011* (0.006)	-0.013** (0.006)
Fiscal policy, instr.	0.307*** (0.077)	0.283*** (0.072)	0.287*** (0.073)	0.287*** (0.074)	0.281*** (0.073)	0.280*** (0.072)	0.287*** (0.073)	0.300*** (0.073)
FXI x K controls, instr.	0.631*** (0.225)	0.675*** (0.191)	0.646*** (0.191)	0.728*** (0.194)	0.691*** (0.193)	0.691*** (0.189)	0.761*** (0.191)	0.731*** (0.189)
Constant	-0.005 (0.003)	-0.010*** (0.003)	-0.010*** (0.003)	-0.011*** (0.003)	-0.011*** (0.003)	-0.011*** (0.003)	-0.011*** (0.003)	-0.011*** (0.003)
Observations	1,480	1,701	1,701	1,713	1,713	1,713	1,713	1,705
Number of ifs_code	52	52	52	52	52	52	52	52
R-squared IV	0.490	0.483	0.489	0.469	0.468	0.479	0.481	0.472
R-squared fit	0.523	0.515	0.522	0.500	0.500	0.512	0.512	0.502
Root MSE	0.032	0.032	0.032	0.032	0.032	0.032	0.032	0.032

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

1.3. Revised Demographic Block

1.3.1. Background and Motivation

The current specification for the demographic block was introduced in 2018 and includes a set of theoretically motivated demographic indicators (Online Annex Table 1.3.1). The specification captures both the static (compositional) and dynamic (longevity) effects of demographic change. The static effect reflects differences in population composition, while the dynamic effect incorporates behavioral responses to changes in life expectancy and transfer generosity induced by demographic pressures. Both channels are well established in the theoretical literature (Dao and Jones 2018, Auclert and others 2021, Platzer and Peruffo 2022, Koomen and Wicht 2023).

The refinement seeks to simplify the demographic block, enhance transparency, and adopt a more parsimonious specification. A key objective is to make the model easier to communicate to country authorities and more closely aligned with standard EBA practice on multilateral consistency. In addition, the current specification can generate counterintuitive predictions for the effects of future population aging, leading to

differences in CA norms hard to reconcile with data and theory for countries with similar current demographic profiles but different projected aging paths.

1.3.2. Demographics and the CA

The connection between demographic variables and the current account has been extensively studied in both theoretical and empirical work. Several channels link an economy's demographic structure to its saving-investment balance and, consequently, its external position. Under the life-cycle hypothesis, households save and dissave at different stages of life: working-age cohorts tend to be net savers, while those in retirement transition into dissaving. Shifts in the population age structure hence change the aggregate balance between savers and dissavers across countries and over time. Firm behavior is also influenced by demographic conditions: variations in productivity-adjusted labor supply alter the desired capital stock and thus investment. In addition, the public saving-investment balance typically responds to demographic pressures, whether through changes in the size of aggregate taxes and transfers or induced policy adjustments, the latter of which can generate important feedback effects on private saving.⁸ A common distinction in the literature separates these demographic channels into static and dynamic effects:

- **Static effect.** The static (or compositional) effect captures how differences in the age structure influence saving and investment. The age composition of an economy reflects past fertility trends, changes in longevity, and migration flows. The static effect operates through aforementioned effects on saving and investment, as the ratio of savers and dissavers as well as workers and dependents shifts. In the current EBA model, three variables capture the static effect: population growth as a proxy for the young, the share of prime-aged savers, and the old-age dependency ratio.
- **Dynamic effect.** Dynamic effects operate through behavioral responses to changes in longevity and public policies like the extent of old-age transfers. Higher longevity generally implies more years spent in retirement. Consumption-smoothing households therefore accumulate additional savings during their working life which they then gradually decumulate in retirement. The life-cycle saving motive strengthens with increases in the expected lifespan. In the current EBA specification, this mechanism is captured by life expectancy at ages 45–50.

Recognizing that the need for life-cycle saving also depends on the generosity of formal and informal old-age support systems, the current model further interacts life expectancy with the future old-age dependency ratio. Given limits to intergenerational redistribution, a higher future dependency ratio is expected to constrain the sustainability of transfer systems, thereby encouraging higher saving among current workers (Dao and Jones 2018).

The interaction term also helps to capture the U-shaped empirical relationship between life expectancy and the current account. In economies with low initial life expectancy—typically EMDEs—gains in longevity are associated with improved labor supply and better health outcomes, leading to higher investment and a lower current account. In contrast, in high-life-expectancy economies, typically advanced economies, longer expected retirement durations strengthen the life-cycle saving motive and increase desired precautionary savings in response to uncertainty around long-term elderly-care expenditures (De Nardi and others, 2009, 2010).

1.3.3. Refined Specification

The refined specification streamlines the static block by moving to a more parsimonious formulation based on population shares. Using population shares to capture static demographic effects is simple, transparent, and aligns with the theory of life-cycle saving and recent contributions to the literature (Auclert and others, 2021).

⁸ The literature even points to additional, more indirect, effects of demographic change on the economy, and hence the current account. For example, the effect of demographic change on business formation (Liang and others 2018) or market power (Bornstein 2025).

The share of the population aged 45–54 serves as a proxy for prime-age savers, the segment of the population associated with high saving rates. The share of the population aged 65 and older captures the size of the population in or close to retirement, which generally act as dissavers. Robustness checks indicate that proxies for the young population, including population growth, do not have a statistically significant relationship with the current account once other demographic variables are accounted for (see Online Annex Table 1.3.2).

Online Annex Table 1.3.1. Comparison of Demographics Specifications

	2022 EBA	Refined EBA
Static Effects	▪ Share of prime-savers (ages 45-64/30-64) ▪ Old-age dependency ratio (OAD) (ages ≥65/30-64) ▪ Population growth	▪ Share of population age 45-54 ▪ Share of population age ≥65
Dynamic Effects	▪ Life expectancy at 45-50 (LE) ▪ Interaction: LE x future OAD	▪ Life expectancy at 45-50 (LE) ▪ Interaction: LE x share age ≥65

Life expectancy and the interaction between longevity and population aging remain important features of the EBA demographic block. As in the current specification, the dynamic effects on saving are captured directly through life expectancy at ages 45-50, which reflects longevity at the prime-saving stage of the life cycle. As an additional term, life expectancy at 45-50 is interacted with the share of population aged 65 and older. This formulation links longevity at the prime-saving stage of the life cycle with the overall degree of population aging, capturing how life-cycle saving incentives depend on aggregate aging pressures.

Contrary to the current specification, population aging in the interaction term is captured with a contemporaneous variable (the 65+ population share), rather than a projected variable (e.g., the 20-year ahead old-age dependency ratio as used in the current specification). Robustness checks suggest that the contemporaneous old-age shares, rather than projected future shares, are what matter empirically for the current account (see robustness). The current degree of population aging may serve as a reliable proxy for households' expectations on the future generosity of the transfer system. Furthermore, under the current specification, countries with similar current demographic profiles but different projected aging paths may have CA norms that run counter to theoretical priors—for example, a country with a higher future old-age dependency ratio may have a lower predicted CA norm. The refined specification does not rely on future old-age dependency ratios and therefore avoids the counter-intuitive implications that can arise in the current framework.

A further refinement concerns the construction of the interaction term. Instead of centering only one component, the refined specification centers the full interaction term itself by subtracting its GDP-weighted world average. This ensures multilateral consistency directly within variable construction, fully aligning the dynamic block with standard EBA practice (see Online Annex Box 1.3.1).

Online Annex Box 1.3.1. Construction of the Interaction Term

Under the current specification, the interaction term $LE \times \widehat{OAD}_t$ is constructed as the following:

$$LE \times \widehat{OAD}_t = (LE_t - \overline{LE}_t) \times OAD_{t+20} \quad (1)$$

Where LE is life expectancy at 45-50, and OAD_t is the old-age dependency ratio in year t , and

$$\overline{LE}_t = \frac{1}{\sum GDP_t} \sum GDP_t \times LE_t \quad (2)$$

The GDP-weighted sum of $LE \times \widehat{OAD}_t$ is generally not zero. Multilateral consistency of the EBA CA norm is ensured using post-regression adjustments.

The interaction term in the refined specification $LE \times \widehat{share}_{65+t}$ is constructed as

$$LE \times \widehat{share}_{65+t} = LE_t \times share_{65+t} - \overline{LE}_t \times \overline{share}_{65+t} \quad (3)$$

where $share_{65+t}$ is the share of population at or older than 65 in year t , and

$$\overline{LE}_t \times \overline{share}_{65+t} = \frac{1}{\sum GDP_t} \sum GDP_t \times (LE_t \times share_{65+t}) \quad (4)$$

By construction it holds that

$$\sum GDP_t \times (LE \times \widehat{share}_{65+t}) = 0 \quad (5)$$

1.3.4. Implications

Estimation results show that the signs and magnitudes of the coefficients on the refined demographic variables are statistically significant and align with economic priors (Online Annex Table 1.3.2, column 1). In particular, the coefficient on the share of the population aged 45–54 is positive, while the coefficient on the 65+ share is negative, consistent with the life-cycle hypothesis. The combination of the life expectancy standalone and interaction terms captures the non-linearity discussed above. As in the 2022 EBA vintage, life expectancy exhibits either a muted or even negative association with the current account in low-life-expectancy economies, but an increasingly positive association in AEs facing unfavorable old-age support ratios. Furthermore, in economies with higher life expectancy, a higher contemporaneous 65+ share has a less negative -- or even positive -- impact on the current account. In these cases, the stronger life-cycle saving motive associated with longer expected retirement horizons and potentially less generous transfer systems outweighs the static dissaving effect of a larger elderly population.

The refinement of the demographic block results in modest changes in CA norms for most EBA economies, with some exceptions. The average absolute change of CA norms for EBA (ESR) economies in 2024 is 0.45 percent of GDP, slightly smaller than the change from data updates and extensions alone (0.53 percent of GDP for EBA economies, 0.51 percent of GDP for ESR economies). The largest changes in CA norms reflect modifications to the interaction term. The refined specification also produces smaller cross-country variation in the demographic contribution to CA norms. The standard deviation for EBA (ESR) economies in 2024 falls from 0.95 (1.05) percent of GDP in the current specification to 0.50 (0.57) percent of GDP in the refined specification. Furthermore, the refined specification reduces the role of demographics as a driver of the “desirable” CA. The

average absolute demographic contribution to the CA norm for EBA (ESR) economies in 2024 falls from 0.73 (0.84) percent of GDP in the current specification to 0.36 (0.42) percent of GDP using the refined specification.

1.3.5. Robustness

The refined specification is robust to changes in the estimation sample (Online Annex Table 1.3.2).

Online Annex Table 1.3.2. Regression Results and Robustness Checks

VARIABLES	(1) Refined specification	(2) Sample 1986-2015	(3) Sample 1994-2023	(4) (1) + add population growth	(5) (1) + add fertility rate	(6) (1) + add 25-34 share	(7) Future Share 65+ in interaction, t+20	(8) Future Share 65+ t+20
Output gap	-0.259*** (0.030)	-0.289*** (0.032)	-0.238*** (0.034)	-0.257*** (0.030)	-0.258*** (0.030)	-0.257*** (0.030)	-0.261*** (0.030)	-0.261*** (0.030)
Commodity ToT x trade openness	0.378*** (0.041)	0.408*** (0.069)	0.365*** (0.043)	0.382*** (0.041)	0.378*** (0.041)	0.374*** (0.041)	0.380*** (0.041)	0.381*** (0.041)
NFA	0.031*** (0.005)	0.029*** (0.005)	0.031*** (0.005)	0.030*** (0.005)	0.030*** (0.005)	0.031*** (0.005)	0.031*** (0.005)	0.031*** (0.005)
Oil and gas reserves	0.303*** (0.069)	0.363*** (0.071)	0.289*** (0.072)	0.302*** (0.069)	0.303*** (0.069)	0.303*** (0.068)	0.303*** (0.069)	0.301*** (0.069)
Expected GDP growth	-0.362*** (0.102)	-0.380*** (0.112)	-0.348*** (0.113)	-0.360*** (0.102)	-0.369*** (0.102)	-0.361*** (0.102)	-0.348*** (0.103)	-0.347*** (0.103)
Institutional quality	-0.047** (0.018)	-0.041** (0.018)	-0.072*** (0.022)	-0.047** (0.018)	-0.049*** (0.019)	-0.046** (0.018)	-0.049*** (0.018)	-0.051*** (0.018)
Output per worker	0.044*** (0.014)	0.050*** (0.010)	0.050*** (0.015)	0.047*** (0.014)	0.045*** (0.014)	0.043*** (0.013)	0.047*** (0.014)	0.045*** (0.014)
Credit gap	-0.084*** (0.011)	-0.090*** (0.012)	-0.085*** (0.013)	-0.083*** (0.011)	-0.084*** (0.011)	-0.085*** (0.011)	-0.086*** (0.011)	-0.086*** (0.011)
Health spending	-0.408*** (0.129)	-0.571*** (0.145)	-0.357** (0.140)	-0.404*** (0.129)	-0.407*** (0.129)	-0.413*** (0.127)	-0.397*** (0.128)	-0.397*** (0.129)
REER annual log-change (lagged)	-0.013** (0.006)	-0.014** (0.006)	-0.007 (0.006)	-0.013** (0.006)	-0.013** (0.006)	-0.012** (0.006)	-0.013** (0.006)	-0.013** (0.006)
Fiscal policy, instr.	0.279*** (0.075)	0.234*** (0.075)	0.376*** (0.081)	0.264*** (0.073)	0.277*** (0.074)	0.288*** (0.073)	0.279*** (0.074)	0.287*** (0.074)
FXI x K controls, instr.	0.625*** (0.192)	0.823*** (0.252)	0.696*** (0.205)	0.621*** (0.189)	0.624*** (0.191)	0.630*** (0.185)	0.626*** (0.192)	0.630*** (0.192)
Life expectancy (LE)	-0.003** (0.001)	-0.004*** (0.001)	-0.003** (0.001)	-0.003*** (0.001)	-0.003** (0.001)	-0.002** (0.001)	-0.001 (0.001)	-0.001 (0.001)
Share 45-54	0.315*** (0.111)	0.377*** (0.132)	0.239** (0.117)	0.283** (0.114)	0.289** (0.121)	0.316*** (0.109)	0.091 (0.117)	0.121 (0.138)
Share 65+	-0.830*** (0.311)	-0.843** (0.411)	-0.786** (0.320)	-1.035*** (0.339)	-0.888*** (0.331)	-0.773** (0.312)	-0.172* (0.102)	-0.115 (0.108)
LE x Share 65+	0.022*** (0.009)	0.025** (0.012)	0.022** (0.009)	0.027*** (0.009)	0.024*** (0.009)	0.020** (0.009)		
Population growth				-0.430 (0.314)				
Fertility rate					-0.002 (0.003)			
Share 25-34						-0.151 (0.123)		
LE x Share 65+ (t+20)							0.004 (0.002)	
Share 65+ (t+20)								0.064 (0.096)
Observations	1,713	1,297	1,495	1,713	1,713	1,713	1,713	1,713
Number of countries	52	52	52	52	52	52	52	52
R-squared	0.52	0.51	0.54	0.52	0.52	0.52	0.51	0.51
Root MSE	0.032	0.032	0.032	0.032	0.032	0.032	0.032	0.032

Note: *Significant at 10 percent; **significant at 5 percent; ***significant at 1 percent based on heteroskedastic and autocorrelation-consistent standard errors. Constant term not shown.

Rolling 30-year windows yield stable coefficient estimates, with the variables in the refined demographic block generally remaining statistically significant across specifications. In contrast, population growth, which was included in previous vintages of the EBA model, is not statistically related to the current account once other demographic variables are included. While population growth has previously served as a proxy for the size of the young cohort, additional robustness exercises using alternative measures of youth—such as fertility rates

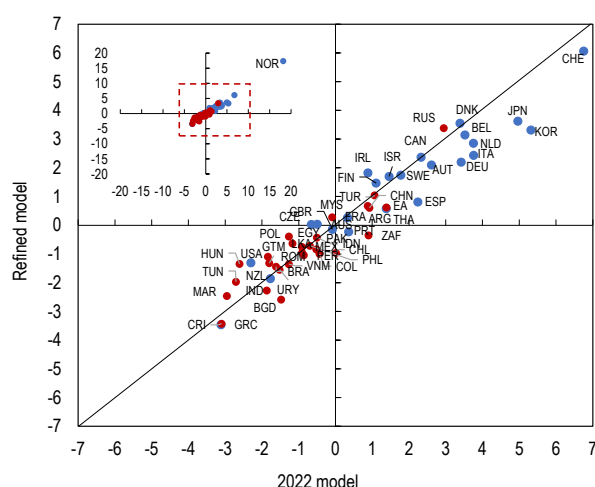
and shares of the population aged 0–14, 15–24, and 25–34—likewise show no significant relationship with the current account once the full demographic block is controlled for.

Contemporaneous measures of population aging better capture the non-linear relationship between longevity and aging than projected aging measures. To assess robustness, the interaction term between life expectancy and the 65+ population share was reconstructed using future population shares at 5-year horizons up to 25 years ahead. As the forecast horizon lengthens, key demographic variables become progressively less significant, and overall model fit declines. Measures of aging speed also do not exhibit a statistically significant relationship with the current account once other demographic variables are included. The demographic block was augmented with future 65+ population shares, replicating the aging-speed concept used in earlier EBA vintages.⁹ Overall, these results indicate that the refined specification is robust to alternative samples and controls, including forward-looking demographic measures.

1.4. Implications for EBA CA Norms

Online Annex Figure 1.4.1 presents a comparison of the EBA CA norms for 2025 estimated with the 2022 model and the refined model. The distribution of current account shows limited variability relative to the 2022 model specifications. Advanced economies with aging population, creditor positions, and high income per capital have positive CA norms under both the 2022 and refined model specification. The refinement, however, led to a distribution of norms that is now more closely aligned across countries with similar income and demographic characteristics, for example, Germany compared to Austria or Colombia compared to Peru and Chile.

Online Annex Figure 1.4.1. Comparison of EBA Estimated Current Norms for 2025: Refined Model versus 2022 Model
(Percent of GDP)



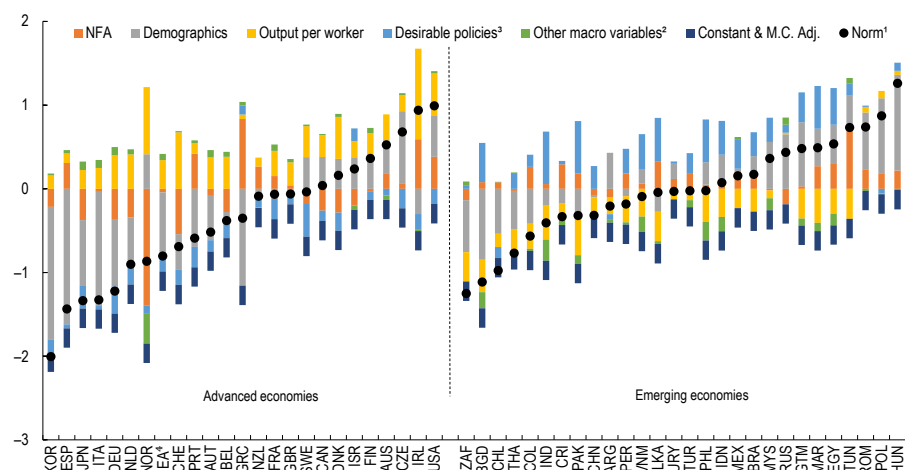
Source: IMF staff calculations.

Note: Blue dots refer to advanced economies; red dots refer to emerging economies. Data label in the figure use International Organization for Standardization country codes. EA=euro area.

Online Annex Figure 1.4.2 presents a decomposition of changes in current account norms comparing the refined model with the 2022 model for each EBA economy. Demographics, output per worker, desirable policies, and net foreign assets account for most of the changes in norms.

⁹ In the 2013 vintage of the EBA model, aging speed is defined as the change in the old-age dependency ratio 20 years ahead.

Online Annex Figure 1.4.2. Changes in Contributions to Estimated EBA Current Account Norms in 2025: Refined Model vs. 2022 Model
(Percent of GDP)



Source: IMF, External Balance Assessment estimates.

Note: Data labels use International Organization for Standardization country codes. EA=euro area; EBA=External Balance Assessment.

¹ The EBA current account norm is multilaterally consistent and cyclically adjusted.

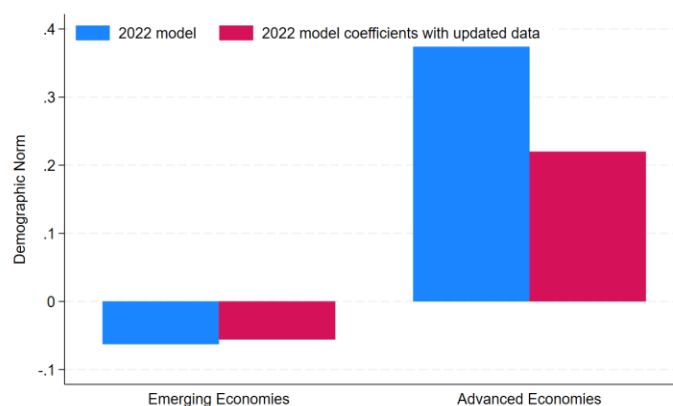
² Other macro variables include expected GDP growth, oil and international country risk guide (ICRG).

³ Desirable policies include desirable credit gap, desirable fiscal balance, desirable foreign exchange intervention, and desirable health.

⁴ The current account norm is corrected for reporting discrepancies in intra-area transactions, because the current account of the entire euro area is about 1.03 percent of GDP less than the sum of the individual 11 countries' balances (for which no such correction is available).

On demographics, beyond refinements to the demographic bloc, substantial updates to demographic data, including historical revisions, have contributed considerably to changes in current account norms. For example, under the 2022 model, demographics contribute on average about 0.4 percent of GDP to current account norms for advanced economies; with updated demographic data, this contribution declines to about 0.2 percent (Online Annex Figure 1.4.3). By contrast, the demographic contribution to current account norms for emerging economies remains broadly unchanged before and after the data updates. These changes occur against a backdrop of rapid demographic change, with population aging in emerging markets well under way and, by some metrics, proceeding faster than in advanced economies. Convergence in some key demographic variables across country groups has already contributed to a narrowing of demographic contributions to current account norms and is expected to continue to do so going forward.

Online Annex Figure 1.4.3. Demographic Norms: 2022 Model vs. 2022 Model Coeffs. with Updated Data
(Percent of GDP)



Source: IMF staff calculations.

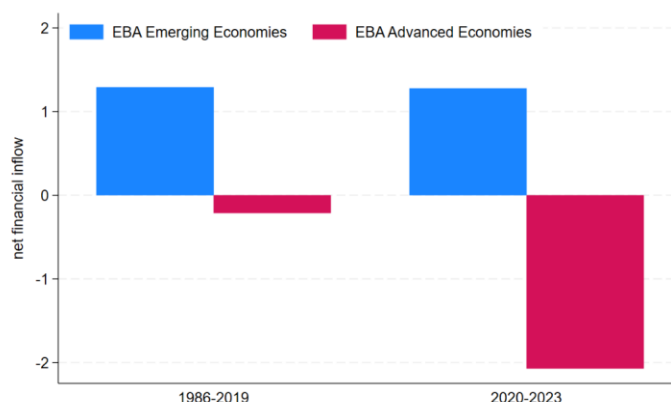
Note: The demographic norm is adjusted to be multilaterally consistent across countries and is reported as a simple average for advanced and emerging economies.

Output per worker also contributes importantly to changes in the norm. This largely reflects the increase in the estimated coefficient—from 0.034 in the 2022 model to 0.050 in the 2022 model with updated data, and to 0.044 in the refined model. This coefficient captures the notion that richer economies, with higher capital–labor ratios, tend to export capital to poorer economies by running higher-than-otherwise current account balances, with the opposite expected for poorer countries (see Chinn and Prasad, 2003; Lee et al., 2008). The higher coefficient when extending the sample to 2023 reflects increased capital outflows from advanced economies during 2020–2023 relative to 1986–2019, as shown in Online Annex Figure 1.4.4.

Desirable policies, particularly health policy, have a modest effect on the changes in the CA norm. The coefficient on the health spending variable becomes more negative, increasing in absolute value from -0.298 in the 2022 model to -0.408 in the refined model. In the EBA framework, health spending proxies for the strength of the social safety net and, through precautionary saving motives, influences aggregate saving behavior. The increase in the coefficient may reflect some strengthening of precautionary saving, likely driven by two main factors. First, as discussed above, population aging has proceeded faster than expected, particularly in emerging market economies. This is reflected in a re-estimation of the 2022 model using updated data, which raises the coefficient on health spending (in absolute value) to -0.342 (see Online Annex Table 1.1.3 Column 1). Second, recent global shocks—notably the COVID-19 pandemic and the war in Ukraine—have further reinforced precautionary saving motives. Extending the sample period from 1986–2019 to 1986–2023 results in an additional increase in the coefficient (in absolute value), from -0.342 to -0.364 (see Online Annex Table 1.1.3 Column 5).

For NFA, despite a modest decline in the estimated coefficient from 0.036 in the 2022 model to 0.031 in the refined model, the implied contribution can be quantitatively large for economies with sizable net creditor or debtor positions.

Online Annex Figure 1.4.4. Net Financial Inflows: EBA Emerging Economies versus Advanced Economies



Source: IMF, World Economic Outlook database; and IMF staff calculations.

Note: The net financial inflows consist of reserve and non-reserve inflows. Reserve inflows are measured by changes in reserve assets, including reserve position in the Fund and SDR holdings; and non-reserve inflows are equal to the balance on financial account minus reserve assets. Negative values indicate net outflows of capital.

1.5. Updated Complementary Toolboxes

Pensions. The pension tool was introduced with the 2022 EBA refinements and provides insights into how pension system parameters may contribute to current account (CA) balances for a subset of the 52 EBA economies for which the relevant indicators are available. Online Annex Box 1.5.1 summarizes a 2026 update of the pension tool. Direct application of estimation results from the pension toolbox for EBA is not warranted. First, pension systems are complex, vary widely across countries, and comparable cross-country data on key features—such as effective replacement rates, retirement age, coverage, and eligibility rules—remain limited

and largely confined to advanced economies. Second, including pensions in the CA model would require defining the “desirable” level of pension generosity or pension system design more generally—a normative judgement that depends, among other things, on fiscal sustainability, demographics, and country-specific institutional arrangements and is difficult to treat consistently across the sample. Third, what matters for saving is the future generosity and sustainability of pension systems, yet forward-looking measures are not readily available in a consistent panel format. An additional challenge is that the institutional complexity of pension systems could necessitate a very large set of variables, making their explicit inclusion infeasible within the econometric constraints of the model. Nevertheless, the results can aid in the interpretation of EBA CA model residuals and the formulation of policy advice.

Product and Labor Market Regulations. Building on earlier work by Cubeddu and others (2019), the product and labor market regulation tool provides insights into the role of labor and product market regulations, with a focus on advanced economies. The tool was introduced with the 2018 EBA refinements. Data limitations continue to preclude the inclusion of labor and product market regulation indicators directly in the EBA CA model. However, results for a subset of economies with the necessary data can help inform policy discussions on the role of structural reforms. Online Annex Box 1.5.2 examines the effects of labor and product market regulations on the CA using a regression analysis approach, extended to incorporate machine learning analysis of residuals.

Inflation Bias. Investment income on debt securities is recorded in the balance of payments nominal terms, departing from the economic notion of real income (and real accumulation of external wealth) as nominal interest income compensates for the expected erosion of the real value of the principal through inflation. The latter can lead to systematic bias in NIIP valuation changes. To correct for this, the inflation bias adjustor was introduced for a small set of countries during the 2018 EBA refinement (Cubeddu et al, 2019), replacing the “financial center dummy” that had been included in EBA between 2013 and 2018 (Phillips et al, 2013). The methodology used to construct the inflation bias adjustor was documented in Adler et al (2019) as well as Herkenhoff and Sauré (2021). A significant drawback of the calculated adjustors was their grounding in the estimated CA mismeasurement stemming from the inflation differential only, without systematically checking for the presence and size of the relevant off-setting exchange rate-based valuation effects for the relevant net foreign debt positions.

As part of 2026 EBA refinements, a complementary toolbox on inflation bias addresses this shortcoming. The toolbox lays out the relevant conditions for both the inflation differential and the accompanying valuation effect (Online Annex Box 1.5.3). The BPM acknowledges the possibility of an inflation bias in the case of high inflation.¹⁰ Analysis of historical data reveals that in the EBA sample the inflation bias could be relevant for only a few countries (i.e., financial centers). This may be the case because relative currency movements are dominated by factors other than inflation differentials, and such factors outweigh the role of relatively muted inflation differentials for many countries in the EBA sample. Moreover, even where inflation bias could be relevant, historical estimates of this factor are volatile, making its role in annual external sector assessments highly uncertain. Ensuring multilateral consistency of inflation bias corrections is a further challenge. As a result, while the findings do not support the use of formal adjustors to normative EBA CA benchmarks, the toolbox provides guidance for discussing inflation bias in the interpretation of EBA CA model residuals for the limited number of economies where historical evidence suggests it may be a meaningful factor.

¹⁰ See Chapter 11 of BPM6 and Chapter 12 of BPM7.

Online Annex Box 1.5.1. Updated Pension Toolbox¹

The relationship between pension system features and the CA is not straightforward from a theoretical standpoint. A pension system's generosity, its system of financing, whether participation is mandatory or voluntary, and the share of the population that it covers can theoretically affect national saving and the CA balance. In an economy with myopic households or liquidity constraints, moving from a voluntary approach to a mandatory system can result in higher national saving and a rise in the CA balance. More generous pension system parameters, in terms of coverage and replacement rates, should in principle amplify these effects. In addition, mandatory systems with a fully funded (FF) financing scheme, where workers accumulate funds for their retirement in accounts, may raise the CA balance by more than pay-as-you-go (PAYG) schemes, which are based on intergenerational budgetary transfers. For a discussion of theoretical channels through which different pension systems can affect saving behavior, see Amaglobeli and others (2019). As with other CA drivers, the overall outcome for the CA balance depends on how the pension system parameters compare with those in the rest of the world.

International evidence of these effects on CA balances is limited, in part reflecting gaps in comparable data on pension systems across economies and over time. A recent paper by the Swiss National Bank staff (Koomen and Wicht 2022; KW henceforth) collects data on mandatory pension system replacement rates, as well as coverage rates, for 49 economies over 30 years (1986-2016). The authors find that mandatory FF systems' replacement rates come with higher CA balances, and more so in economies with higher coverage rates, but that the replacement rates of PAYG systems are unrelated to CA balances.

Data and Related Caveats

The analysis starts by using the KW dataset, which includes pension indicators for 49 economies (all in the EBA sample) during 1986-2016. KW include in their dataset mandatory FF and PAYG replacement rates based on the estimates of Bloom and others (2007). KW only consider mandatory pension systems.

To extend the analysis to consider both mandatory and voluntary systems, and to facilitate updating the related data over time, the analysis also uses a second data source: the replacement rates for voluntary and mandatory pension schemes published in the Organisation for Economic Co-operation and Development (OECD) *Pensions at a Glance* biennial reports.

The OECD reports present tables with mandatory and voluntary replacement rates computed for 51 OECD and G20 economies (not all of which are in the EBA sample) spanning 2005-2024. The tables report the OECD staff estimates of total mandatory (separate for both public and private component) and voluntary pension replacement rates (gross pension entitlement divided by gross pre-retirement earnings) for different levels of worker earnings. The present analysis uses the OECD staff estimates for full-career average income-earning workers.

To obtain a measure of *coverage* rates that is comparable across economies and over time, the analysis follows the approach of KW and uses a proxy based on the self-employment share. Measures of the pension coverage rate over time are not widely available but the self-employed are more likely to be excluded from pension systems than employees are. On this basis, a proxy for the coverage rate is defined as 1 minus the share of workers that are self-employed, annual data for which are available from the International Labour Organization (ILO).

Online Annex Box 1.5.1 (continued)

Estimation Results

The analysis estimates the relation between the aforementioned pension indicators and the residuals from the 2026 refinement of the EBA CA model for economies for which the pension indicators are available in the period 1986–2023. Online Annex Table 1.5.1a reports the estimated relation between the residuals of the refined EBA CA balance equation and the pension system parameters. The variables enter the equation in demeaned form—in deviation from the GDP-weighted sample average.² Following KW, the specifications include the replacement and coverage rates as explanatory variables, as well as interactions between them. The *R*-squared statistics indicate that the pension variables explain between 1.0 and 5.0 percent of the variation of EBA CA model residuals. This result represents a noticeable improvement in fit, considering that the baseline EBA CA equation has an *R*-squared of about 52 percent. The proportion explained is larger for the subsample of 36 EBA economies for which the OECD replacement rates are available (columns 3–6) than for the 49 EBA economies for which the indicators of KW are available (columns 1–2).

The estimated relation with CA balances is stronger for mandatory FF replacement rates than for PAYG rates, as expected (columns 1 and 2). The relation with FF rates is especially strong for economies with larger coverage rates. These results are broadly consistent with those of KW.

The results based on OECD *Pensions at a Glance* mandatory and voluntary replacement rates confirm the strong relation between mandatory replacement rates and CA balances, especially at high levels of coverage rates (columns 3–4). The estimated relation between voluntary replacement rates and CA balances is, as expected, relatively weak with estimated coefficients that are statistically indistinguishable from zero. Finally, the OECD mandatory *private* replacement rates have a stronger estimated relation with the CA than do mandatory *public* replacement rates, especially at higher rates of pension coverage (columns 5–6). Since mandatory private replacement rates are often FF, this stronger estimated relation is consistent with the results based on the KW dataset, which indicate a stronger relation for mandatory FF replacement rates. By the same token, since mandatory public replacement rates are often PAYG, their weaker estimated relation with the CA is consistent with the results based on the KW dataset which indicates a weaker relation for PAYG replacement rates.

The estimation results can be used to derive contributions from pension variables to CA balances. There are considerable uncertainties associated with contributions based on different estimates, which partially reflects that the replacement rates can differ considerably depending on the assumptions used to construct them.

In addition to the panel regression, a machine learning approach is used to complement the existing analysis in the toolbox.³ Compared with traditional OLS panel regressions, this approach estimates the relationship between residuals and explanatory variables non-parametrically. The use of machine learning offers several advantages.

The algorithm can be run on an unbalanced panel and accommodates incomplete data, which makes it possible to incorporate all pension variables, even if the country and time coverage of some variables is incomplete.⁴ Moreover the algorithm can accommodate high-dimensional explanatory variables and detect non-linear relationships in the data. This typically results in higher explanatory power than obtained by OLS. However, machine learning also has drawbacks. Unlike with OLS, it cannot be guaranteed that the response and explanatory variables obey relationships consistent with economic theory. Moreover, admitting non-linearities makes the exact nature of the relationships between the response and explanatory variables harder to interpret. Results from the complementary machine learning approach yield qualitatively similar findings to the regression analysis.

Online Annex Box 1.5.1 (continued)

Online Annex Box Table 1.5.1a Relation Between CA Model Residuals and Pension System Parameters

Variable	Source of replacement rate data					
	KW dataset		OECD dataset			
	(1)	(2)	(3)	(4)	(5)	(6)
PAYG replacement rate #	0.255 (0.706)	0.336 (0.809)				
Mandatory FF replacement rate #	2.262*** (0.876)	2.836*** (0.996)				
Coverage rate #	2.209** (0.992)	-0.068 (2.248)	5.494*** (1.493)	1.152 (3.711)	5.582*** (1.453)	0.756 (3.713)
PAYG replacement rate x Coverage rate #		2.700 (3.373)				
Mandatory FF replacement rate x Coverage rate #		5.497** (2.715)				
Mandatory replacement rate #			1.543 (1.206)	2.170* (1.252)		
Voluntary replacement rate #			-3.953 (2.865)	-1.168 (3.897)	-3.317 (2.670)	-1.200 (3.776)
Mandatory replacement rate x Coverage rate #				12.194** (5.614)		
Voluntary replacement rate x Coverage rate #				-26.332 (25.916)		-22.764 (25.419)
Mandatory public replacement rate #					1.150 (1.111)	0.825 (1.208)
Mandatory private replacement rate #					5.138*** (1.672)	2.951* (1.789)
Mandatory public replacement rate x Coverage rate #						9.251 (5.640)
Mandatory private replacement rate x Coverage rate #						36.448*** (11.801)
Constant	0.094 (0.206)	0.098 (0.208)	-0.462 (0.384)	-0.069 (0.524)	-0.660* (0.351)	-0.275 (0.518)
Observations	1,451	1,451	628	628	619	619
R-squared	0.010	0.012	0.021	0.030	0.040	0.048
Number of economies	49	49	36	36	36	36

Note: # denotes deviations from world GDP-weighted average. Sample is 1986-2023. Pension variables for missing years imputed based on nearest year available. Heteroskedasticity and autocorrelation robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

¹ This box is an update to ESR 2022, Online Annex Box 1.1.3.

² A potential concern is that the pension system variables may be correlated with other variables included in the EBA CA model, which could contaminate the associated estimates. However, robustness analysis suggests that this concern is not warranted: re-estimating the latest EBA CA equation while adding the pension system indicators (for the subset of economies for which these are available) yields very similar coefficients that are statistically indistinguishable from those reported in Online Annex Box Table 2.4.1a.

³ Specifically, the analysis relies on a supervised learning algorithm under the gradient boosting framework, implemented using XGBoost. For details, see Chen, T. and C. Guestrin, C., 2016. "XGBoost: A scalable tree boosting system." in: Proceedings of the 22nd ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, pp. 785-794.

⁴ Pension variables include the PAYG replacement rate, mandatory fully funded replacement rate, and coverage rate from the KW dataset, as well as the coverage rate and the mandatory, voluntary, public, and private replacement rates from the OECD dataset.

Online Annex Box 1.5.2. The Role of Market Regulation

The stringency of regulations in labor and product markets, as well as reforms aimed at easing them, can have an impact on saving, investment, and the CA balance. In principle, easing labor market regulation could increase export competitiveness and raise the CA balance, while easing product market regulations could raise investment and reduce the CA balance. A number of studies have confirmed this relationship both from the theoretical and empirical point of view (for example, Cacciatore and Fiori 2016; IMF 2018).

Introducing product and labor market regulation indicators in the EBA CA model is precluded by data limitations but results for a subset of economies with the necessary data can inform policy discussions on the role of structural reforms. For those economies, the analysis investigates the relation between the part of the CA not explained by the EBA model variables (residuals) and indicators of regulatory stringency. The equation estimated, for the subsample for which data are available, is as follows:

$$\hat{\mu}_{jt} = \alpha + S_{jt}\gamma + \varepsilon_{jt} \quad (1)$$

where $\hat{\mu}$ denotes the estimated EBA CA residual for country j in year t , and S_{jt} is a vector of variables measuring regulatory stringency, expressed as deviations from their GDP-weighted world average.

The analysis draws on indicators of product and labor market regulations for countries with available OECD data. Specifically, it includes measures of regulatory burdens in the licensing and permits system (LPS) to capture product market regulation, as well as employment protection legislation (EPL) and the effective retirement age for males to capture labor market regulation.¹ In addition, the analysis incorporates World Economic Forum (WEF) indicators, namely starting business procedures (SBP) as a measure of product market regulation and the degree of cooperation in labor–employer relations (CLER) as a measure of labor market regulation. In addition to the panel regression, a machine learning approach is used to complement the existing analysis in the toolbox.² A detailed discussion comparing the OLS and machine-learning approaches is provided in Online Annex Box 1.5.1.

Online Annex Box Table 1.5.2a summarizes the findings on the extent to which the EBA CA residuals relate to indicators of labor and product market regulations, expressed in deviations from their world averages. The relationship between the current account (CA) and the indicator for product market regulation has the expected sign based on theory: deregulation in product markets—i.e., lower entry barriers—is associated with lower CA balances. The labor market regulation indicator is also found to have the expected relationship with CA balances: stricter labor market regulations increase labor costs, reduce competitiveness and exports, and thus lower the CA balance (column 1), while greater cooperation in labor–employer relations is associated with higher CA balances (column 2). The results are broadly consistent with recent findings in the literature. For example, Duval, Furceri and Jalles (2022) find that, in advanced economies, major reforms deregulating product markets have been associated with a lower CA balance, while the opposite is true for reforms deregulating employment protection legislation. The authors also find that those effects fade over time and explain how this finding is consistent with theoretical models where, over the longer term, saving and investment adjust and the CA gradually returns to its initial level.

The R -squared statistics indicate that the structural variables explain between 2 and 5 percent of the variation of EBA CA model residuals. This result represents a noticeable improvement in fit, considering that the baseline EBA CA equation has an R -squared of about 52 percent.

Online Annex Box 1.5.2 (continued)

Use in External Assessments

The results should be interpreted with caution and complemented by country-specific information and judgment in light of the aforementioned uncertainty attached to the impact of regulations, and its dependence on the specific indicators considered.

While using the results to quantify formal adjusters to normative EBA CA benchmarks is not currently warranted, the results can aid in the interpretation of EBA CA model residuals and the formulation of policy advice. Ultimately, however, the impact of structural reforms on the CA will be highly country-specific and will depend on the mix of reforms implemented. Depending on the type of reform, the persistence of the effect on the CA may also vary. This calls for granular policy recommendations regarding structural reforms based on country-specific circumstances, within the overall package of recommended policies.

Online Annex Box Table 1.5.2a EBA Residuals and Product and Labor Market Rigidities

	(1) OECD	(2) WEF
PMRs: LPS (+ = more burdens)	0.0049**	
LMRs: EPL (+ = stricter regulations)	-0.0048**	
Effective retirement age, male	-0.0015	
PMRs: SBP (+ = more procedures)		0.0242**
LMRs: CLER (+ = more cooperation)		0.0508**
Constant	0.0011	0.0874
Observations	374	533
R-squared	0.026	0.053
Number of countries	24	49
rho	0.735	0.472

Sources: OECD, WEF, and Staff Estimates.

Note: Dependent variable is the EBA CA model residual in percentage points of GDP. * significant at 10%; ** significant at 5%; *** significant at 1%.

¹ The latest dataset used here covers Product Market Regulation ([PMR](#)) and Employment Protection Legislation ([EPL](#)) for years spanning 1998 to 2018 for 22 AEs. The indicators run from 0 to 6, with 6 being most heavily regulated. For the purposes of the current analysis, data for missing observations are imputed using the nearest available year.

² Market variables include regulatory burdens in the licensing and permits system (LPS), employment protection legislation (EPL), and the effective retirement age for males from the OECD database, as well as starting business procedures (SBP) and the degree of cooperation in labor–employer relations (CLER) from the World Economic Forum (WEF) indicators database.

Online Annex Box 1.5.3. Measuring the Inflation Bias

What is Inflation Bias?

Inflation bias in CA statistics may arise because, in line with the principles set out in successive Balance of Payments Manuals (BPM), interest on foreign-denominated debt is measured in nominal terms converted into domestic currency. This fails to account for changes in the value of the foreign debt principal to domestic lenders due to exchange rate appreciations or depreciations. To the extent that lenders anticipate such valuation effects, they may give rise to nominal return differentials that cause CA balances to offer a systematically biased assessment of foreign asset dynamics.

If domestic lenders anticipate the foreign currency to depreciate, they will require a higher nominal return on foreign debt to compensate for the loss in the value of foreign currency-denominated principal. If they anticipate the foreign currency to appreciate, they will be willing to accept a lower nominal return. Under current BPM guidelines, such return differentials due to the effect of anticipated currency movements on foreign-denominated principal will overstate the real return on foreign debt to a domestic economy expecting foreign depreciation; and they will understate the real returns to a domestic economy expecting foreign appreciation. As a result, an economy expecting foreign depreciation would appear to have higher foreign debt income, higher savings and a stronger CA balance than reflected in its actual foreign asset accumulation. An economy expecting foreign appreciation would appear to have lower foreign debt income, savings and a weaker CA balance.

This possible distortion has been termed inflation bias because monetary theory ties relative currency movements closely to inflation differentials. Most textbook macroeconomic models predict the currency of high-inflation economies to depreciate against the currencies of low-inflation economies over time. Therefore, low-inflation economies should expect foreign depreciation and receive high nominal returns on their foreign debt, while high-inflation economies should expect foreign appreciation and receive low nominal returns abroad.¹

Assessing Inflation Bias Across Countries

It follows from the arguments outlined above that, for inflation bias to distort CA balances, two conditions must be satisfied:

1. Economies' net foreign debt positions need to differ significantly in their exposure to higher-expected-inflation currencies.
2. Economies that are relatively long in debt denominated in higher-expected-inflation currencies should see a systematic erosion of their net foreign debt by adverse valuation effects from exchange rates. Economies that are relatively short in debt denominated in higher-expected-inflation currencies should see systematic exchange-rate valuation gains.

To establish condition 1., it is possible to compute the exposure of an economy j 's foreign debt position to different currencies' expected inflation rates in year t as follows:

$$InfExp_{jt} = \sum_i \pi_{it} NFA_{ijt}^D; \quad (1)$$

where:

- π_{it} is **expected inflation** associated with currency i , proxied by the 5-year ahead Consensus Forecast inflation.²

Online Annex Box 1.5.3 (continued)

- NFA_{ijt}^D is economy j 's **net foreign debt position**³ in currency i (expressed in percent of economy- j GDP).

To investigate condition 2., it is possible to calculate $ValXR_{jt}^D$ – the **valuation effect from exchange rates** affecting the net foreign debt position of economy j in year t (expressed in percent of economy- j GDP). Condition 2 requires that a systematically positive inflation exposure ($InfExp_{jt} > 0$) should be associated with systematically negative valuation effects eroding an economy's foreign debt position ($ValXR_{jt}^D < 0$); while a systematically negative inflation exposure ($InfExp_{jt} < 0$) should be associated with systematically positive valuation effects ($ValXR_{jt}^D > 0$).

Although the BPM acknowledges the possibility of an inflation bias in the case of high inflation,⁴ analysis of historical data reveals that in the EBA sample the inflation bias could be relevant for only a few countries (i.e., financial centers). This may be the case because relative currency movements reflect factors other than inflation differentials, and such factors outweigh the role of relatively muted inflation differentials for many countries in the EBA sample. Moreover, even where inflation bias could be relevant, historical estimates of this factor exhibit high volatility, making its role in annual external sector assessments highly uncertain. Ensuring multilateral consistency of inflation bias corrections is a further challenge.

¹ See Herkenhoff and Sauré (2021) for a formal exposition.

² Currencies include the five SDR currencies (US dollar, euro, Japanese yen, Pound sterling, and renminbi), the domestic currency (When different from the five SDRs), and “other currencies” which comprise all other currencies not included in the previous two categories.

³ Net foreign debt position includes FDI debt, portfolio bonds, other investment and reserve assets.

⁴ See Chapter 11 of BPM6 and Chapter 12 of BPM7.

1.6. An Excess-Adjusted NFA

1.6.1. Background and Motivation

The EBA framework regresses the current account to GDP ($ca_{i,t}$) on cyclical variables ($C_{i,t}$), medium-term structural features ($F_{i,t}$), policy variables ($P_{i,t}$), and the lagged net foreign asset ($nfa_{i,t-1}$) position:¹¹

$$ca_{i,t} = \alpha + \beta C_{i,t} + \lambda F_{i,t} + \gamma P_{i,t} + \phi nfa_{i,t-1} + u_{i,t} \quad (10)$$

Why include the NFA in the EBA regression? The rationale is that the NFA captures the slow-moving steady-state relationship between the CA and the NFA. In steady state, the law of motion of the NFA implies that the steady-state CA ($ca_{i,t}^{ss}$) is proportional to the NFA position ($nfa_{i,t}^{ss}$), as $ca_{i,t}^{ss} = (g_{i,t}^{ss} + \pi_{i,t}^{ss}) nfa_{i,t}^{ss}$, with $g_{i,t}^{ss}$ real GDP growth rate and $\pi_{i,t}^{ss}$ inflation.^{12,13} While the steady-state drivers of NFA—such as structural asset demand and supply, demographics, and other slow-moving fundamentals—are not directly observable, their cumulative effects are reflected in the level of NFA itself. To the extent that actual NFA approximates its steady-state

¹¹ For more details on the EBA methodology, see Allen and others (2023).

¹² The relationship has the opposite sign for the trade balance (see Online Annex Box 2.5.1 for further details).

¹³ A common misconception is that the positive CA-NFA relationship in steady state reflects investment income received by creditor countries. However, the steady-state condition defined above does not contain the interest rate—returns on foreign assets are irrelevant. From a macroeconomic perspective, the source of income—labor or capital, domestic or foreign—does not matter; what matters is aggregate saving relative to aggregate investment (see Online Annex Box 2.5.1 for more details).

counterpart, including it in equation (10) absorbs persistent cross-country differences in the current account that observable fundamentals and policies alone do not capture.¹⁴ Without it, cross-country differences in these slow-moving determinants would contaminate the residual.

Consistent with the steady-state relationship between the NFA and CA, the estimated coefficient on lagged NFA is positive.¹⁵ This implies that debtor countries are statistically associated with CA deficits, while creditor countries are associated with surpluses. The positive coefficient is justified even when the economy is not in steady state, because the NFA anchors the slow-moving steady-state component of the CA, while other regressors explain deviations around it (see Online Annex Box 1.6.1 for more details).

Motivation for Refinement. However, the actual NFA reflects not only steady-state fundamentals but also accumulated past excess imbalances—deviations from norms that have persisted over time. The positive sign on its coefficient creates a normative inconsistency: excess external imbalances today feed into larger NFA positions that subsequently justify even greater imbalances by shifting the CA norm. Using actual NFA means that past excesses shift the estimated norm, gradually explaining away imbalances rather than identifying them. This creates a feedback loop: excess imbalances accumulate into NFA positions that subsequently justify larger norms. In addition, this concern has grown more pressing over time as the lagged NFA term now accounts for a substantially larger share of CA norms than a decade ago, reflecting both rising estimated coefficients across successive EBA vintages and the widening of external positions. The refinement addresses this normative inconsistency by constructing an adjusted NFA from accumulated CA norms.

1.6.2. Methodology

To address this undesirable feedback loop, we construct *adjusted* NFA levels using accumulated CA norms through an iterative procedure. Importantly, this method does not derive an optimal NFA*; rather, it constructs adjusted NFA by removing cumulated excess current account balances from the observed NFA.¹⁶

Defining an adjusted NFA poses challenges. The NFA—a key state variable in many models of international macroeconomics tracking the net financial position of a country vis-a-vis the rest of the world (Lane and Milesi-Ferretti, 2002; Florez-Orrego and others, 2024)—can be seen as the collection of past shocks and initial conditions. To get around this, the approach strips from the NFA any excess identified in the EBA framework. This method, thus, prevents past excess imbalances from influencing future norms. The benefit of this methodology is that it is anchored in the accumulation of EBA norms—which capture optimal changes in saving-investment.¹⁷

This section walks through the steps to calculate the NFA adjustments.

Step 1: Baseline Estimation. Estimate the standard EBA regression in equation (1) and recover the CA norms ($ca_{i,t}^n$) using desirable policies $P_{i,t}^*$ and actual structural features $F_{i,t}$.¹⁸

¹⁴ Conditional on observable steady-state components (or their proxies), NFA summarizes the remaining slow-moving steady-state forces.

¹⁵ The estimated coefficient in the EBA regression is $\hat{\phi} = 0.031$. In the previous specification the coefficient was 0.036, see Allen and others (2023).

¹⁶ Alternative approaches are covered in section 6.

¹⁷ This approach is similar to Turrini and Zeugner (2019), with important differences. The authors decompose covariates of the CA regression into fundamentals and non-fundamentals—a somewhat arbitrary distinction—and compute CA norms as the fitted value including only fundamentals. This excludes not only policy variables such as the fiscal balance, but also the lagged NFA. The method can generate an inconsistency: the CA norm is estimated excluding the NFA (or, equivalently, assuming an NFA benchmark of zero), yet the CA norm is then used to construct a non-zero benchmark NFA. The resulting NFA benchmark thus rests on the implicit assumption that the benchmark NFA is itself zero. In contrast, the refined approach in this note preserves the NFA term in CA norms while iteratively replacing actual NFA with adjusted NFA, ensuring internal consistency.

¹⁸ Importantly, this procedure is a post-estimation adjustment applied on top of the standard EBA regression output. No coefficients are re-estimated; the regression itself, including the estimated NFA coefficient ϕ , is unchanged from the baseline EBA.

$$ca_{i,t}^n = \hat{\alpha} + \hat{\lambda}F_{i,t} + \hat{\gamma}P_{i,t}^* + \hat{\phi}nfa_{i,t-1} \quad (11)$$

Step 2: Initialize Adjusted NFA. Set the initial adjusted NFA equal to the actual NFA at a baseline year $nfa_{i,t_0}^b = nfa_{i,t_0}$. Then construct the following year adjusted NFA for $t_0 + 1$:

$$nfa_{i,t_0+1}^b = \frac{nfa_{i,t_0}^b}{1 + g_{i,t_0+1} + \pi_{i,t_0+1}} + ca_{i,t_0+1}^n + val_{i,t_0+1} \quad (12)$$

where g_{i,t_0+1} is real GDP growth from t_0 to $t_0 + 1$, π_{i,t_0+1} is inflation, and val_{i,t_0+1} is the valuation term for period $t_0 + 1$, scaled by GDP. Valuation changes are incorporated in the adjusted NFA in order to exclude valuation swings from impacting the gap between the NFA and the adjusted NFA.^{19,20}

Step 3: Calculate Adjusted CA Norms. Adjust the next-period CA norm ($ca_{i,t}^{adj}$) by replacing the contribution of $nfa_{i,t-1}$ with $nfa_{i,t-1}^b$:²¹

$$ca_{i,t}^{adj} = ca_{i,t}^n - \hat{\phi}nfa_{i,t-1} + \hat{\phi}nfa_{i,t-1}^b \quad (13)$$

Step 4: Iterate Forward. Construct the NFA adjustment for the subsequent year:

$$nfa_{i,t+1}^b = \frac{nfa_{i,t}^b}{1 + g_{i,t+1} + \pi_{i,t+1}} + ca_{i,t+1}^{adj} + val_{i,t+1} \quad (14)$$

Iterate forward using adjusted CA norms. The resulting CA gap decomposes into policy gaps, NFA adjustments, and residuals. Multilateral consistency is imposed such that the sum of adjusted NFAs equals zero across countries in each period.

Step 5: Calculate new EBA CA gaps. Using our NFA adjustment, the adjusted norm can be rewritten as:

$$ca_{i,t}^{adj} = \hat{\alpha} + \hat{\lambda}F_{i,t} + \hat{\gamma}P_{i,t}^* + \hat{\phi}nfa_{i,t-1}^b \quad (15)$$

Let $ca_{i,t}^{cycle}$ denote the cyclically-adjusted CA, that is, the CA net of the estimated contributions of the cyclical variables, defined as: $ca_{i,t}^{cycle} = ca_{i,t} - \hat{\beta}C_{i,t}$

We can define the new EBA gap as the difference between the cyclically-adjusted CA and new adjusted CA norm ($ca_{i,t}^{gap} = ca_{i,t}^{cycle} - ca_{i,t}^{adj}$) and using equations (10), (11), (13) the CA gap becomes:

$$ca_{i,t}^{gap} = ca_{i,t}^{cycle} - ca_{i,t}^{adj} = \underbrace{\hat{\gamma}(P_{i,t} - P_{i,t}^*)}_{\text{policy gap}} + \underbrace{u_{i,t}}_{\text{residual}} + \underbrace{\hat{\phi}(nfa_{i,t-1} - nfa_{i,t-1}^b)}_{\text{NFA adjustment}} \quad (16)$$

A key implication of (7) is that the NFA refinement alters the definition of the EBA CA gap, adding to it contributions from past CA gaps, as summarized by the “NFA adjustment” term. Thus, the refinement brings consistency to the dynamic relationship between flow (CA) and stock (NFA). The EBA regression considers as

¹⁹ While year-to-year valuation changes can be sizable, they tend to be mean-reverting over time (Gourinchas, 2008; Devereux and Sutherland, 2010). In addition, to the extent that valuations changes are permanent (for example, with an exorbitant privilege), they should be included in the adjusted NFA.

²⁰ Valuation changes are applied additively to both actual and adjusted NFA, ensuring the NFA adjustment captures only cumulated excess current account flows. An alternative multiplicative treatment would introduce a valuation component into the NFA adjustment, though given the mean-reverting nature of valuation changes, this is unlikely to materially affect results.

²¹ Alternatively, use medium-term real growth can be used instead of $\hat{\phi}$. Results are similar.

CA gap whatever is not explained by fundamentals or policy or cycles. The NFA adjustment strips out of the NFA whatever is not explained by past CA norms and initial conditions.

Treatment of Valuation Changes. Valuation changes are added to benchmark NFAs for three main reasons. First, large year-to-year valuation swings would otherwise translate directly into NFA adjustments, requiring offsetting CA adjustments that may not be appropriate policy responses. Second, while valuation terms are highly variable, they tend to be slowly mean-reverting. Third, when valuation effects reflect permanent differences across countries—such as the exorbitant privilege for reserve currency issuers—these should logically be incorporated into adjusted NFAs.

Treatment of Data Revisions. Data revisions to the current account and net foreign asset position pose a consistency challenge: actual CA and NFA are revised continuously, while published CA norms reflect assessments made at a point in time. To maintain internal consistency, we recompute historical CA norms to be consistent with revised data while preserving the original assessment. Specifically, let $ca_{i,t}^{gap,published}$ denote the CA gap from the assessment in year t , and let $ca_{i,t}^{cyc, revised}$ denote the cyclically-adjusted CA using revised CA data (applying the same cyclical adjustment as the original assessment). The revised CA norm is then:

$$ca_{i,t}^{norm, revised} = ca_{i,t}^{cyc, revised} - ca_{i,t}^{gap, published} \quad (17)$$

This ensures that data revisions do not alter the historical assessment of imbalances. On the stock side, revisions to nfa_{i,t_0} enter symmetrically: the starting point is updated for both actual and adjusted NFA, while the accumulation uses revised CA flows (for actual) and revised norms (for the adjusted series). Since both sides are adjusted consistently, the NFA adjustment term—which reflects only cumulated excess flows—is invariant to revisions in the initial NFA level.

1.6.3. Implementation

Applying the methodology requires data on:

- (i) the adjusted NFA in t_0 ,
- (ii) sequence of adjusted CA norms $ca_{i,t}^{adj}$,
- (iii) sequence of valuation effects, $val_{i,t}$, and
- (iv) the estimated parameter for NFA in EBA, $\hat{\phi}$.

Several elements of the methodology are mechanical and do not involve trade-offs. Valuation changes enter both actual and adjusted NFA, and therefore cancel out of the NFA adjustment, which reflects only cumulated excess CA flows. The estimated parameter for NFA is similarly fixed, taken directly from the EBA CA regression. Two other elements, namely the sequence of norms and the initial start date, do involve methodological choices with material trade-offs, discussed below. To illustrate the results graphically, we calculate deviations of CA gaps relative to a baseline of EBA CA gaps for 2025, as based on the refined EBA model.

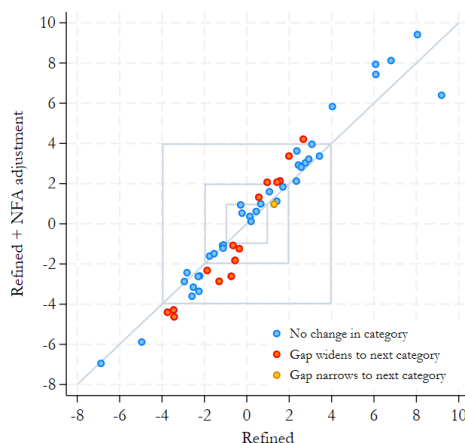
In this reference case, for (i) we set $t_0 = 2012$, corresponding to the first EBA assessments of 2013, for (ii) we take the sum of adjusted EBA CA norms plus “adjusters to the norm,”²² for (iii) we calculate valuation changes

²² Adjusters to the norm are Staff adjustments to the EBA CA gaps mostly for NIIP financing risks or external sustainability considerations. For instance, this was relevant in various assessments in the past for Argentina, Spain, India, Brazil and Türkiye in the ESR sample.

as the change in NFA not accounted for by flows,²³ and for (iv) we use the coefficient based on the refined EBA CA regression, $\hat{\Phi} = 0.031$.

Online Annex Figure 1.6.1 compares EBA CA gaps for 2025 across two specifications: (i) the refined EBA specification with updated demographic block (x-axis), and (ii) the refined methodology with NFA adjustments using implementation choices described above (y-axis).

Online Annex Figure 1.6.1. EBA CA Gaps with NFA Adjustments, 2025



Note: EBA CA gaps in 2025, percent of GDP; EBA sample; “Refined” refers to EBA gaps from the 2026 refinement specification; “Refined + NFA adjustment” corresponds to new EBA CA gaps using the NFA adjustment. Outlier excluded.

At the global level, the methodology produces larger negative CA gaps in countries with persistent past excess CA deficits, offset by larger positive CA gaps in countries with persistent past excess CA surpluses. At the country level, changes are larger in countries with large debtor or creditor positions. The average magnitude of EBA CA gap revisions, measured as absolute change, from incorporating our NFA adjustment is 0.71 percentage points relative to CA gaps generated by the refined specification (or 0.51 percentage points GDP-weighted) (see Online Annex Table 1.6.1). By comparison, the data updates alone generate a similar 0.51 percentage points change relative to the 2024 CA gap assessment (or 0.66 percentage points GDP-weighted).²⁴

The adjusted NFA means assessed excess imbalances are now corrected for the past inconsistency so that CA gaps are not unduly affected by past CA excesses. These corrected gaps will tend to be larger, the NFA adjustment can be expressed as a geometrically weighted sum of past CA gaps, depreciated by nominal growth.²⁵ If past CA gaps have the same sign as today’s gap, NFA adjustment will increase excess imbalances.²⁶ The old methodology let these accumulated excesses incorrectly shift the norm itself, whereas the new methodology strips this out and reclassifies it as a CA gap. The methodology produces systematic adjustments depending on the persistence of past CA gaps. To illustrate the mechanism: consider a creditor economy running a current account surplus above its norm (a positive CA gap). Because actual flows exceed desired flows, actual NFA accumulates faster than the adjusted NFA, generating a positive NFA adjustment that amplifies the assessed CA gap. The logic is symmetric for debtor economies running deficits in excess of their norm.

²³ Specifically, valuation changes are defined as the difference between asset-side capital gains (asset stock changes minus gross credit flows) and liability-side capital gains (liability stock changes minus gross debit flows). All data is from the latest vintage of the WEO or the Balance of Payments.

²⁴ It should be noted that the average change relative to the EBA 2022 specification with updated data were lower.

²⁵ This is given by the expression: $nfa_{i,t} - nfa_{i,t}^b = \sum_{s=t_0+1}^t \frac{ca_{i,s}^{gap}}{(1+\bar{g}+\bar{\pi})^{t-s}}$, taking constant nominal GDP growth $(1 + \bar{g} + \bar{\pi})$.

²⁶ If there is no persistence in CA gaps, NFA adjustments would be uncorrelated with CA gaps.

Online Annex Table 1.6.1. Summary of the Absolute Change in CA Gaps with Various Alternative Methodological Choices

	$\Delta CA \text{ gap} $ in 2024 with data updates / extensions relative to 2024 assessments		$\Delta CA \text{ gap} $ in 2025 with NFA adjustment relative to Refined CA gap	
	Simple average	GDP-weighted	Simple average	GDP-weighted
Reference	0.51	0.66	0.71	0.51
Alternative starting dates for nfa_{i,t_0}				
$nfa_{i,t_0} = \overline{nfa}_{i,2010-2012}$			0.71	0.53
$nfa_{i,t_0} = 2000$			1.16	1.27
Memory assumptions				
5-year window			0.27	0.22
10-year window			0.54	0.40
Historical $\alpha_{i,t}^{adj}$ sequence				
Staff Norms			0.51	0.38
Uniform EBA specification			0.73	0.66

Note: This table presents the changes in current account gaps due to data updates and extensions in 2024 and due to alternative methodological choices in 2025, both for the ESR sample. The first column shows the change in the absolute CA gap ($\Delta|CA \text{ gap}|$) when data are updated and extended relative to 2024 assessments. In the second column, each row reports the change in the absolute CA gap ($\Delta|CA \text{ gap}|$) relative to refined EBA specification. The reference uses $nfa_{i,t_0} = 2012$ and EBA CA norms. Alternative starting dates vary the initial condition, with $\overline{nfa}_{i,2010-2012}$ the average of the NFA over 2010–2012. Memory assumptions govern the window over which past adjusted current accounts are accumulated for the NFA adjustment. Uniform EBA specification uses the refined EBA specification to recompute EBA gaps. Results are reported as simple cross-country averages and GDP-weighted averages.

1.6.4. Comparison Across Implementation Choices

Alternative starting dates. The choice of initial date t_0 involves a set of trade-offs across going as far back as possible on conceptual grounds, data vintage consistency, and the accumulation uncertainty (see Online Annex Table 1.6.2 for a summary of the trade-offs). Conceptually, an earlier start date is preferable, as a long accumulation window captures a longer history of imbalances. However, extending backward requires imputing CA norms for years without formal EBA assessments and leads to the accumulation of uncertainty around norms. At the opposite extreme, setting $t_0=2025$ would eliminate any concerns related to the accumulation of uncertainty, but it also disregards any historical excess. In this case, normative inconsistency is addressed only from 2025 onwards. In the above reference case, the accumulation begins in 2012 (corresponding to the first EBA assessment year in 2013), striking a balance between these trade-offs. Two additional alternatives are also considered.

- First, we initialize the adjustment using a three-year average of actual NFA over 2010–2012 rather than the single 2012 value, to ensure results are not driven by idiosyncratic conditions in the base year. Results are broadly similar to the reference case (Online Annex Table 1.6.2): the three-year average revises CA gaps by an average of 0.71 percentage points relative to the refined specification (0.53 percentage points GDP-weighted). Comparing EBA gaps relative to the reference case, all ESR economies have a deviation of less than 0.3 percent of GDP (Online Annex Figure 1.6.2).
- Second, an early anchor year can be set at 2000, as an instructive alternative capturing the pre-2009 episode of surging global imbalances. Notional norms combining fitted CA and constant desired policies for the pre-2012 period are constructed and accumulated forward. However, this requires strong assumptions to back out pre-EBA CA gaps, which are problematic for some key countries. In addition, a 25-year window can compound any uncertainty related to the estimation of the norm. This earlier start date generates substantially larger divergences between actual and adjusted NFA for many countries (Online Annex Table 1.6.2), reflecting the accumulation of pre-2009 imbalances. This revises CA gaps by an average of 1.16 percentage points relative to the refined specification (1.27 percentage points GDP-weighted). We note again that an important shortcoming of this approach is that it requires strong assumptions about CA norms prior to 2012. Comparing EBA gaps relative to the reference case, only 11 economies have a deviation of less than 0.3 percent of GDP (Online Annex Figure 1.6.2).

More generally, the further back in time one extends the NFA adjustment method, the larger the resulting CA gaps tend to be.

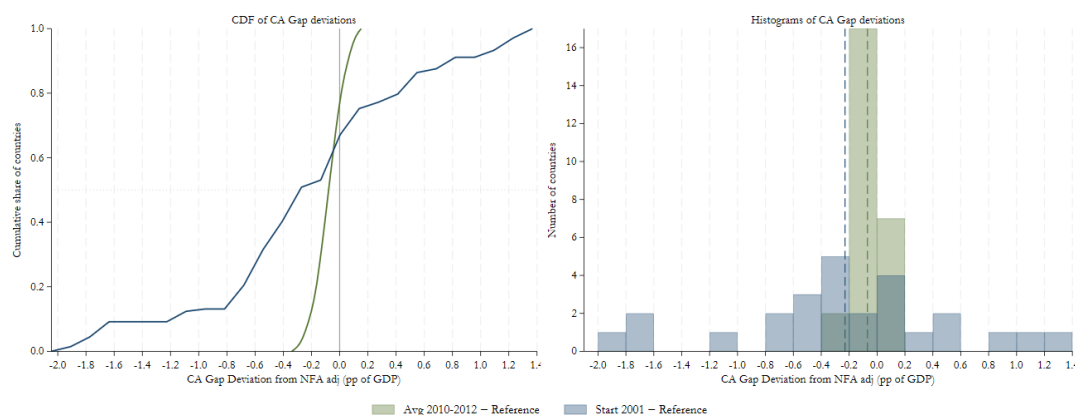
$$ca_{i,t}^{gap} = \hat{\gamma}(P_{i,t} - P_{i,t}^*) + u_{i,t} + \hat{\phi} nfa_{i,t}^{gap} = \hat{\gamma}(P_{i,t} - P_{i,t}^*) + u_{i,t} + \hat{\phi} \sum_{k=0}^{t-t_0-2} \frac{ca_{i,t-k-1}^{gap}}{(1 + \bar{g} + \bar{\pi})^k} \quad (18)$$

Online Annex Table 1.6.2. Trade-offs from Alternative Starting Dates

Objective	$t_0 = 2000$	$t_0 = 2012$	$t_0 = 2025$
Conceptual horizon	● High — long window captures 2000s imbalances	● Medium — captures post-GFC imbalances but not the build-up to 2008	● Low — no historical accumulation
Data Assumptions	● Low — pre-2012 requires strong assumptions on desired policies	● High — no assumptions needed for desired policies from 2012	● High — uses only contemporaneous data; no reliance on historical vintages
Accumulation uncertainty	● Low — 25-year accumulation compounds uncertainty in norms	● Medium — 12-year window accumulates moderate uncertainty in norms	● High — no accumulation

Note: ● high, ● moderate, ● low. Indicator color reflects staff judgment of each specification's performance on the stated objective. t_0 denotes the anchor year from which the NFA adjustment is accumulated

Online Annex Figure 1.6.2. Deviations in 2025 CA Gaps under Alternative Starting Dates for Adjusted NFA



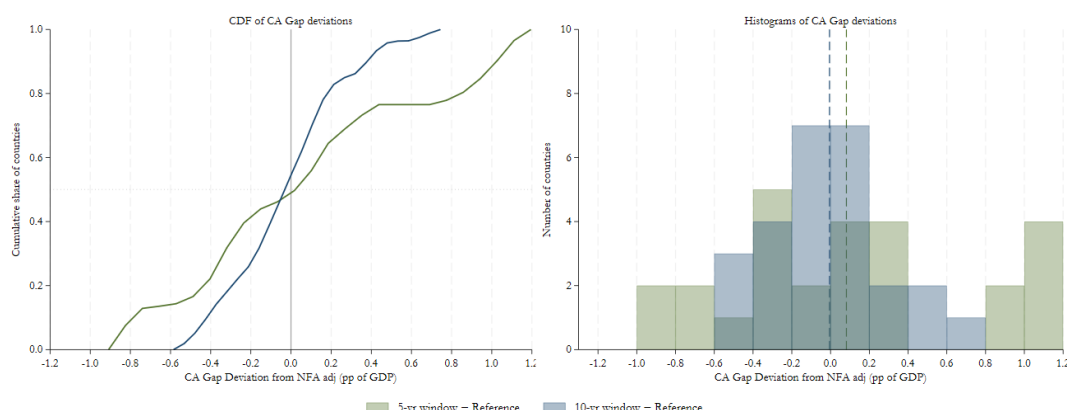
Note: Distribution of EBA CA gaps in 2025, percent of GDP, constructed as deviations from the reference case (defined as alternative CA gap – reference case CA gap). The two alternatives change the anchor: "Avg 2010-2012" replaces the single-year anchor with the 2010-2012 average NFA, while "Start 2001" extends the accumulation window back to 2001. Dashed lines on right hand side chart are means. ESR sample. All based on EBA CA norms with norm adjusters. CDF refers to the cumulative density function.

As an illustration, with constant 6 percent nominal growth and discount factor $\gamma = 1/(1 + \bar{g} + \bar{\pi}) = 1/1.06$, the half-life of this process is approximately 12 years ($\ln(2)/\ln(1.06) \approx 11.9$). This memory has important implications:

a country running a persistent 2 percent CA gap for a decade would accumulate an NFA adjustment contributing approximately 0.4 percentage points to its assessed CA gap.²⁷

A potential solution would be resetting the start year every year (to some rolling year in the past, for instance starting 5 years prior every year), limiting the backward horizon to a fixed window of H years. This would prevent very distant historical gaps from indefinitely affecting current assessments while maintaining the discipline of the adjustment approach. There is no formal criterion that pins down an optimal memory length; the choice involves a trade-off between (i) conceptually preferable longer window and (ii) limiting the influence of more distant past, which some could see as a desirable property. Online Annex Figure 1.6.3 shows the results for a window of 5 years or 10 years. The shorter the window, the lower the accumulated excess imbalances will tend to be. This revises CA gaps by an average of 0.27 percentage points relative to the refined specification (0.22 percentage points GDP-weighted) for the 5-year window, and 0.54 percentage point (0.40 percentage points GDP-weighted) for the 10-year window. Comparing EBA gaps relative to the reference case, around 42 percent of the economies have a deviation of less than 0.3 percent of GDP for both memory windows (Online Annex Figure 1.6.3).

Online Annex Figure 1.6.3. Deviations in 2025 EBA CA Gaps with Alternative Memory Windows for NFA Adjustments



Note: Distribution of EBA CA gaps in 2025, percent of GDP, constructed as deviations from the reference case (defined as alternative CA gap – reference case CA gap). Both alternatives shown here use a rolling rather than fixed anchor: “5-yr window” accumulates norms over the past five years, “10-yr window” over the past ten years. Dashed lines on right hand side chart are means. ESR sample. All based on EBA CA norms with norm adjusters. CDF refers to the cumulative density function.

Choice of the historical $ca_{i,t}^{adj}$ sequence. The choice of the sequence of norms used in the accumulation involves a set of trade-offs related to evenhandedness, multilateral consistency, staff judgment, and replicability (see Online Annex Table 1.6.3 for a summary of the trade-offs). In the reference case, EBA CA norms are used to strike a balance between the trade-offs. These norms are multilaterally consistent across the sample and internally consistent with the rest of the EBA framework. They are adjusted with “adjustors to the norm,” where some economies have adjusters for IIP considerations (for instance, Spain, India, Brazil or Türkiye). Two alternative norm sequences are also considered.

²⁷ Suppose a country runs a 2-percentage point CA gap each year from 2013 to 2022 (10 years). The accumulated NFA adjustment at the end of 2022 is: $nfa_{2022} - nfa_{2013}^b = 0.02 \sum_{k=0}^9 \delta^k = 0.02 \cdot \frac{1 - (1/1.06)^{10}}{1 - 1/1.06} = 0.02 \times 7.8 = 0.156$.

With $\hat{\phi} = 0.031$ (the coefficient with updated data), this NFA adjustment contributes $0.031 \times 0.156 \approx 0.48$ percentage points to the assessed CA gap.

Online Annex Table 1.6.3. Trade-offs from the Choice of the Historical $ca_{i,t}^{adj}$ Sequence

Objective	CA Staff Norms	EBA CA Norms	Uniform Specification
Evenhandedness	● Medium — country-specific adjustments applied inconsistently across ESR/non-ESR	● High — model-derived	● High — single specification applied uniformly
Multilateral Consistency	● Low — no multilateral consistency for non-ESR; incomplete coverage	● High — norms are multilaterally consistent	● Medium — norms are multilaterally consistent, but coefficients use future data
Staff Judgment	● High — incorporates all adjustments; matches official assessments	● Medium — norm adjustors included but headline adjustors omitted (COVID/measurement)	● Low — no scope for country-specific factors
Transparency / Replicability	● Low — relies on dispersed country-team inputs; incomplete historical data	● Medium — self-contained but vintage-specific discontinuities complicate replication across time	● High — single fixed specification; easily replicable

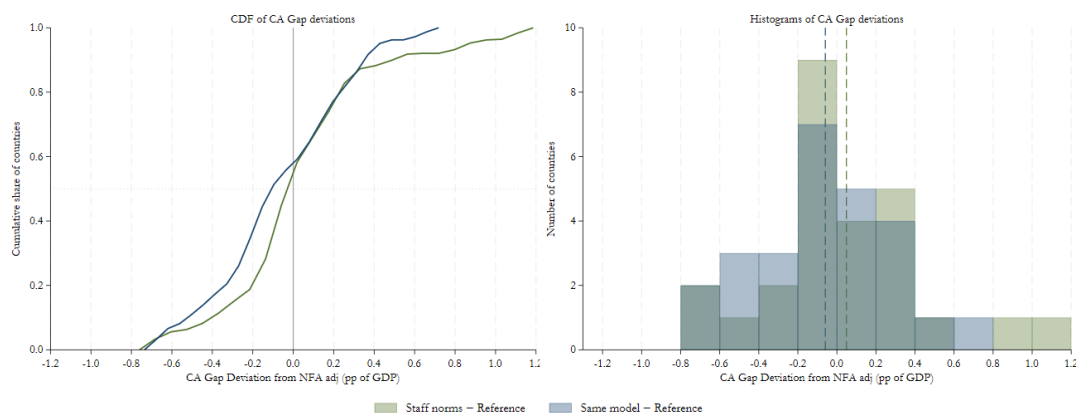
Note: ● high, ● moderate, ● low. Indicator color reflects staff judgment of each specification's performance on the stated objective.

- First, staff CA norms, that are EBA CA norms with adjustors based on staff judgment, are available for the ESR sample. Staff norms incorporate the full set of country-team adjustments and by construction align with official external sector assessments. However, they are only sporadically available for non-ESR countries, lack multilateral consistency across the broader sample, and rely on dispersed country-team inputs that can be difficult to replicate historically. Using staff norms revises CA gaps by an average of 0.51 percentage points relative to the refined specification (0.38 percentage points GDP-weighted). Comparing EBA gaps relative to the reference case, 69 percent of the economies have a deviation of less than 0.3 percent of GDP (Online Annex Figure 1.6.4).
- At the opposite end of the spectrum, CA norms from a uniform EBA specification can also be used. These norms are computed using a single fixed regression applied mechanically across the full sample and horizon, alleviating concerns that norms shift year-on-year due to changes in data but also changes in the baseline EBA specification.²⁸ However, as the definition of some policy variables has changed across EBA methodological vintages (e.g., the credit gap), this requires additional assumptions on how to construct consistent series. In addition, the resulting CA gaps may deviate from official EBA gaps in a given year, posing communication challenges. An added benefit of this approach is that there is no need to adjust any norm for historical data revisions, which can be sizable. Using a fixed specification revises CA gaps by an average of 0.73 percentage points relative to the refined baseline (0.66 percentage points GDP-weighted). Comparing EBA gaps relative to the reference case, 58 percent of economies have a deviation of less than 0.3 percent of GDP (Online Annex Figure 1.6.4).
- Prudential considerations.** External sustainability concerns for large negative NFA positions, that have been an integral part of past EBA assessments, should equally apply to adjusted NFAs. There could be concern that the NFA adjustment computed based on the accumulation of CA norms may be lower than what Staff judge to be a sustainable level for the NFA, for instance, relative to the ARA metric. While part of these considerations should already be taken care of in EBA CA norm, it could be possible to adjust the NFA adjustments upwards to above a certain threshold for large debtor economies (see, for example, Catao and Milesi-Ferretti, 2014; Cubeddu and others, 2023). For instance, the European Commission's Macroeconomic

²⁸ It should be noted that Staff judgment is incorporated in the setting of desirable policies in EBA CA norms.

Imbalances Procedure (MIP) defines a threshold of -35 percent to flag potential risks for large debtor economies (European Commission, 2019).

Online Annex Figure 1.6.4. Deviations in 2025 EBA CA Gaps under Alternative CA Norms for NFA Adjustments



Note: Distribution of EBA CA gaps in 2025, percent of GDP, constructed as deviations from the reference case (defined as alternative CA gap – reference case CA gap). "Staff norms" replaces EBA norms with staff-assessed norms when accumulating the adjusted NFA. "Same model" uses the EBA CA norm from a uniform specification. Dashed lines on right hand side chart are means. ESR sample. CDF refers to the cumulative density function.

1.6.5. Discussion of Policy Advice

Policy advice. The introduction of NFA adjustments can raise questions about how policy advice should be framed once the NFA refinement is implemented. Staff's view is that policy advice should continue to be anchored on the CA norm, now based on the adjusted NFA, rather than targeting the difference between the adjusted and the actual NFA. This difference simply measures a correction term for the original inconsistency between NFA and CA gaps. Importantly, the resulting adjusted CA norm is no longer influenced by past CA excesses.²⁹ This approach maintains continuity with existing practice and focuses advice on a flow variable that responds more directly to policy actions such as fiscal adjustment or structural reforms.

1.6.6. Discussion of Alternative Approaches

Several alternative approaches to NFA adjustments have been considered or proposed. These differ from the approach in this note in scope, methodology, or objective, and are discussed in turn below.

A long-run NFA estimation (or NFA norm). One alternative is to derive an optimal or long-run NFA level directly, via cointegration techniques regressing the NFA on fundamentals such as output per capita, public debt, and demographic variables, building on Lane and Milesi-Ferretti (2002).³⁰ However, these regressions did not yield robust results across specifications in our broad sample of economies. Importantly, the method of constructing adjusted NFA presented in this note does not derive NFA norms or an optimal NFA*; rather, it constructs adjusted NFA by removing cumulated excess current account balances from observed NFA.

External Sustainability approach. The EBA methodology includes an external sustainability (ES) approach, which determines the CA-to-GDP ratio that would stabilize the NFA-to-GDP position over the medium term at a

²⁹ The CA Norm is a key metric in policy discussions. Medium-term forecasts of the CA tend to converge to the norm.

³⁰ For papers on the determinants of long-run NFA, see Lane and Milesi-Ferretti (2002, 2004); Prati and others (2011), on the sustainability of the NFA, see Blanchard and Das (2017); Durdu and others (2013). More recent papers on the NFA have focused on the role of demographics (Auclert and others, 2021), reserve accumulation (Choi and Taylor, 2022), and equity valuations (Atkeson and others, 2025).

benchmark or desired level. This approach is a complement to estimates from the CA, REER-Index, and REER-Level models, by focusing on external sustainability considerations and is most relevant when NFA positions are considered excessively large, and a further widening of these positions is unwarranted or would put external sustainability at risk. However, ES does not address the feedback-loop concern motivating the adjusted NFA. At the same time, the construction of NFA adjustments is not about assessing the level of the NFA. It tackles a narrower issue: the feedback loop where past excess CA imbalances accumulate into NFA positions that subsequently justify larger norms. The resulting NFA adjustments to the CA norm—the difference between actual and adjusted NFA multiplied by the estimated coefficient—do not contribute to CA norms, breaking the feedback loop.

NFA decomposition approaches. A further alternative would modify the EBA CA regression to disaggregate the NFA regressor by asset class, for instance, separating reserves from the rest of the NFA, net debt from net equity, or foreign-currency from domestic-currency positions (see Allen and others 2022). While these decompositions are informative about the composition of balance sheets and their correlation with the CA, they do not address the normative inconsistency: under any such decomposition, lagged NFA still enters the norm, so past excess CA imbalances continue to feed into subsequent CA norms.

“Policy-gap-only” norm sequences. A further proposal would restrict the norm sequence to the identified policy-gap component of the CA gap, excluding the residual. This would, however, introduce a second and inconsistent definition of “excess” within the same EBA exercise. The interpretation of residuals in EBA, both in EBA and previous versions of CGER, builds on the notion that the model captures the key fundamentals, and therefore there is a presumption that residuals reflect mainly (country-specific) distortions not explicitly captured. While staff acknowledge that model misspecification is possible, maintaining two different measures of excess CA imbalances within a single assessment framework would not be advisable.

Dropping the NFA. The most direct response to the normative inconsistency is to drop the lagged NFA from the EBA regression. This would eliminate the normative inconsistency at its source, but at considerable cost: the framework would lose its main channel for capturing slow-moving steady-state fundamentals (demographics, structural asset demand, and other unobservables) whose cumulative effects are reflected in the NFA position. Moreover, there are strong theoretical reasons to include NFA as discussed in Anne Box 1.6.1.

1.6.7. Concluding Remarks

The increasing contribution of past CA imbalances, through the lagged NFA, in determining the CA norm has become a material concern for the EBA exercise. Left unaddressed, this feedback loop means subsequent CA norms will increasingly embed past excesses. The adjusted NFA methodology proposed in this note breaks this loop by stripping out past excesses from contributing to the CA norm, while leaving the broader EBA framework unchanged. Staff’s view is that the benefits of eliminating this normative inconsistency outweigh the implementation costs. The resulting revisions to CA gaps are on average comparable to those stemming from other EBA methodology revisions and concentrated in persistent surplus and deficit economies. It is important to reiterate that the adjusted NFA methodology does not derive a normative NFA level, and staff policy advice will not focus on closing the difference between actual and adjusted NFA. The focus of external sector assessments will remain on the CA norm, which now includes an adjusted NFA contribution rather than a contribution from observed NFA.

Online Annex Box 1.6.1. Motivation for Including the NFA in the EBA Regression

This online annex box outlines the rationale for including NFA in the EBA framework. It shows that there is solid ground for its inclusion with a positive coefficient, because it captures a slow-moving steady-state relationship.

The Steady-State Relationship. We start from the steady-state relationship between the current account and net foreign assets. From the law of motion of the NFA ratio, stabilizing the NFA-to-GDP ratio requires:^{1,2,3}

$$ca_{i,t}^{ss} = (g_{i,t}^{ss} + \pi_{i,t}^{ss}) nfa_{i,t}^{ss} \quad (1)$$

where $g_{i,t}^{ss}$ denotes real GDP growth, $\pi_{i,t}^{ss}$ denotes inflation, and superscript ss denotes steady-state values. As usual, the steady state can be long run, but can also be thought of as the level of the current account and NFA where things would settle in the absence of new shocks.

A key limitation of this equation is that we don't observe the terms on the right-hand side. However, the steady-state NFA, in turn, is a function of structural fundamentals, as well as "steady-state" policies will determine the level of this steady-state NFA. Assume we can write:

$$nfa_{i,t}^{ss} = nfa^{ss}(F_{i,t}^{ss}, X_{i,t}^{ss}, P_{i,t}^{ss}) \quad (2)$$

Where F^{ss} denotes steady state observable structural fundamentals (demographics, productivity), X^{ss} denotes unobservable fundamentals, and P^{ss} denotes policy variables. Suppose the steady-state current account can be represented with the following equation (ignoring constants):

$$ca_{i,t}^{ss} = \lambda F_{i,t}^{ss} + \gamma P_{i,t}^{ss} + u_{i,t}^{ss} \quad (3)$$

This specification is incomplete. The error term $u_{i,t}^{ss}$ contains the unobservable fundamentals X^{ss} , but also the observable drivers F (such as demographics, or structural drivers of demand for assets and supply of assets) that are not directly observable at their "steady-state" values.

One option for estimating this equation would be to lump the "steady-state policies" into the error term too and use actual structural drivers $F_{i,t}$ as regressors. But that may give a very poor fit of the "steady-state" current account since there are a lot of omitted variables and moreover it is not the correct F that is on the right-hand side.

NFA as a proxy for unobservable fundamentals. The NFA provides a solution. From equation (1), if we had some proxy $nfa_{i,t}^p$ for $nfa_{i,t}^{ss}$, we should also include it in the regression.⁴ The regression we would like to run is now:

$$ca_{i,t}^{ss} = \lambda F_{i,t}^{ss} + \gamma P_{i,t}^{ss} + \phi nfa_{i,t}^p + u_{i,t}^{ss} \quad (4)$$

¹ The law of motion of the NFA is given by: $NFA_{i,t} = NFA_{i,t-1} + CA_{i,t}$. Dividing by GDP, and rearranging, and at steady state we get $ca_{i,t}^{ss} = (g_{i,t}^{ss} + \pi_{i,t}^{ss}) / (1 + g_{i,t}^{ss} + \pi_{i,t}^{ss}) \times nfa_{i,t}^{ss}$.

² There are time subscripts on all the "steady-state" variables because they may be time-varying. For instance, the process of financial and trade globalization would lower transaction costs and allow for changes in external wealth to GDP or current accounts to GDP ratios that would occur slowly over time. For an application of this, see Gourinchas and Rey (2007), where the intertemporal budget constraint is log-linearized around a slow-moving trend relation (itself satisfying an intertemporal relationship).

³ However, the relationship has the opposite sign for the trade balance (as long as the effective return is larger than the growth rate, $r_i > g_i + \pi_i$) as net exports is given by: $nx_i^* = (g_i + \pi_i - r_i) \times nfa_i^*$.

⁴ If it is a perfect proxy (meaning, equal to $nfa_{i,t}^{ss}$), it would be a summary statistic for $ca_{i,t}^{ss}$, rendering the other variables redundant. However, the NFA is only an imperfect proxy, thus, conditional on F^{ss} and P^{ss} , NFA summarizes the unobservable X^{ss} —it is not a sufficient statistic for the entire steady-state CA, which is why F and P remain in the regression.

Online Annex Box 1.6.1. (continued)

From steady state to observables. The next step is to realize that we are not in steady state and that the CA may well differ from its steady-state value for perfectly desirable reasons. Some of these reasons are cyclical. Others are that desirable policies may not be equal to steady-state policies ($P \neq P^{ss}$). For instance, it may be desirable for a country to run an expansionary fiscal policy in the short run and a contractionary one in the medium run. Yet others are that structural drivers may differ from their steady-state version, i.e., $F \neq F^{ss}$.

Suppose, however, that the deviation of the current account from its steady state can be represented as a function of the cyclical drivers, and the deviation of structural and policies from their steady state. That is, posit:

$$ca_{i,t} - ca_{i,t}^{ss} = \beta C_{i,t} + \lambda(F_{i,t} - F_{i,t}^{ss}) + \gamma(P_{i,t} - P_{i,t}^{ss}) + u_{i,t}^{dev} \quad (5)$$

where $C_{i,t}$ denotes cyclical variables (output gap, commodity prices) that are zero in steady state and $u_{i,t}^{dev}$ is the error term.

Replacing equation (4) into equation (5), the unobservable F^{ss} and P^{ss} terms cancel out, yielding an equation with observables:

$$ca_{i,t} = \beta C_{i,t} + \lambda F_{i,t} + \gamma P_{i,t} + \phi nfa_{i,t}^p + u_{i,t}^{ss} + u_{i,t}^{dev} \quad (6)$$

This is our EBA equation (see equation 1 in the main text). But now, $nfa_{i,t}^p$ has a clear interpretation in terms of the steady-state CA. The question then becomes what is a good proxy for $nfa_{i,t}^{ss}$.

Income source. A common misconception is that the positive relationship between the current account and NFA in steady state reflects the fact that creditor countries receive positive net investment income. This partial equilibrium intuition is misleading. The steady-state condition linking the CA and the NFA does not contain the interest rate r , i.e., the return on foreign assets is irrelevant for this relationship (equation 1). The equation is purely a stock-flow accounting identity required to stabilize the NFA ratio in a growing economy: a country must run a current account surplus proportional to its NFA position simply to prevent the ratio from being diluted by GDP growth. From a macroeconomic perspective, the source of income—whether from labor or capital, domestic or foreign—does not matter. What matters is how much of total income is saved relative to investment. A creditor country could in principle earn zero returns on its foreign assets and still need to run a current account surplus to maintain its NFA ratio, just as a debtor country with large income payments abroad would need to run deficits. The trade balance equation is where returns enter, precisely because it must adjust to offset net investment income while keeping the current account at its steady-state level.

1.7. Re-Evaluating the Role of Trade Barriers using A Gravity Estimation Approach

This section constructs comprehensive measures of trade barriers to evaluate their impact on the External Balance Assessment (EBA) model. It estimates directional bilateral barriers using a gravity approach, aggregating them into country-level measures. The analysis finds that trade barriers have statistically significant effects on the current account, which, however, are economically modest and lack robustness. Complementary analysis finds that the effect of direct trade policy measures, such as import tariffs, on the current account is not statistically different from zero. Important challenges remain in establishing the relationship between trade barriers and the current account, including endogeneity concerns, the persistence of trade barrier shifts, and the heterogeneous impacts of granular policies.

1.7.1. Methodology and Data

Direct measures of trade barriers for goods and services that are exhaustive of all trade distortions, consistent across time, and readily available in comparable form for a large set of countries do not exist. For this reason, this section utilizes an approach that infers bilateral barriers between countries from observed trade patterns using the structure of the widely used gravity model of international trade.³¹ The resulting measure of bilateral trade barriers serves as a catch-all, encompassing all trade distortions (tariffs, non-tariff policy barriers, and non-policy barriers). It can be aggregated across trade partners to obtain a measure of economies' total export barriers and import barriers. The resulting trade-barrier measures are consistent with mainstream trade and macroeconomic models, comparable across countries and over time, and meet most of the data requirements for use within the EBA framework.

Data Sources. The analysis requires bilateral expenditure shares between sample countries covering all economic output (goods and services) from 1980 to the present. Two data sources provide the required coverage: (i) OECD Inter-Country Input-Output tables (ICIO, 2025 edition) spanning 1995–2022 for 48 EBA countries plus an aggregate rest-of-the-world region; (ii) international input-output tables compiled by Johnson and Noguera (2017) covering 1980–1995 for 39 EBA countries plus an aggregate rest-of-the-world region. All non-EBA countries are aggregated into one aggregate synthetic region for estimation purposes.

1.7.2. Estimate Trade Barriers for EBA Countries

This section describes the steps to obtain measures of import and export barriers for EBA countries. The computation proceeds in three steps.

Step 1: Estimation of bilateral trade barriers. Let λ_{ijt} denote country j 's expenditure share on country i output in year t . The first step consists of estimating the following equation:

$$\lambda_{ijt} / \lambda_{jtt} = \exp\{\pi_{it} + \omega_{jt} + \delta_{ij} + \varepsilon_{ijt}\} \quad (19)$$

where π_{it} and ω_{jt} are time-varying importer and exporter fixed effects, and δ_{ij} captures time-invariant bilateral trade drivers (e.g., distance, common land border). Equation (19) is estimated using Poisson Pseudo Maximum Likelihood (Santos Silva and Tenreyro, 2006).

If trade barriers are pairwise asymmetric, this implies that there is a $\hat{\delta}_{it} = \hat{\omega}_{it} + \hat{\pi}_{it} \neq 0$ that captures the extent of trade-barrier asymmetry. The main bilateral trade-barrier measure used throughout this note ($\hat{\tau}_{ijt}^{EK}$) is given by³²:

$$-\theta \ln \hat{\tau}_{ijt}^{EK} = \hat{\delta}_{jt} + \hat{\delta}_{ij} + \hat{\varepsilon}_{ijt} \quad (20)$$

. The analysis identifies trade barriers only up to a constant multiplier, θ , which represents trade elasticity. For presentational purposes, $\theta = 4$ throughout this section.

An alternative approach promoted by Waugh (2010) is to attribute systematic asymmetry in trade barriers to the exporter, which is assumed to enter as an export costs. The resulting bilateral trade barrier measure $\hat{\tau}_{ijt}^W$ is then given by:

$$-\theta \ln \hat{\tau}_{ijt}^W \equiv \hat{\delta}_{it} + \hat{\delta}_{ij} + \hat{\varepsilon}_{ijt} .$$

Online annex 2.6.1 presents the robustness results using this bilateral measure.

³¹ For an overview of the history of the gravity model, its theoretical underpinnings and wide-ranging empirical applications, see Head and Mayer (2014).

³² This follows a convention established in Eaton and Kortum (2002) to attribute any gravity-implied asymmetry in bilateral trade barriers to the importer.

Step 2: Aggregation. Bilateral barriers are aggregated to country-level import and export barrier indices using one-year lagged export and import shares, respectively. The aggregated export and import costs are denoted as

$\hat{\tau}_{it}^{X,EK}$ and $\hat{\tau}_{it}^{M,EK}$ respectively.

Step 3: Multilateral consistency. To facilitate cross-country comparisons and ensure multilateral consistency in EBA regression, barriers are demeaned using GDP weights:

$$\ln \hat{\tau}_{it}^{z,EK} = \ln \hat{\tau}_{it}^{z,EK} - \sum_i y_{it} \ln \hat{\tau}_{it}^{z,EK} \quad (21)$$

where $z \in \{M, X\}$ and y_{it} represents country i 's share in world GDP.

1.7.3. Trade Barriers Validation

This subsection presents tests that the trade barrier measures used throughout the section appropriately reflect known trade hinderances. First, it validates the estimated bilateral trade barriers against bilateral trade policy. Then, it focuses on testing the appropriateness of the aggregate trade barriers.

Validation: Bilateral trade barriers. The estimated bilateral barriers align with previous estimations in the literature. The average trade bilateral barriers for goods equal 1.72 in 1990, consistent with Anderson and van Wincoop (2004) survey estimates of approximately 1.7 for goods in the 1990s.

Gravity-based measures strongly correlate with observable bilateral policy variation. Bilateral barriers correlate significantly with log tariffs (coefficient 0.56–0.59, significant at 1% level), while GATT/WTO membership reduces barriers by 12–13% and EU membership by 17–23% as expected (see Online Annex Table 1.7.1).

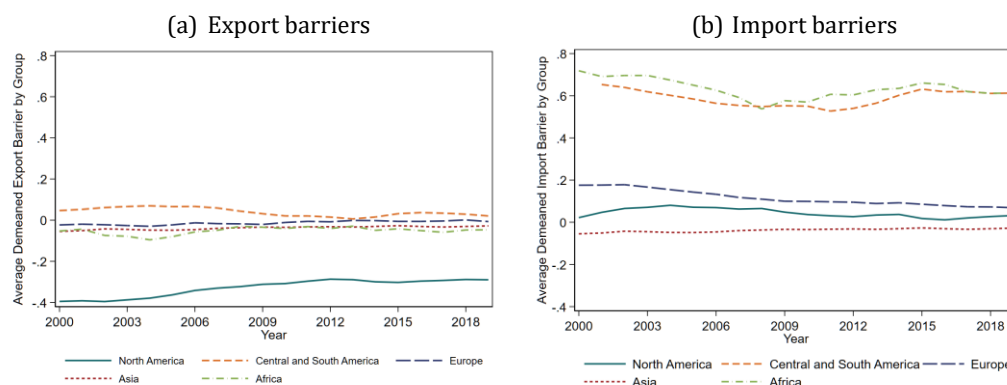
Online Annex Table 1.7.1. Additional Validation: Bilateral Trade Barriers and Trade Policy

Dep. variable:	Bil. trade barriers (goods)			Bil. trade barriers (all)		
	(1)	(2)	(3)	(4)	(5)	(6)
Log tariff	17.25*** (0.12)	0.94*** (0.16)	0.59*** (0.18)	14.01*** (0.11)	0.70*** (0.14)	0.56*** (0.15)
=1 if GATT/WTO			-0.12*** (0.02)			-0.13*** (0.02)
=1 if EU members			-0.23*** (0.01)			-0.17*** (0.01)
R ²	0.27	0.94	0.94	0.23	0.94	0.94
Observations	73,077	73,077	73,077	73,229	73,229	73,229

Note: Standard errors in brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Validation: Aggregate trade barriers. Aggregate trade barriers remain flat for most countries. Online Annex Figure 1.7.1 displays the average demeaned aggregate trade barriers by country groups. The figures show that trade barriers remain broadly constant for most country groups, with the exception of import barriers for North America, Central and South America, and Africa, which show a gradual decline between 2001 and 2008.

Online Annex Figure 1.7.1. Aggregate Trade Barriers by Group



Note: Figure shows average demeaned log trade barriers by country group. Variables are demeaned using GDP-weighted annual averages. Sample restricted to ESR countries.

Two tests are used to validate that aggregate trade barrier measures capture aggregate trade policy and have aggregate relevance:

- I. **Test 1:** Aggregate effective tariffs (defined as customs revenue/total imports) should correlate positively with import barriers. We estimate the following equation to test for this relationship:

$$\Delta_5 \ln \text{Import barrier}_{it} = \beta_1 \Delta_5 \ln(1 + \text{Tariffs})_{it} + e_{it} \quad (22)$$

where $\Delta_5 x_t = x_t - x_{t-5}$ and $\beta_1 \geq 0$ is expected.

- II. **Test 2:** Trade barriers should affect real exchange rates consistent with theory. Import barriers should appreciate real effective exchange rate (REER) while export barriers depreciate it, we test for these relationships by estimating the following equation:

$$\Delta_5 \ln \text{REER}_{it} = \beta_2 \Delta_5 \ln \text{Import barrier}_{it} + \beta_3 \Delta_5 \ln \text{Export barrier}_{it} + \epsilon_{it} \quad (23)$$

where $\text{REER} \equiv EP/P^*$ and $\beta_2 \geq 0$ (appreciation) and $\beta_3 \leq 0$ (depreciation) are expected.

Aggregate trade barriers properly capture trade policy and are macro-relevant. Online Annex Table 1.7.2 confirms both validation tests. For Test 1, five-year changes in import barriers correlate positively with tariff changes, with coefficients of 0.233–0.242 (significant at 1% level) depending on whether large tariff change events or the full sample are used. For Test 2, import barriers appreciate REER (coefficient 0.159–0.203) while export barriers depreciate it (coefficient –0.086 to –0.174), exactly as theory predicts.

Online Annex Table 1.7.2. Aggregate Trade Barriers are Consistent with Tariffs and REER Changes

Test 1: Tariffs and import barriers		
	(1)	(2)
Δ_5 Tariffs	0.242*** (0.117)	0.233*** (0.108)
R ²	0.173	0.147
Observations	835	1,265
Sample	Large tariff changes	All

Test 2: REER and trade barriers		
	(1)	(2)
Δ_5 In Import barrier	0.203*** (0.074)	0.159*** (0.064)
Δ_5 In Export barrier	-0.174*** (0.127)	-0.086*** (0.106)
R ²	0.125	0.067
Observations	663	1,329

Note: Standard errors in brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

1.7.4. Trade Barriers in External Balance Assessment

EBA estimation. The EBA model (vintage 2022) is extended to incorporate demeaned trade costs. Two different specifications are estimated. The first specification uses trade barriers in log levels following a similar approach in previous work on the topic (Boz and others, 2019):

$$CA_{it}/GDP_{it} = 2022EBA + \gamma^X \ln \tilde{\tau}_{it}^{X,EK} + \gamma^M \ln \tilde{\tau}_{it}^{M,EK} + \xi_{it}. \quad (24)$$

The second uses trade barriers in log year-on-year changes:

$$CA_{it}/GDP_{it} = 2022EBA + \gamma^{\Delta X} \Delta \ln \tilde{\tau}_{it}^{X,EK} + \gamma^{\Delta M} \Delta \ln \tilde{\tau}_{it}^{M,EK} + \xi_{it}; \quad (25)$$

where *2022 EBA* denotes all the variables used in EBA model for the 2022 vintage as detailed in Allen and others (2022).

The two estimations capture distinct mechanisms. On one hand, it has been argued that the *levels* of trade barriers can affect the average magnitude of CA balances by strengthening any divergence between national saving and investment (Obstfeld and Rogoff, 2001; Fitzgerald, 2012). The analysis tests this mechanism by estimating equation (24). On the other hand, *changes* in trade barriers may shift saving and investment decisions—and thus the CA—via standard intertemporal channels. The analysis evaluates this second mechanism by estimating equation (25).

EBA results. Online Annex Table 1.7.3 shows that trade barriers do not significantly alter the current account. Although all EBA variables are included, only variables of interest and those with significant coefficient shifts (REER, population growth, and output per worker) are reported. Column (1) shows baseline EBA results. Column (2) performs the same estimation on the restricted sample used for trade barriers. Column (3) presents results for equation (24), while Column (4) excludes all EBA controls. Columns (5), (6), and (7) parallel Columns (2), (3), and (4), substituting levels in trade barriers for annual changes.

The inclusion of trade barriers in log levels or log changes yields statistically significant relationships between trade barriers and the current account. Import barriers in log levels are associated with current account reductions, with coefficients ranging from -0.028 to -0.033 , significant at the 1% level. Export barriers in log levels exhibit positive effects (0.006 to 0.028), but these estimates become statistically indistinguishable from zero controlling for EBA variables. When including trade barriers in log changes instead, the results are significant and positive for both export and import barrier changes. Importantly, despite this lack of sign robustness and economic significance, all cases reject the standard partial equilibrium view whereby export barriers decrease net exports and import barriers increase them.

The economic relevance of trade barriers remains limited despite their statistical significance. By way of example, a 1% increase in the log level of import barriers reduces the CA/GDP ratio by 0.028–0.033 percentage points. Given average annual absolute changes of 2.5% for log import barriers and 1.6% for log export barriers, typical yearly movements imply CA adjustments of only –0.07 and 0.009 percentage points, respectively. Impacts remain modest under extreme scenarios: a unilateral 12 percentage point increase in US tariffs—assuming one-to-one translation into import barriers without retaliation—predicts a decline of only 0.33 percentage points in the US current account. Similarly small numbers are obtained from the regressions with trade barriers in log changes.

Online Annex Table 1.7.3. Trade Barriers in External Balance Assessment

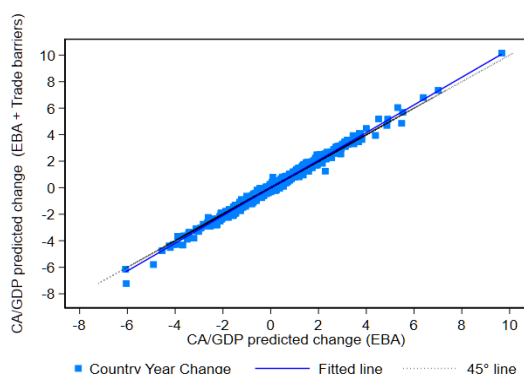
	(1) CA/GDP	(2) CA/GDP	(3) CA/GDP	(4) CA/GDP	(5) CA/GDP	(6) CA/GDP	(7) CA/GDP
Output per worker	0.034*** (0.013)	0.031** (0.014)	0.015 (0.015)		0.032** (0.014)	0.033** (0.014)	
Population growth	-0.581** (0.294)	-0.488 (0.303)	-0.276 (0.313)		-0.504* (0.306)	-0.542* (0.302)	
Δ REER (lagged)	-0.014** (0.006)	-0.012** (0.006)	-0.012** (0.006)		-0.014** (0.006)	-0.010 (0.006)	
Export barriers			0.006 (0.009)	0.028** (0.013)			
Import barriers			-0.028*** (0.007)	-0.033*** (0.007)			
Δ Export barriers						0.061*** (0.021)	0.060*** (0.021)
Δ Import barriers						0.050*** (0.015)	0.034** (0.014)
Constant	-0.006* (0.003)	-0.005 (0.003)	0.003 (0.004)	0.007** (0.003)	-0.005 (0.004)	-0.005 (0.003)	-0.003 (0.003)
R ²	0.505	0.513	0.539	0.115	0.514	0.520	0.004
Observations	1,505	1,404	1,404	1,404	1,379	1,379	1,379
Sample	EBA	EBA & TBs	EBA & TBs	EBA & TBs	EBA & ΔTBs	EBA & ΔTBs	EBA & ΔTBs
Full EBA controls	✓	✓	✓		✓	✓	

Note: All results are based on EBA regression using updated data from 1986 to 2019. Column 1 presents result from standard EBA regression. Column 2 conditions on the EBA sample and estimated trade barriers. Columns 1–3, 5 and 6 include all EBA variables. Column 4 regresses CA over GDP only on trade barriers, using the same sample as Column 2. Standard errors in brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The overall fit of the EBA regressions improves little, suggesting that – to the extent there is a relationship between trade barriers in the current account – it may already be captured by other EBA variables. Comparing Columns (4) and (1) reveal the reduced economic relevance of trade barriers upon inclusion of EBA controls. On their own, trade barriers in log levels account for approximately 11% of observed current account variation. However, conditional on the inclusion of standard EBA controls, increases R^2 by only 2.6 percentage points, from 0.513 to 0.539. This suggests approximately 80% of current account variation explained by trade barriers on their own may be attributable to other variables already incorporated in EBA. Again, similar numbers are obtained from the regressions with trade barriers in log changes.

The inclusion of trade barriers has little impact on the ability of EBA regressions to explain the changes in current accounts. Online Annex Figure 1.7.2 plots the predicted annual change in current account over GDP from the baseline EBA model (without trade barriers), against the EBA model augmented with trade barriers. As the figure shows, including trade barriers does not alter the predicted changes in the CA over GDP in a meaningful way. Online Annex Figure 1.7.2 shows that most data points lie on the 45-degree line, indicating nearly identical predictions across the two models.

Online Annex Figure 1.7.2. Predicted Changes in Current Accounts (percent of GDP)



Note: Figure shows the relationship between predicted CA/GDP changes (in percentage points) for the standard EBA model versus the EBA model extended with trade barriers in levels.

1.7.5. Robustness

The findings are robust to alternative approaches detailed in online boxes:

- I. **Alternative trade barrier estimates and aggregation procedures.** Online Annex Box 1.7.1 presents two sets of robustness. One where any trade barriers bilateral asymmetries are attributed to the exporter instead of the importer. This alternative approach does not change the limited economic relevance, but the sign of estimated coefficients changes. The second set of robustness show that results hold when using counterfactual trade shares for decade-fixed shares.
- II. **Decomposition analysis.** Equivalent results hold when projecting trade barriers against savings and investments over GDP. This can be seen in Online Annex Box 1.7.2, which presents the estimation results of projecting trade barriers onto savings and investment separately.
- III. **Direct tariff measures.** Online Annex Box 1.7.3 details the construction of effective tariff measures. It shows that when trade barriers are replaced by tariffs in EBA, results show an even smaller economic and statical relevance for current accounts.

1.7.6. Conclusion

The analysis finds a statistically significant but economically limited relationship between gravity-based trade barriers and current accounts. The gravity measures successfully capture trade policy variations and correlate with observable barriers, but their limited economic relevance provides insufficient support for incorporation into the EBA framework. These findings align with the findings of a review of the role of trade barriers during a previous round of EBA refinements (Boz and others, 2019), suggesting trade measures based on bilateral gravity estimation remain less important than macroeconomic factors for external balance determination. This section has explored the various options available at this time and documented that the results are economically insignificant and qualitatively non-robust. Given the lack of robustness across methods and the lack of economically relevant improvements to the EBA, it does not seem advisable to incorporate common trade-barrier measures into EBA at this juncture.

The findings highlight several challenges that remain beyond the scope of this annex and present avenues for future analysis. First, the data suggest asymmetric trade barriers, and alternative conventions in the literature assigning them as export or import costs (Eaton and Kortum, 2002; Waugh, 2010) yield markedly different estimates and EBA coefficients. The literature does not yet offer a method to fully estimate these asymmetries in aggregate trade costs separately, which remains an important area for future research. Second, theory implies

that permanent and transitory changes in trade barriers affect the current account differently, warranting efforts to disentangle these components. Third, policies underlying trade barriers—captured jointly in this analysis—may have heterogeneous effects, highlighting the value of using more granular data as it becomes available. Fourth, to the extent that trade barrier measures reflect policy, they are likely endogenous to macroeconomic conditions; addressing this endogeneity is critical to avoid biased estimates of their effects on saving, investment, and the current account.

Online Annex Box 1.7.1. Alternative Aggregation and Identification Assumption

This box presents three robustness results, an alternative identification assumption as well as alternative aggregation methods. Online Annex Box Table 1.7.1a shows when assigning systematic asymmetries in barriers to the exporters, following Waugh (2010). Despite the sign change in estimated coefficients, the economic relevance of trade barriers remains small.

Online Annex Box Table 1.7.1a. Robustness: Alternative Identification Assumption

	(1) CA/GDP	(2) CA/GDP	(3) CA/GDP	(4) CA/GDP	(5) CA/GDP	(6) CA/GDP
Output per worker	0.034*** (0.013)	0.031** (0.014)	0.015 (0.015)	0.012 (0.015)		
Population growth	-0.581** (0.294)	-0.488 (0.303)	-0.276 (0.313)	-0.291 (0.310)		
REER log-change (lag)	-0.014** (0.006)	-0.012** (0.006)	-0.012** (0.006)	-0.012** (0.006)		
Export barriers (EK)			0.006 (0.009)		0.028** (0.013)	
Import barriers (EK)			-0.028*** (0.007)		-0.033*** (0.007)	
Export barriers (WA)				-0.030*** (0.007)		-0.032*** (0.007)
Import barriers (WA)				0.030* (0.017)		0.041** (0.018)
Constant	-0.006* (0.003)	-0.005 (0.003)	0.003 (0.004)	0.004 (0.004)	0.007** (0.003)	0.006* (0.004)
R ²	0.505	0.513	0.539	0.531	0.115	0.083
Observations	1,505	1,404	1,404	1,404	1,404	1,404

Note: All results are based on EBA regression using updated data from 1986 to 2019. Column 1 presents result from standard EBA regression. Column 2 conditions on the EBA sample and estimated trade barriers. Columns 1–3 include all EBA variables. Column 5 and 6 regresses CA over GDP only on trade barriers, using the same sample as Column 2. WA stands for measures using Waugh (2010) assumption on export barriers. Standard errors in brackets. *p < 0.10, ** p < 0.05, ***p < 0.01

Alternative aggregation scheme. Using different weighting schemes, the statistical relevance of export barriers remains, while for imports it is reduced significantly. Online Annex Box Table 1.7.1b presents results when weighting bilateral trade barriers by trade shares fixed at the beginning of each decade.

Online Annex Box 1.7.1. (Continued)

Online Annex Box Table 1.7.1b. Robustness: Decade-Fixed Weights

	(1) CA/GDP	(2) CA/GDP	(3) CA/GDP	(4) CA/GDP	(5) CA/GDP
Output per worker	0.034*** (0.013)	0.031** (0.014)	0.029** (0.014)		0.033** (0.014)
Population growth	-0.581** (0.294)	-0.533* (0.303)	-0.528* (0.302)		-0.502* (0.303)
REER log-change (lag)	-0.014** (0.006)	-0.012** (0.006)	-0.013** (0.006)		-0.012* (0.006)
Export barriers (Decade)			-0.001 (0.003)	-0.004 (0.003)	
Import barriers (Decade)			-0.004 (0.004)	-0.010** (0.004)	
Δ Export barriers (Decade)					0.001 (0.002)
Δ Import barriers (Decade)					0.003 (0.003)
Constant	-0.006* (0.003)	-0.005 (0.003)	-0.001 (0.004)	0.002 (0.004)	-0.005 (0.003)
R ²	0.505	0.515	0.522	0.119	0.516
Observations	1,505	1,410	1,410	1,410	1,388

Note: All results are based on EBA regression using updated data from 1986 to 2019. Column 1 presents result from standard EBA regression. Column 2 conditions on the EBA sample and estimated trade barriers. Columns 1–3, 5 and 6 include all EBA variables. Column 4 regresses CA over GDP only on trade barriers, using the same sample as Column 2. Decade stands for bilateral trade weights fixed at the beginning of each decade. Standard errors in brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Online Annex Box 1.7.2. Savings, Investment.

This box projects estimated trade barriers separately against savings, investment, and net exports over GDP. Online Annex Box Table 1.7.2a shows that a 1% increase in import barriers is associated with a 0.084 percentage point reduction in savings and a 0.054 percentage point reduction in investment, with the larger savings response explaining the negative current account impact. A 1% increase in export barriers is associated with a 0.054 percentage point investment reduction.

Online Annex Box Table 1.7.2a. Trade Barriers, Savings and Investment

	(1) Savings/GDP	(2) Investment/GDP	(3) Savings/GDP	(4) Investment/GDP
Export barriers	-0.022 (0.016)	-0.055*** (0.016)		
Import barriers	-0.084*** (0.008)	-0.054*** (0.008)		
Δ Export barriers			0.028 (0.021)	-0.032 (0.024)
Δ Import barriers			-0.010 (0.014)	-0.043*** (0.016)
Constant	0.257*** (0.004)	0.250*** (0.004)	0.234*** (0.004)	0.237*** (0.003)
R ²	0.390	0.392	0.354	0.389
Observations	1,404	1,404	1,379	1,379

Note: The results in this Table only control the reported variables. Standard errors in brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Online Annex Box 1.7.3. Tariff Analysis

This box analyzes the relevance of tariffs for EBA. Tariffs are defined as government customs revenue over total imports. Government customs revenue is sourced from UNUWIDER, OECD, and WDI.¹ The interaction between tariffs and trade openness is also examined. Trade openness is measured as: $TO = \frac{Exp+Imp}{2GDP}$. Each variable introduced in the regression is demeaned using GDP-weighted averages.

Neither tariffs nor tariffs interacted with trade openness have a significant relationship with current accounts; all coefficients are statistically indistinguishable from zero. Results are shown in Online Annex Box Table 1.7.3a.

Online Annex Box Table 1.7.3a. Tariffs in External Sector Balance Assessment

	(1) CA/GDP	(2) CA/GDP	(3) CA/GDP	(4) CA/GDP	(5) CA/GDP	(6) CA/GDP
Output per worker	0.034*** (0.013)	0.041** (0.019)	0.042** (0.019)		0.026 (0.017)	0.024 (0.017)
Share prime-aged savers	0.152*** (0.056)	0.117 (0.072)	0.113 (0.072)		0.140** (0.069)	0.135** (0.069)
Life expect. x OAD	0.013*** (0.004)	0.011** (0.004)	0.010** (0.004)		0.015*** (0.004)	0.015*** (0.004)
Credit gap	-0.082*** (0.012)	-0.100*** (0.016)	-0.101*** (0.016)		-0.089*** (0.015)	-0.089*** (0.016)
REER log-change (lag)	-0.014** (0.006)	-0.011 (0.008)	-0.011 (0.008)		-0.003 (0.008)	-0.007 (0.008)
Tariffs (lag)		0.000 (0.001)	-0.001 (0.001)	0.001 (0.001)		
Openness (lag)					0.050*** (0.014)	0.062*** (0.020)
Openness × Tariffs (lag)						-0.005 (0.006)
Constant	-0.006* (0.003)	-0.006 (0.004)	-0.006 (0.004)	-0.001 (0.003)	-0.010** (0.004)	-0.010** (0.004)
R ²	0.505	0.561	0.561	0.007	0.585	0.591
Observations	1,505	990	990	990	989	989

Note: All results are based on EBA regression using updated data from 1986 to 2019. Column 1 presents result from standard EBA regression. Column 2 conditions on the EBA sample and estimated trade barriers. Columns 1–3, 5 and 6 include all EBA variables. Column 4 regresses CA over GDP only on tariffs, using the same sample as Column 2. Standard errors in brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

¹ Data from UNU-WIDER is prioritized when available; otherwise, remaining sources are used.

2. 2026 EBA REER-Index and REER-Level Models: Date Update and Extension

Changes to the EBA REER level and index models focus on data update and extension. The REER models have been updated to extend all series from 1990 through 2023, incorporate historical data revisions, and reflect the latest available vintages of periodically updated variables.³³ The updated REER-Index database covers 41 economies over 1990–2023, while the REER-Level database includes 40 economies for the same period. Online Annex Table 2.1.1 reports data sources for variables specific to the REER models. For variables common to both the REER and CA models, data sources and definitions follow those documented in Section

³³ As a separate workstream, staff is planning to review the EBA REER models over the medium term to keep them up to date with the advancements in the literature.

2.1. Alongside the EBA CA model, improvements in the commodities terms-of-trade gap construction were also applied to REER models. Re-estimated model results were examined for robustness to the inclusion of the COVID-19 period and found to be broadly robust.

Online Annex Table 2.1.1. Data Sources

Variables	Sources
REER Index	
Real Effective Exchange Rate	Information Notice System (INS)
Trade Openness	World Economic Outlook
Home Bias	BIS (Debt Securities Statistics)
Real Interest Rates (interacted with capital controls)	International Financial Statistics, World Economic Outlook, Haver, and IMF (Baba and others, forthcoming)
REER Level	
Price Level	International Comparison Program (ICP), released 2020
Ratio of Traded/Non-Traded Sector Productivity	Mano and Castillo (2015), World Bank Development Indicator (WDI) Database
Reserve Currency Status	International Monetary Fund. Currency Composition of Official Foreign Exchange Reserves (COFER)
VAT Revenue	OECD, World Revenue Longitudinal Database (WoRLD), UNU-WIDER, Government Revenue Dataset

Overall, compared with the 2022 EBA models, the sample extension to 2023 has a limited effect on estimated coefficients, with a few notable exceptions (see Online Annex Table 2.1.2). In the REER-Index model, health spending and foreign exchange interventions are no longer significant, primarily due to revisions to historical data. Meanwhile, trade openness variable becomes statistically significant. In the REER-Level model, the coefficient of reserve currency status is no longer significant but remains negative.³⁴ This higher volatility of REER models' estimation results, when compared to the CA model, is an important factor behind their limited use in external sector assessments.

For the majority of EBA countries the data update and extension lead to only limited change in REER gaps. Furthermore, the observed changes in REER gaps are broadly in line with changes reported in the previous EBA REER model refinement round in 2022.

- For the REER-Index model, the data update and extension and coefficient re-estimation result in an average absolute change in REER gaps of about 2.3 percentage points (p.p.) for ESR countries and 4.2 p.p. for non-ESR EBA countries. By comparison, in the 2022 refinement, the data update and coefficient re-estimation led to average absolute changes of 2.9 p.p. for ESR countries and 3.0 p.p. for non-ESR EBA countries.
- For the REER-Level model, data updates/extensions and coefficient re-estimation in the REER-Level specification generate an average absolute change in REER gaps of approximately 4.0 p.p. for ESR countries and 5.8 p.p. for non-ESR EBA countries. By comparison, in the 2022 refinements, the data update and coefficient re-estimation led to average absolute changes of 5.6 p.p. and 8.3 p.p. for ESR countries and non-ESR EBA countries, respectively.

³⁴ Further analysis reveals that these changes in estimation results stem mostly from revisions to historical data series.

Online Annex Table 2.1.2. EBA REER Models

	(1)	(2)	(3)	(4)
	REER Index		REER Level	
	2022 Model 1990-2019	2022 Model (Updated Data) 1990-2023	2022 Model 1990-2019	2022 Model (Updated Data) 1990-2023
Temporary and Cyclical Factors				
Output Gap	0.516**	0.268		
Commodity terms of trade (log, index)	0.160***	0.110**		
Commodity terms of trade, interacted with trade openness			0.054	-0.019
Macroeconomic Fundamentals				
Net foreign asset (NFA) position	-0.105***	-0.101***	0.112***	0.105***
Output per worker	0.241***	0.166***	0.247***	0.203***
Expected GDP growth	3.112***	3.537***	3.308***	3.062**
Financial Home bias (lagged)	0.258***	0.315***		
Reserve currency status (RCS)			-0.174**	-0.076
Traded/Non Traded productivity (log, lagged)			0.180***	0.190***
Structural Fundamentals				
Demographic block				
Old-age dependency ratio (OAD)			0.894***	0.898***
Population growth			9.081***	7.752***
Trade Openness	-0.153	-0.171*	-0.400***	-0.370***
Institutional quality			0.587***	0.779***
VAT revenue, % of GDP			1.209**	1.112**
Policy Variables				
Real interest rates, interacted with capital openness	0.875***	0.781***	1.511***	1.401***
Health spending	1.886**	1.014	3.580***	2.668***
Credit gap	0.099**	0.067*		
FXI, interacted with capital controls	-1.901*	-0.255	-9.290***	-9.889***
Constant	4.447***	4.478***	0.172***	0.127***
Observations	1105	1257	1078	1,227
Adjusted R-squared	0.56	0.52	0.80	0.80
RMSE	0.09	0.10	0.19	0.19
Number of economies	41	41	40	40

Note: *Significant at 10 percent; **significant at 5 percent; ***significant at 1 percent based on heteroskedastic and autocorrelation-consistent standard errors (not shown).

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