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2018 EXTERNAL SECTOR REPORT—REFINEMENTS TO THE EXTERNAL BALANCE ASSESSMENT METHODOLOGY—TECHNICAL SUPPLEMENT

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EXECUTIVE SUMMARY

As is done periodically, the External Balance Assessment (EBA) methodology was refined this year to reflect insights gained since the last (2015) round of changes. The 2018 refinements aimed at providing a stronger, conceptually grounded modelling of the main drivers of current account balances, incorporating advances in the literature and extensive feedback from country authorities. Refinements focused on improving the modeling of certain fundamentals—demographics, the measurement of external positions, and institutional quality—and macroeconomic policies—foreign exchange intervention and credit excesses—in the EBA current account model. Complementary tools were also developed to evaluate the role structural policies could play in explaining excess current account imbalances. The refinements not only placed the model on a stronger conceptual footing, but also improved its overall statistical fit. In this round, the real exchange rate models incorporated the same refinements as the current account model for consistency and comparability, and were estimated with updated data. The EBA model refinements are part of a continuous effort to maintain and improve key tools for rigorous external sector assessments, which will also continue to rely on informed and analytically based country-specific judgment.

I. INTRODUCTION

1. **IMF tools to assess external positions in a multilaterally-consistent fashion have evolved over time.** Initial assessments, based on the Consultative Group on Exchange Rate Issues (CGER) framework, focused on the exchange rates of key advanced economies, although these evolved to include a broader range of measures of a country's external position and wider country coverage. The existing External Balance Assessment (EBA) framework was launched in 2012, with current account and real exchange rate (REER) models that are used as numerical inputs into the external sector assessment conducted by IMF staff. The key innovation of the EBA framework consisted of expanding the set of policy variables, and defining the concept of current account "norms" as current account levels that correspond to policies at their desired levels. The EBA models also helped highlight the role of policy distortions, and introduced an internal collaborative exercise to arrive at multilaterally consistent staff assessments.

2. **Refinements built on insights gained from the use of the EBA framework.** The first refinements to the 2012 EBA methodology were introduced in 2015. These entailed mainly: (1) extending the sample estimation period by three years, (2) seeking to capture the nonlinear effects of demographics, and (3) introducing a new model to understand persistent differences in the *level* of the REER across countries. The experience gained since the 2015 EBA refinements pointed to the need for revisiting the demographic specification, as well as reassessing the modeling of certain fundamentals and policies. In consultation with country teams, country authorities, and experts, extensive work was undertaken to explore these issues, leading to the refinements discussed in this Technical Supplement, presented to the IMF Executive Board on April 9, 2018.[1]

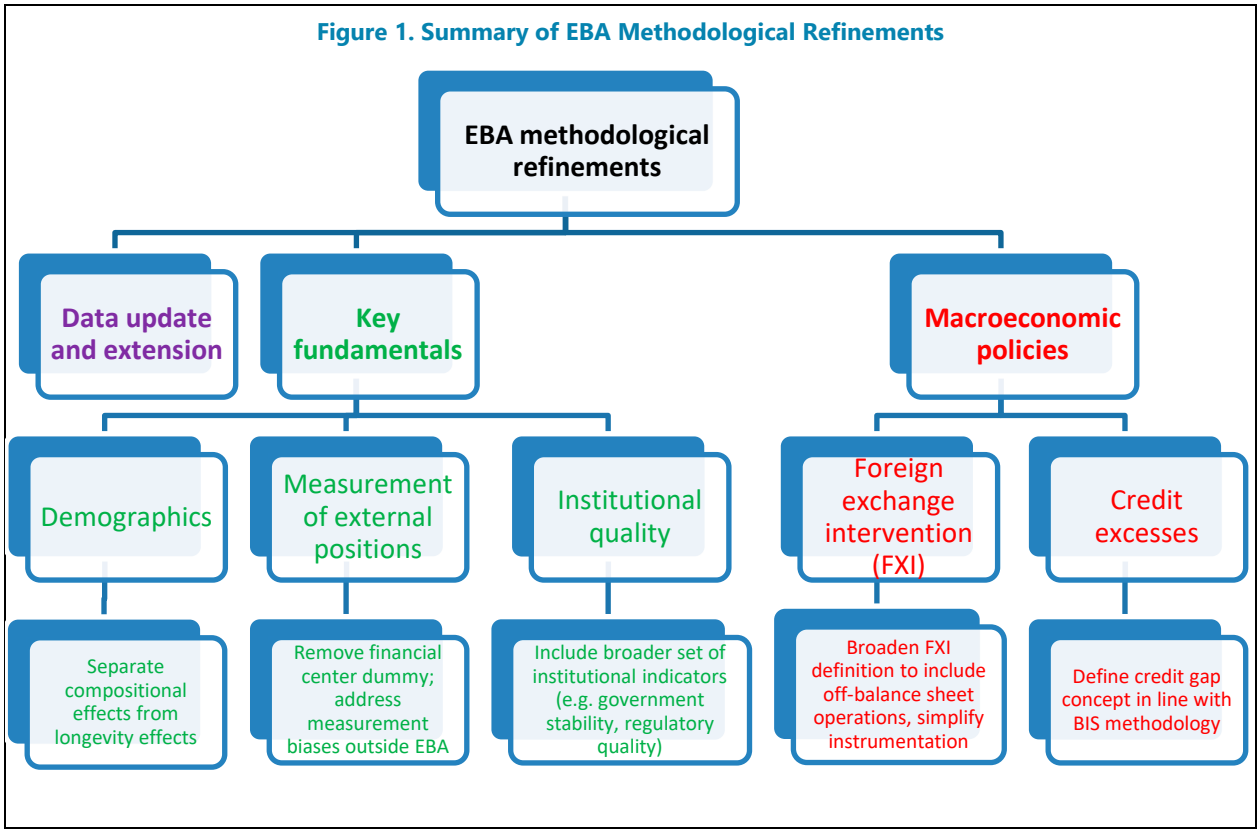
3. **The 2018 methodological refinements focused on providing stronger, conceptually grounded, modeling of the main drivers of current account balances.** While maintaining the structure and logic of the previous EBA framework (as described in detail in IMF 2013), the 2018 refinements focused on improving how the model captured the role of certain fundamentals—demographics, the measurement of external positions, and institutional quality—and macroeconomic policies—foreign exchange intervention and credit excesses. Complementary tools were also developed to shed light on the potential role of structural on excess external imbalances. The refinements focused on the EBA current account model, although similar revisions were adopted by the REER level and index models wherever possible (see paragraph 6). This Technical Supplement to the Overview Paper offers a summary of the refinements and will, subsequently, be complemented by a comprehensive Working Paper.

4. **Overall, the 2018 refinement of EBA methodology can be grouped into four areas (Figure 1):**

[1] There have been numerous interactions with Executive Directors, as well as with authorities and other experts during outreach efforts in Argentina, Belgium (European Commission), China, Germany, Japan, Korea, Spain, Switzerland, Thailand, and the United Kingdom.

(1) *Data update and extension:* As in previous rounds, refinements entailed re-estimating the model with an extended estimation sample (three additional years, to 2016) and revised historical data. These implied some non-trivial changes to the results, including as a result of migration of external statistics data to the IMF's *Balance of Payments Manual,* 6th edition (BPM6) and new demographic estimates and projections (2017 Revision of World Population Prospect). In addition, careful work was undertaken to ensure the consistency in the sources and coverage of the policy variables, especially public health spending and private credit.

Figure 1. Summary of EBA Methodological Refinements



(2) *Modeling of fundamentals:* Refinements in this area focused on improving the modeling of demographics, better accounting for biases in the measurement of the current account, and better measuring the role of institutional and political risk in saving and investment decisions.

- *Demographics:* Changes to the specification addressed concerns related to sharp changes in the demographic contribution to norms in some countries as well as to differences in their contribution across countries with similar demographic characteristics. The new demographic specification disentangles static (or age-compositional) effects from dynamic (or longevity) effects. The set of variables that measure the static effect of the model was expanded to include the current share of prime savers (ages 45–64) as a proportion of the total working-age population (ages 30–64). The dynamic effect is now captured directly by the life expectancy of the current prime-age saver cohort, as well as the interaction of longevity with future old-age dependency to capture the extent to which current savers expect to rely on future workers for their old-age support.

- *Measurement of external balances:* Growing global integration and activities of multinational corporations in recent years have raised questions about the appropriateness of existing measures of external balances, as the attribution of income across countries has become more ambiguous, particularly regarding financial returns on gross foreign assets and liabilities. The previous EBA specifications controlled for these biases by including a financial center dummy, but only for a few ad-hoc cases, and assumed a constant and equal bias for such economies. The refined model excludes this financial center dummy. Instead, measurement issues related to the statistical treatment of financial returns (especially retained earnings on portfolio equity and inflation) are addressed more comprehensively and granularly outside the EBA model through adjustments based on IMF staff estimates of these specific forms of biases, but only when sizable. Given data limitations and estimation uncertainties, the adoption of such outside-the-model adjustors is subject to a careful review process, including to ensure overall multilateral consistency.

- *Institutional and political risk:* Earlier versions of the EBA model used a subset of institutional and political risk indicators from the widely used International Country Risk Guide (ICRG) surveys. IMF staff reassessed the appropriateness of the ICRG as a third-party indicator and whether the subset of indicators (socio-economic conditions, investment profile, corruption, religious tensions, and democratic accountability) properly captured a country's underlying institutional and political risk. After careful conceptual and empirical analysis, the indicator was broadened to include other institutional features, such as government stability, law and order, and bureaucratic quality, that are considered influential in saving and investment decisions. The institutional risk proxy continues to be based on the ICRG survey, which not only has the needed time series coverage, but also yields generally similar results to alternative surveys.

(3) ***The role of macroeconomic policies:*** Refinements related to policy variables focused on better capturing the impact on current account dynamics of *foreign exchange intervention* (FXI) and the financial cycle.

- *Foreign exchange intervention:* The refined model broadens the definition of FXI to encompass off-balance sheet operations (that is, derivatives contracts), which are increasingly being used by countries to complement their spot market interventions. In addition, the instrumentation of FXI has been simplified to mitigate possible overfitting and to capture a small number of variables linked mainly to precautionary motives for reserve accumulation. Where FXI data are not made public, IMF staff estimates are used.

- *Financial cycle (credit excesses):* To better capture the role of the financial cycle in current account dynamics, the refinement adopts a new detrending methodology consistent with that developed by the Bank for International Settlements (BIS). The new specification allows for a more straightforward interpretation of the degree of credit excesses, since it considers the role of financial deepening and other low-frequency movements in credit.

(4) ***The role of structural policies:*** While in theory a country's structural policies should have an important effect on its external position, data limitations prevent their inclusion directly into the EBA

model. Given these constraints, and using publicly available third-party data on structural indicators for a subset of country-years, IMF staff developed tools outside the model to inform the extent to which residuals (that is, the unexplained portion of the current account gap) are associated with distortions in the product market and labor markets. These complementary tools are meant to *provide general guidance* to country desks on the potential role of structural policies in a more systematic and multilaterally consistent fashion. Country-specific insights will remain of essence to properly tailor the structural policy advice.

5. **Apart from improving the model's conceptual basis, the updated and refined EBA current account model is associated with improvements in goodness-of-fit indicators.** Most model coefficients, especially those associated with the refinements, turned out to be statistically significant and with the sign predicted by the conceptual framework. Moreover, the distribution of estimated current account norms is now more closely aligned across countries with similar income and demographic characteristics.

6. **The REER index and level models were also updated, incorporating the refinements of the current account model where applicable.** In 2015, a new REER level model was introduced to explain differences in the level of relative prices across countries. For this round, efforts focused on refinements to the current account model. The general features of the REER models were left broadly unchanged, although for comparability and consistency, changes in modeling of certain fundamentals and policies were also included where applicable. The fit of the updated REER models was generally unchanged, and estimated coefficients were broadly in line with those coming from the current account models.

7. **While EBA model estimates provide a key quantitative input, external sector assessments will continue to rely on informed and analytically based country-specific judgment.** The EBA models provide numerical inputs to IMF country teams to arrive at external sector assessments. In general, since the current account is a less volatile variable than the REER, it is often preferable to base the overall assessment on the EBA current account model, especially when the current account and REER models provide conflicting signals. Moreover, these assessments cannot be based solely on models, given their inevitable limitations when applied across a broad range of countries. Judgment will also be needed, and the overall framework allows for this critical component, provided it is well grounded and transparently explained**.**

8. **This round of methodological refinements represents a step forward in delivering a more reliable assessment tool, but this is not the last step.** Lessons will continue to be drawn from model implementation, as well as from discussions with country authorities and academic research.

II. DATA UPDATE AND EXTENSION

9. **As in previous rounds, refinements entailed extending the estimation sample by three years to 2016.** Historical data were also updated, resulting in some non-trivial changes, partly because of the migration of external statistics data to BPM6 and new demographic estimates and projections (2017 Revision of World Population Prospect). In addition, work was undertaken to ensure the consistency in the sources and coverage of the policy variables, especially public health spending and private credit. On

the latter, a more consistent measure of private credit across countries, based on BIS data (available for all but 10 of the 49 EBA countries), was adopted which corrects for breaks in the series and covers both banks and nonbank financial institutions (see Annex I).[2]

III. STRENGTHENING THE MODELING OF KEY FUNDAMENTALS

A. Demographics

10. **Background and motivation:** Drawing from the standard life cycle model, the 2015 EBA model specification captured the nonlinear effects of demographics on the current account with four variables: population growth, old-age dependency ratio (OADR), and two interactions of the old-age dependency ratio with aging speed (which is defined as the expected 20-year-ahead *change* in the OADR). However, the specification, while empirically significant, turned out to be associated with large increases in current account norms for some countries over a short period, contradicting the presumed slow-moving evolution of demographics and its contribution to aggregate savings. The specification also implied difficult-to-reconcile differences in the demographic contribution of countries with similar demographic characteristics. A key shortcoming came from the interpretation of the aging speed variable, which confounded very different forces in one indicator, including changes in longevity, cumulative fertility changes, and variations in cohort sizes.

11. **Refinement objectives:** The new demographic specification seeks to better disentangle the different relationships between demographics and savings. The refinements were guided by a multicountry overlapping generations model embedding the relevant demographic forces and are informed by the latest academic research on the relationship between demographics and savings and international capital flows.[3] Structural models of the demographic transition commonly focus on two key drivers of recent demographic trends: (1) age composition (the static effect), driven mostly by declining fertility rates, and (2) increasing old-age survival risk (the dynamic effect), the key driver of household savings in quantitative models.[4] However, the literature suggests a variety of indicators to proxy for these effects. The age composition has been often been measured by the OADR, although some papers have proposed a polynomial approximation to represent the entire age structure (Higgins, 1998). Meanwhile, old-age survival risk has been measured directly by estimating age-specific life expectancy (Lisack, Sajedi, and Thwaites et al. 2017), although some have also used the speed of aging as a proxy (Lane and Milesi-Ferretti, 2011; European Commission, 2017).

[2] In addition, new benchmark estimates for public health spending are based on updated and revised data. These benchmarks which are used for setting desirable levels, do not affect the estimation of the model.

[3] For example, see Brooks (2003); Domeij and Floden (2006); Backus, Cooley, and Henriksen et al (2014); Eugeni (2015); and Bárány, Coeurdacier, and Guibaud (2016). Further details will be included in a forthcoming IMF Working Paper (Dao and Jones).

[4] See Auerbach and Kotlikoff (1987); Eggertsson, Mehrotra, and Robbins (2017); and Lisack, Sajedi, and Thwaites (2017).

Table 1. Comparison of Demographics Specifications

	2015 EBA	Refined 2018 EBA
Static Effects	• Old age dependency (OAD) ratio (ages 65+/30-64) • Population growth	• OAD (ages 65+/30-64) • Population growth • Current share of prime savers (ages 45-64) as a proportion of the total working-age population (ages 30-64)
Dynamic Effects	• Interaction of relative aging speed (20-year ahead change in OAD) with current OAD • Interaction of relative current OAD with aging speed.	• Life expectancy of a current prime-aged saver • Interaction of life expectancy with future old-age dependency.

12. **The new demographic specification:** Guided by these studies, direct measures for static and dynamic effects were used. Table 1 shows how the demographic variables compare between the earlier (2015) and new specifications.

- The **static effect**, captured in the earlier specification by the contemporaneous old-age dependency ratio (ages 65+/30–64) and population growth, has been expanded to include the current share of prime savers (ages 45–64) as a proportion of the total working-age population (ages 30–64). The idea is to capture the relative differences in the demographic transition across countries that go beyond the old-age dependency, while also recognizing that the 45–64 age cohort typically has the highest saving rates. The latter is a direct result of the life cycle model and the hump-shaped earnings and savings profiles—so that a higher share of prime-age savers should imply a higher aggregate saving rate (see theoretical underpinnings in, for example, Lisack, Sajedi, and Thwaites 2017; and Jones 2018 and empirical support in, for example, Lane and Milesi-Ferretti, 2001).

- The **dynamic effect** is now captured by the life expectancy of a current prime-aged saver, such that countries with longer longevity and retirement spans save more, as predicted by the standard lifecycle hypothesis. An interaction between life expectancy and future old-age dependency is also included to capture the notion that workers save more when they expect to live longer, but also when they expect to be able to rely to a lesser extent on future generations for support.[5] While the future age composition captures, to some extent, the sustainability of public pension systems, understanding the role of pension systems remains an area for future work, as data limitations and

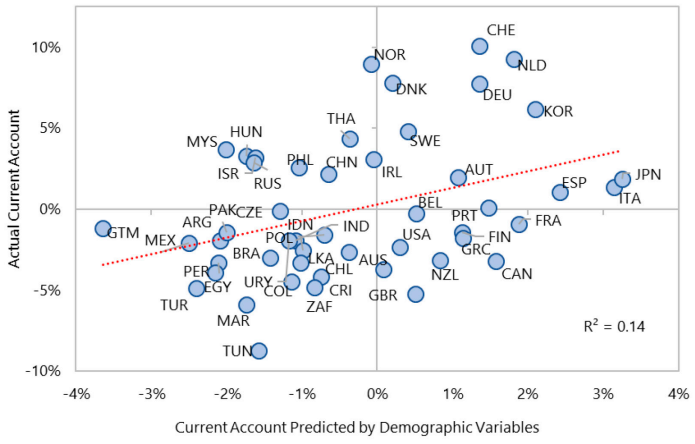
[5] For a few EBA countries that are clear outliers in terms of low life expectancy and high adult mortality, consideration is being given to shifting down by 5 years the age-cohorts defining the working age population, prime-aged savers and old age dependency when computing the demographic contribution to their current account norms.

(continued)

conceptual complexities currently constrain a more explicit modelling of these aspects of the EBA framework.[6]

13. **Results and implications:** The refined demographic specification shows statistically significant coefficients, with expected signs, for variables that capture both static and dynamic effects.[7] In particular, the life expectancy term and its interaction capture the non-linearities observed in the reduced-form relationship between life expectancy and the current account balance (negative slope for low life expectancy emerging market and developing economies, turning positive for advanced economies facing unfavorable old-age support ratios). In addition, the combined impact of the demographic variables is economically significant, and can explain about 15 percent of the cross-country variation in current accounts over the past five years (Figure 2).[8] Furthermore, across the sample, the new demographic specification explains a larger fraction of the unexplained component of the current account, after accounting for the non-demographic regressors in the EBA model.[9] Importantly, the refinements lead to a more stable and intuitive interpretation of the demographic contribution to the current account norm across countries—relatively younger countries with larger shares of prime age savers, and countries with longer retirement life spans, have correspondingly larger increases in the demographic contributions to their norms, consistent with theory.

Figure 2. EBA Countries: Actual versus Predicted Current Account,2012-16 Average (*Percent of GDP*)



Source: IMF staff estimates.

Notes: The horizontal axis denotes the current account level predicted by the regression model with the new demographic specification (and an intercept). Values on both axis are averaged over the 2012-16 period for each country.

[6] Work on this area would build on the forthcoming IMF Staff Discussion Note "The Future of Saving: The Role of Pension System Design in an Aging World."

[7] See Section V and Table 4. Among the demographic variables, only the old-age dependency ratio is not significant, but with the correct sign, as was also the case for the 2013 and 2015 EBA current account models.

[8] This magnitude is consistent with the literature, in which demographic forces generated by calibrated structural models explain between 13 and 27 percent of current account variation across major advanced economies, depending on the time period considered (see Domeij and Floden, 2006; see also Brooks, 2003; Backus, Cooley, and Henriksen, 2014).

[9] This involved comparing under the 2015 and the 2018 EBA models, the R^2 from a regression of the mean residual of the EBA model without demographics on the mean residual predicted by the demographic variables. The R^2 rises from 0.05 under the previous model to 0.13 under the new model, indicating that across the sample, the new demographic specification explains more of the residual variation in the current account.

(continued)

B. Measurement of External Positions

14. **Background and motivation:** Increasing financial and trade integration and the growing role of multinational corporations have blurred the boundaries between residents and non-residents, and the corresponding attribution of income across countries. This can cause mismeasurement of external positions that vary by country and over time. [10] The relevant economic concept of external positions for countries' external assessments is their residents saving minus domestic spending on capital formation, or the saving-investment imbalance. The fraction that residents save that is not spent on capital formation must be lent to, and spent by, nonresidents. By the same token, domestic spending on capital formation that exceeds saving must be borrowed from abroad. Measured in real terms and on an ultimate-owner basis, this concept of the saving-investment imbalance gives an indication of countries' real contributions to world demand and accumulation of external wealth, and is therefore also an indicator of potential sustainability problems.

15. **Sources of mismeasurement (or definitional differences):** International statistical standards (BPM6), however, record the *accrued nominal income arising from a transaction.*[11] This means that returns on cross-border financial investments that do not give rise to a transaction or are not based on a contractual agreement, are not recorded in the income balance, even if they are considered part of the income generated on an investment. Such returns are instead reflected in valuation changes in foreign assets and liabilities.[12] These definitional differences can entail different attributions of income across countries. Two forms of definitional differences are particularly prominent:

- **Retained earnings on equity investments:** The income from equity investments is not always attributed to the ultimate owner.[13] The nominal return on equity consists of total nominal earnings plus any increase in the equity price beyond these earnings.[14] The former is considered income and the latter valuation changes. The statistical treatment of earnings, however, is different between direct and portfolio investment and not always attributed to the ultimate owner. For portfolio equity, the portion of the return that is paid out as dividends is recorded as income in the current account income balance while retained earnings are not. Instead, they are reflected in international investment position (IIP) valuation changes. Conversely, in the case of foreign direct investment, under the BPM6 definition, retained earnings are considered part of a formal agreement for

[10] An illustrative example is the impact of the recent large transfer of intangible and internationally-mobile capital assets by a multinational company on Ireland's key economic statistics. Their recording in national accounts and balance of payments statistics has led to an inflated picture of Ireland's true economic performance. See Ireland's 2017 IMF Staff Report (IMF Country Report 17/171).

[11] Obstfeld (1986) notes that measured income balances and hence current accounts do not include investment returns related to valuation, thus making the current account in certain circumstances less fit as a measure of saving-investment imbalances.

[12] The focus on *accrued* income also means that changes in the market value of assets that are not linked to contemporaneously generated income are not recorded as income of the asset owner.

[13] See also Mancini and Stoffels (2012) and Lane (2015 and 2017).

[14] These additional equity price increases, in turn, consist of nominal inflation, and other real equity price changes.

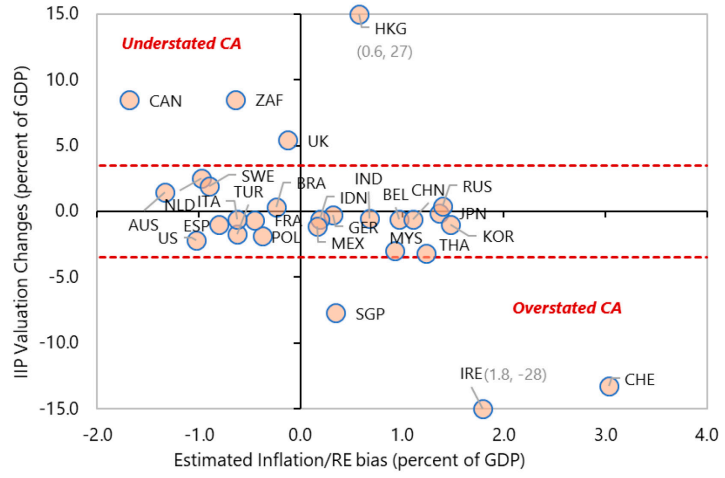
(continued)

remuneration on the investment, and hence are recorded as income. From an economic perspective, however, retained earnings can be considered income in both cases.

- **Inflation component in interest income:** Investment income is recorded in nominal terms. While this is consistent with the treatment of other forms of income in the balance of payments, it entails a departure from the economic notion of real income (and real accumulation of external wealth in this case). This issue is well recognized in national accounting, and has received recent attention also in the context of the recording of income on international assets, as discussed by Fletcher (forthcoming) as well as Mian and Saure (2018).[15] Specifically, the nominal return on debt assets reflects the real interest rate and inflation according to the Fisher equation. Higher nominal interest payments due to inflation are recorded as a positive income stream for the creditor, and as a negative income stream for the debtor. However, the associated (anticipated) erosion in the real value of debt caused by inflation (and the related nominal foreign currency depreciation) is not recorded as income and instead leads to IIP valuation changes.

16. **Earlier limitations in the treatment of measurement issues:** Earlier versions of the EBA did not address measurement issues consistently across countries. A financial center dummy was used to capture persistent measurement biases for a few economies, which were more susceptible to these measurement biases than other countries due to their large gross foreign investment positions (Figure 3). In addition, in the process of conducting external assessments, country teams have proposed country-specific adjustors for measurement issues. The underlying assumption in the financial center dummy—that biases have a similar direction (sign) and magnitude over time, and that they are present for only a few economies—was too restrictive. The sign and size of measurement biases vary with many factors, including with net equity and debt positions, inflation differentials, differences in dividend policies, and so on, which are not uniform across time and countries. Some of these cross-country differences were addressed in the 2015 *External Sector Report* framework by applying adjustors for measurement outside the EBA model, although there was scope to enhance the consistency in their estimation and application across countries.

Figure 3. ESR Economies: Estimates of IIP Valuation Changes and Measurement Biases, 2012-16 Average *(Percent of GDP)*



Sources: Lane and Milesi-Ferretti 2017 data set; IMF, *World Economic Outlook*; and IMF staff estimates.

[15] The inflation bias of interest income on debt is well recognized in national accounting. See, for example, Jump (1980), Vanoli (1999) and Hill and Hill (2003). Similarly, the inflation content in the current account income balance was also previously studied by Freedman (1979).

Technical Supplement Box 1. Methodology for Estimating Measurement Biases

This box describes the methodologies for estimating biases in the measurement of retained earnings on portfolio equity and income from fixed income instruments.

Estimating the bias from excluding retained earnings. Retained earnings on portfolio equity are not recorded in the income balance. These components of income can be proxied or estimated from stock positions and financial market data. The methodology used assumes that the portfolio breakdown of stocks included in cross-border portfolio equity investments is similar to the national average reflected in national stock market data. Three different approaches are considered, given data limitations and uncertainties about some key assumptions:

- **A flow approach** relies on recorded income streams on foreign portfolio equity positions to reflect distributed dividends. Using stock market data on dividend yields and price earnings ratios by country allows for computation of an estimate of total earnings and, in turn, retained earnings as a residual. Specifically, the dividend-yield and price-earnings (PE) ratios are applied to the recorded investment income on portfolio equity assets (iA^{PEQ}) and liabilities (iL^{PEQ}) to obtain an estimate of the unrecorded retained earnings in country j:

$$RE_j = re_W * iA_j^{PEQ} - re_j * iL_j^{PEQ}$$

  in which $re_j = 1/(dividend\_yield_j \times PE\_ratio_j) - 1$ and re_W is the world average *re* weighted by the bilateral asset portfolio equity exposures of country j vis-à-vis each other country.

- **A stock approach** relies on gross portfolio investment positions and stock market data on PE ratios to provide an estimate of total earnings. Multiplying outstanding foreign portfolio equity positions by stock market data on the dividend yield gives an estimate of distributed dividends. The difference between these two estimates provides an estimate of retained earnings. Specifically, the dividend yield and the PE ratio are applied to portfolio equity asset (A^{PEQ}) and liability (L^{PEQ}) stock positions according to:

$$RE'_j = rep_W * A_j^{PEQ} - rep_j * L_j^{PEQ}$$

  in which $rep_j = (1/PE\_ratio_j) - dividend\_yield_j$, and rep_W is defined in the same way as re_W above.

- **A hybrid approach** relies on international portfolio equity income flows to capture distributed dividends, while international portfolio stock positions and financial market data on PE ratios provide estimates of total earnings. The difference between these two measures reflects retained earnings. Specifically, average PE ratio data are applied to portfolio equity asset and liability positions, and investment income is netted out:

$$RE_j'' = (A_j^{PEQ}/PE\_ratio_W) - (L_j^{PEQ}/PE\_ratio_j) - (iA_j^{PEQ} - iL_j^{PEQ})$$

  The advantage of this approach is that it takes maximum advantage of observed data on external income and stock positions, thereby minimizing the reliance on stock market data. The drawback is that the estimates of earnings and distributed dividends rely on different sources, and may hence be less consistent.

Key results (See Figure 1.TS.1). Estimates on retained earnings bias are, on average, small for most economies, although they range from an underestimation of the "economic concept" income of 6 percent of GDP to an overestimation of income of 1 percent of GDP. The three approaches generally point in the same direction, with only a few exceptions (for the latter, particular caution in the application of adjustments will be necessary).

Estimating inflation bias. Income is recorded in nominal terms, departing from the relevant economic notion of real income. The nominal return on debt assets (i^D) reflects the real interest rate (r) and inflation (π) according to the Fisher equation, $i^D = r + \pi$. Higher nominal interest payments due to inflation are recorded as a positive income stream for the creditor, and as a negative income stream for the debtor. However, the associated (anticipated) erosion in the real value of debt associated with inflation (and the related nominal foreign currency depreciation) is not recorded as income and leads instead to IIP valuation changes. The inflation bias can be estimated using data on inflation rates and currency composition of international debt positions.[1] Country *j*'s bias can be computed as the expected inflation rate associated with each currency *i* (π_i) times country *j*'s net debt position in each currency *i* (NFA^D_{ij}):

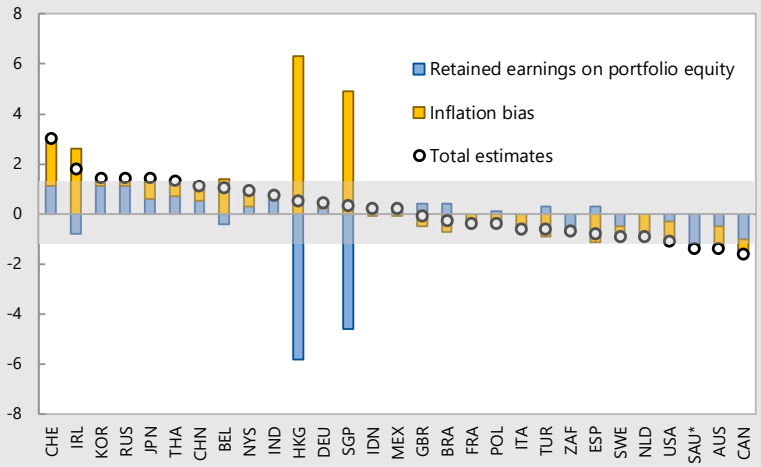
$$\pi\text{-income}_j = \Sigma_i \, \pi_i \times NFA^D_{ij}$$

Data on currency weights in international debt positions from alternative sources are used to divide net international debt positions by currency. When available, data from country authorities are used, otherwise estimates provided by Benetrix and Lane (2015) are used.[2] Expected inflation is approximated by either *realized* inflation or the five-year ahead *consensus forecast* inflation. Since both measures are subject to error, an average of the estimates based on these two inflation measures is used.[3]

Technical Supplement Box 1. Methodology for Estimating Measurement Biases (concluded)

Results (See Figure 1.TS.1). Estimates for the inflation bias are generally small, and range from about 6 percent of GDP (indicating that standard statistics overestimate the economic concept of the income balance—balancing out the underestimation due to retained earnings) to about –1 percent (indicating an underestimation of the income balance). For most economies, the estimates based on the two different inflation measures point in the same direction and with little discrepancy.

Figure 1.TS.1. Estimates of Retained Earnings on Portfolio and Inflation Bias, 2012-16 Average [1/]



Sources: IMF Staff Calculation.
1/ Countries sorted by the sum of estimates of retained earnings on portfolio equity and inflation

[1] Debt positions include reserves and money-market mutual fund positions. The latter are added ex-post as they are recorded as equity positions in balance of payments data. However, disaggregated money-market data are available for a limited number of economies, with a visible difference only for Ireland.

[2] The weights provided in Benetrix and Lane (2015) have been updated only until 2012. For country estimates relying on these, constant currency weights since 2012 are assumed.

[3] Consistently with the estimates for retained earnings, the inflation distortion is presented in five-year moving averages. There is less year-to-year noise in the estimates for inflation income, however.

17. **A new approach to deal with measurement issues**: The refinements entailed removing the financial center dummy from the EBA current account model, and including outside adjustors for measurement issues, when empirical estimates consistently point to sizable biases. To implement this refinement, IMF staff will produce consistent and comparable country-specific estimates of (1) specific biases due to retained earnings and inflation distortions, and (2) general biases related the systematic and persistent differences between a country's financial account and changes in its IIP. The biases related to retained earnings on portfolio equity would be estimated from stock positions and financial market data, while those related to inflation biases would be estimated using data on inflation rates and currency composition of international debt positions (see Technical Supplement Box 1 for more details). Given uncertainties related to data limitations and the need to rely on simplifying assumptions, measurement adjustments will initially only be considered only for countries where IIP valuation issues are large and persistent and granular estimates of inflation and retained earnings biases point in the same direction.

18. **Results and implications:** IMF staff estimates, based on data over the past five years, suggest that adjustments for measurement would be applicable only to a few economies—where current account

balances may be *overstated* (Ireland, Singapore, Switzerland), or *understated* (Canada, Hong Kong SAR, South Africa, United Kingdom). The precise size of the adjustment would be determined on a case by case basis, taking into account that the net foreign asset (NFA) coefficient in the EBA model already partially captures these measurement biases.

C. Institutional and Political Risk

19. **Background and motivation:** In line with the vast literature that supports the notion that the quality of institutions influences the ability of countries to finance current account deficits (see Chinn and Ito 2007; Gruber and Kamin 2007; Legg, Prasad, and Robinson 2007; Cheung, Furceri, and Rusticelli 2013; and Alfaro, Kalemli-Ozcan, and Volosovych 2008), the EBA model includes a proxy for institutional quality or risk. However, questions were raised over the appropriateness of the *International Country Risk* Guide (ICRG) survey as a third-party indicator, as well as whether the indicator used in the model was sufficiently broad to capture all relevant aspects of institutions and political risks.[16] Earlier versions of the model excluded indicators, such as government stability, law and order, and bureaucratic quality, that were generally considered important in linking institutional quality to saving and investment decisions, on grounds that each of them independently was not statistically significant (IMF 2013).

20. **Refinement objectives:** The refinements examined the adequacy of the institutional proxy on several dimensions**.** First, the appropriateness of the ICRG as a third-party indicator was assessed, and compared against the widely-used Worldwide Governance Indicators (WGI), compiled by staff from the World Bank, the Natural Resource Governance Institute, and the Brookings Institution, based on more than 30 surveys of companies, citizens and experts**.** Second, a fresh conceptual and empirical look was taken at the set of indicators generally considered important in linking institutional quality to saving and investment decisions.

21. **Summary of refinements:** IMF staff opted to keep the ICRG based institutional risk indicator, and to expand the set of sub-indicators to include other variables known to affect the current account.

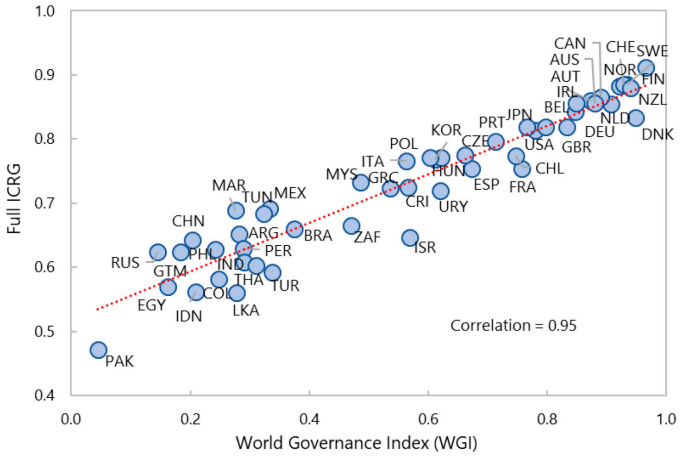
- **Appropriateness of the third-party indicator:** Like the ICRG, the annual WGI indicator includes multiple dimensions of governance—voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption (Table 2). Not surprisingly, both indicators showed very similar cross-country institutional quality rankings, which are highly correlated with income per capita (Figure 4). IMF staff explored the option of basing the institutional quality index on WGI data, although given that reliable cross-country data are only available only starting in 2002, alternative ways were considered of merging both indicators.[17]

[16] The IMF has recently documented a range of third-party indicators that are typically available to provide perspectives on governance in any given country (IMF 2017b). In line with the principles for best practice, an important caveat to this exercise is that governance concepts are difficult to measure using any kind of data. Perception-based indicators like the ICRG can change from year to year without fully reflecting changes in the fundamentals of a country.

[17] These included using WGI from 2002 and pre-2002 ICRG; and using WGI from 2002 and basing pre-2002 WGI on the ICRG/WGI relationship during 2002–16.

IMF staff also studied the option of combining the WGI and ICRG indicators, which delivered statistically significant coefficients and results that were robust to different alternatives for merging the indicators. Since combining the ICRG and WGI measures leads to similar results, IMF staff opted to keep the ICRG-based indicator and to use the WGI for robustness of estimates.

Figure 4. EBA Countries: Comparing Institutional Indices, Full ICRG versus WGI, 2002-16 Average



Sources: IMF staff estimates, PRSG, World Bank. (0: Lowest; 1: Highest)

- **A broader view on institutional risk:** Factors such as government stability, law and order, and bureaucratic quality, which were excluded from the earlier EBA models, are conceptually important components of a country's overall institutional environment, and are typically used by others in the literature. For example, Gruber and Kamin (2007) find that regulatory quality and rule of law were important determinants of US current account dynamics. Moreover, further empirical investigation found that after updating and extending the EBA sample series to 2016, some of the previously-excluded sub-indices (for example government stability, military in politics) were individually statistically significant, with most other indices having the expected sign. The analysis led IMF staff to base the index on the full set of sub-indices.

Table 2. EBA Comparing Institutional Subindicators, ICRG versus WGI

ICRG	WGI
· Democratic accountability	· Voice and accountability
· Corruption	· Political stability
· Socioeconomic conditions	· Government effectiveness
· Investment profile	· Regulatory quality
· Religious tensions	· Rule of law
· Government stability	· Control of corruption
· Internal conflict	
· External conflict	
· Military in politics	
· Law and order	
· Ethnic tensions	
· Bureaucratic quality	

Source: Third-Party Indicators Digest, 2017.
Note: Indicators in red refer to those excluded in the previous EBA specification.

22. **Results and implications:** The refined institutional proxy did not affect the fit of the model—yielding the same level of statistically significant root mean squared errors (see Section V and Table 4). However, the new indicator affected some current account norms. In particular, norms are lower in emerging market and developing economies where government stability and law and order are relatively strong (see discussion in Section V).

IV. IMPROVING THE MODELING OF POLICIES

A. Foreign Exchange Intervention

23. **Background and motivation:** If capital is imperfectly mobile, foreign exchange interventions (FXI) should affect nominal and real exchange rates and therefore the current account. To capture this, the EBA model includes as a regressor the FXI/GDP ratio, interacted with a measure of capital controls. In the previous versions of EBA, depending on data availability, FXI was measured as the change in the stock of reserves in US dollars, or the net reserves flow from the balance of payments statistics, while the degree of capital mobility is based on the Quinn's index of capital controls (ranging from full mobility at 0, to no mobility at 1). However, a growing number of countries are complementing their spot market FXI operations with the use of derivatives contracts, which have been found to have comparable effects to on-balance-sheet operations (see IMF 2014; and Nedeljkovic and Saborowski 2017). Moreover, recent research has found that FXI has, in general, a larger effect on the REER and the current account than that estimated by the EBA model, suggesting that the instrumentation of FXI may have been associated with a downward bias in the estimated effect (see also IMF 2013).[18]

24. **The FXI refinements:** Revisions were made to the definition and the instrumentation of FXI:

(1) **A broader definition of FXI** was adopted, encompassing comparable operations in derivative markets. Derivatives include aggregate short and long positions in forwards and futures in foreign currencies vis-à-vis the domestic currency (including the forward leg of currency swaps), and financial instruments denominated in foreign currency but settled by other means (for example, in domestic currency), as reported in the *International Reserves and Foreign Currency Liquidity Template*. This broader measure of FXI builds on the notion that on- and off-balance sheet interventions have similar effects on exchange rates and current accounts.[19] The on-balance sheet component can be proxied by balance of payments reserves flows (changes in stocks are used only when flow data are not available, which is uncommon).[20]

(2) **A simpler instrumentation**, with a more limited number of variables (three), is now used to facilitate interpretation, avoid possible over-fitting in the first stage of the regression, and deliver more stable second-stage regression coefficients. These instruments include: (a) a measure of *global accumulation of reserves*, capturing what is known in the reserve accumulation literature as the "keeping-up with-the-Joneses" effect, or the desire of countries to maintain FX liquidity (for precautionary motives)

[18] For related empirical studies, see Adler, Lisack, and Mano (2015); Blanchard, Adler, and de Carvalho Filho (2015); Bayoumi, Gagnon, and Saborowski (2015); and Gagnon (2012, 2013).

[19] Derivatives and spot market interventions may not have comparable effects when there are meaningful risks of non-convertibility (in the case of instruments settled in local currency), or tightening of capital controls; or when derivatives are of very short maturity.

[20] While this measure still includes interest income on reserves, this component is typically small and stable over time. More importantly, the latter are largely uncorrelated with the country's exchange rate and current account, and as such should not lead to biases in the estimated coefficient.

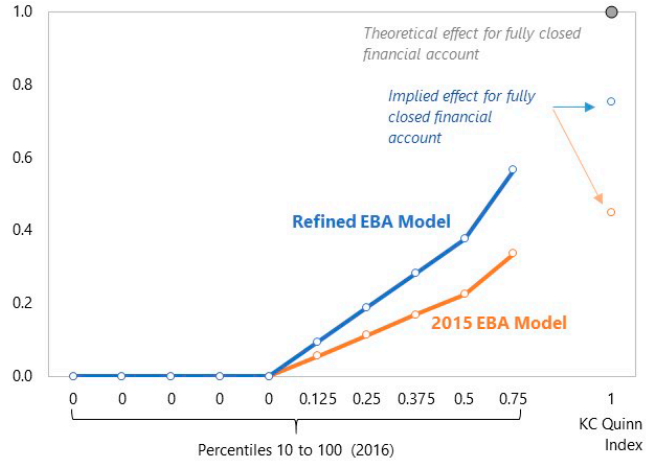
(continued)

at par with peer emerging market countries (excluding own reserve accumulation for each country),[21] (b) a measure *of reserve adequacy linked to M2*, which is defined as (M2-reserves)/GDP relative to the average emerging market group; and (c) an emerging market and developing economy dummy, in line with Bayoumi, Gagon and Saborowski (2015), to capture the tendency of emerging markets and developing economies to accumulate reserves as part of their export-led growth strategies.

25. **Results and implications:** The estimated effect of FXI under the refined model is larger than in previous EBA estimations, and more in line with theoretical predictions and other recent empirical studies (Figure 5 and Section V, Table 4). The regression coefficient suggests that a 1 percent of GDP FXI leads to a 0.19 percent of GDP increase in the current account for a country in the 75th percentile of the EBA distribution of the Quinn index of capital controls (compared to 0.11 under the earlier specification) and 0.38 for a country at the 90th percentile (compared to 0.22).

26. **Defining desired policy levels for FXI:** For consistency with the broader definition of FXI flows, off-balance-sheet positions should be taken into account when assessing the adequacy of FX stocks and thus the desirability of FXI operations from a precautionary point of view. Over the medium term, countries would be expected to hold a level of reserves (plus the comparable off-balance-sheet FX position) that is deemed adequate from a precautionary viewpoint, thus requiring no additional accumulation (beyond small amounts to sustain such adequate level of FX liquidity). That is, the desirable FXI over the medium-term should be zero ($P^* = 0$). In exceptional circumstances, if countries are not expected to reach adequate reserves over the medium-term, a non-zero desirable level could be set, provided it is accompanied by a clear justification.[22] Deviations from the medium-term desirable level (that is, $P - P^*$) would not necessarily be interpreted as a distortion. In fact, FXI policy gaps may be appropriate if they are an adequate response to current conditions (for example, to cope with large capital inflows under the conditions set forth in the IMF's Institutional View on Managing Capital Flows) or the necessary temporary, build-up of reserves to reach an adequate level of reserves over the medium-term.

Figure 5. EBA Countries: Marginal Effect of FXI on the Current Account by Capital Account Openness *(Percent of GDP)*



Source: IMF staff estimates and calculations.

[21] See, for example, Cheung and Qian (2009) and Cheung and Sengupta (2011).

[22] This formulation aligns more closely with those of other policy variables. For capital controls, in most cases, the benchmark level that is suggested as desirable for the medium term is either the contemporaneous cross-country average level of the controls index, or a country's actual level, whichever is the smaller, as indicated in IMF (2013b).

(continued)

B. Private Credit

27. **Background and motivation:** To capture the role of financial excesses, previous versions of the model included the private sector credit-to-GDP ratio (relative to its historical average) as an explanatory variable. This follows a large body of research that shows that the current account deteriorates and the REER appreciates in countries that experience credit booms, with the opposite occurring during credit busts.[23] However, this financial indicator had several shortcomings. For one, there is substantial variation in the coverage of financial intermediation institutions across countries and the indicator lacked a systematic treatment of breaks that are common in credit series.[24] In addition, the *demeaned* credit series did not adequately isolate the financial cycle nor recognize the existence of low-frequency drivers, including financial deepening. As a result, large and permanent deviations of credit from their historical average were estimated in countries experiencing trend changes in the credit-to-GDP ratio. Such deviations are not necessarily related to financial excesses.

28. **Data and methodological refinements:** Refinements focused on improving both the coverage and consistency of credit data, as well as the modeling of financial excesses.

- **Data upgrades:** Refinements involved constructing a comprehensive and consistent measure of credit to the private sector. For most countries in the EBA sample, the BIS is now the main data source, given efforts made over the years to address breaks in the credit series and compile a comprehensive and consistent measure of credit across countries (BIS, 2013).[25] To capture only the "resident" component of credit from banks and nonbank intermediaries to the nonfinancial private sector, the *cross-border banking flows to the domestic non-bank sector* (which come from the BIS "Locational Banking Statistics") are subtracted from the BIS aggregate credit measure. This is necessary since credit provided by nonresidents is also recorded in the financial account.[26]

- **A new proxy for financial excesses:** A new credit gap measure is used, consistent with advances in the literature and the new methodology developed by the BIS (Drehmann, Borio, and Tsatsaronis, 2011). Specifically, a one-sided Hodrick-Prescott (HP) filter is applied to the credit-to-GDP ratio with a large penalty parameter that takes into account the fact that financial cycles have longer duration

[23] See Dell'Ariccia and others (2012); Mendoza and Terrones (2012); and Landerretche, Gourinchas, and Valdés (2001).

[24] More specifically, the World Bank's *World Development Indicators* (WDI) use credit to the private sector from the IMF's *International Financial Statistics* (IFS). In some cases, the WDI obtain this series from the Financial Survey, which includes depository corporations and nonbank financial institutions, while in other cases the data source is the Banking Survey, which excludes nonbank financial institutions. The WDI also does not systematically correct for breaks in the series for euro area countries in the years around the adoption of the euro.

[25] The WDI private credit series is used in the 10 (out of the 49) EBA countries without BIS data (Costa Rica, Egypt, Guatemala, Morocco, Pakistan, Peru, Philippines, Sri Lanka, Tunisia, Uruguay). Meanwhile, for the few countries for which BIS data does not cover the full sample period (Brazil, Colombia, Hungary, Israel, Poland, and Russia), the BIS series is extended by splicing the data backwards using the WDI series (see Annex I).

[26] In the case of Ireland, the BIS series for bank credit to the private nonfinancial sector is used instead, because using the BIS total credit series minus cross-border banking flows produced non-intuitive results given Ireland's recent boom-and-bust cycle.

(continued)

than real business cycles.[27] Meanwhile, applying a one-sided filter avoids revisions to the estimated gaps from the use of real-time data. IMF staff credit gaps estimates are generally consistent with those published by the BIS, with small differences reflecting data and methodological differences (that is, the BIS credit measure includes cross-border banking flows, and the HP-filter is applied to quarterly rather than annual data, see Table 3). Technical Supplement Box 2 provides an example of the implications of applying the new methodology for identifying credit excesses.

29. **Implications for the current account model:** Results imply that a 10 percent of GDP increase in credit relative to its trend would be associated with a 1 percent of GDP deterioration in the current account (see Section V, Table 4). This estimated effect is highly significant and symmetric along the financial cycle. Moreover, given improvements in the modeling of financial excesses, the relationship between the fiscal balance and the current account is somewhat weaker under the new specification, since the effect is now party captured by the credit gap variable.[28] This result is consistent with the new literature suggesting that the financial cycle accentuates the procyclicality of fiscal policy.[29] Robustness was also evaluated, which involved replacing the new credit gap measure with the current and lagged credit-to-GDP changes. The fit of the alternative specification turned out to be very similar to the revised credit gap specification, although it would be unclear conceptually how to go about defining the desired credit growth level.

30. **Defining desired credit gap levels:** Under the new credit gap specification, deviations from the estimated trend will be deemed as unwarranted, as the starting point will be to set the desired credit gap level to zero. This means that in the refined model, and unlike in the 2015 model, credit does not generally have an impact on the current account norms. However, adjustments can be considered if the credit gap estimate does not provide an accurate picture of financial imbalances. This might be warranted in countries that are experiencing financial deepening (where the gap measure may be overstating financial imbalances by understating the long-term trend).[30] Adjustments can also be considered in countries experiencing a credit bust (where the credit-to-GDP ratio is either not expected to return to pre-crisis levels or will recover only over a protracted period).[31]

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[27] The BIS suggests a penalty parameter (that is, "lambda") of 400,000 for quarterly data. Ravn and Uhlig (2002) suggest dividing the quarterly value by 4^4 to obtain its annual frequency counterpart. This results in a penalty parameter of 1600 for annual data, which is higher than the value of 100 typically assumed with the HP-filter in real business cycle analysis. In a few countries with data limitations (China, Czech Republic and Russia), a two-sided HP filter was applied to estimate the credit gap in the initial years of the sample.

[28] The coefficient of the fiscal balance fell from 0.47 to 0.33, bringing it closer to the value estimated in the original 2013 EBA model (see Section V and Table 4).

[29] See Borio, Lombardi and Zampolli (2016) and Benetrix and Lane (2015). The intuition is that during periods of buoyant credit and/or high asset prices government revenues rise (beyond the business cycle) and the fiscal balance improves. The opposite holds true during credit busts.

[30] This would require justifying why the pace of financial deepening is healthy, rather than on an unsustainable trajectory. Since distinguishing between "good" and "bad" credit booms in real time is difficult, erring on the safe side would generally be recommended.

[31] In certain situations, such as in the aftermath of a prolonged period of excessive credit growth, the BIS credit gap could be biased downwards (see ECB 2017 for a discussion), and adjustments to the estimated credit gap would be

(continued)

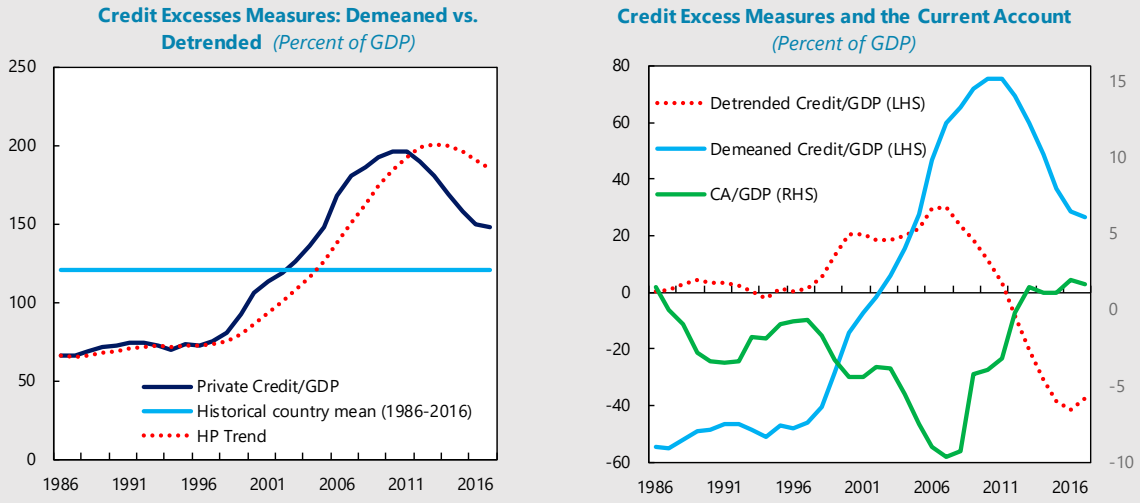
Technical Supplement Box 2. Measuring the Effect of the Credit Cycle on the Current Account

Using a country example, this box examines the implications of the refinements in the modeling of financial excesses, comparing them with the previous specification.

Measurement of credit gaps: How financial excesses are measured could lead to different conclusions on their role in driving external balances. Take for example an actual country that has undergone both a period of financial deepening and a full boom-and-bust cycle. Applying the previous EBA credit gap concept, which involved demeaning the data with the historical average, would suggest that the country had large negative gaps in the first half of the sample and large positive gaps towards the end of the sample, even after a large credit bust. In contrast, applying the new filtering methodology, which allows for both the removal of the low-frequency movements (related to structural changes in credit markets or other factors) and the identification of the financial cycle component, would suggest small credit gaps in the early part of the sample, the emergence of a positive gap during the boom and negative gaps following the post-global-financial-crisis bust.

Relationship with the current account: The relationship between demeaned credit and the current account is weak (with a correlation of –0.26 over the entire series), as the turning points of both series are not always aligned. In particular, while the current account deficit started narrowing in 2007, the demeaned credit shows a declining pattern only after 2011. Meanwhile, the new detrended measure displays a striking negative correlation (-0.85), and can capture the turning points in the current account over different cycles. While other countries in the EBA sample have different credit cycles and their relationship with the current account varies, a general pattern can be found: while the correlation between the current account and the demeaned credit series is –0.01, it decreases to –0.30 with the new credit gap measure. These findings suggest that the new credit gap measure is able to better capture the well-known negative effects that credit excesses have on a country's current account balances.

Figure 1.TS.2. Sample Country: Comparing Implications of Credit Excess Specifications



Sources: BIS, World Economic Outlook and IMF Staff calculations.

justifiable. In addition, large and negative credit gaps are highly persistent. The experience prior to the global financial crisis suggests that large negative credit gaps (in excess of 30 percent of GDP at the trough of the cycle) close only by half in 5 years and do not fully close even after 10 years. Where negative credit gaps exceed 20 percent of GDP, consideration could also be given to setting the "desired" detrended credit level such that half of the gap is closed in the medium term.

V. EBA CURRENT ACCOUNT MODEL: CONSOLIDATED RESULTS

31. **The methodological refinements offer a more theoretically-grounded specification, while improving the overall fit (Table 4)**.

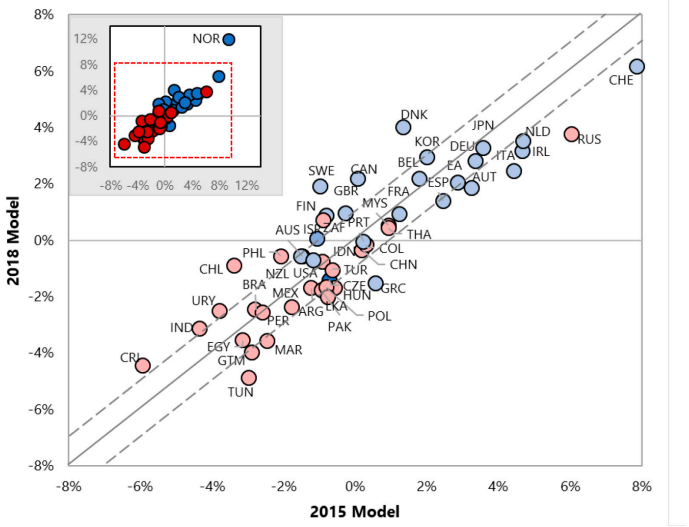
- **Model fit:** The goodness of fit improves with respect to the 2015 model with updated data, with the *R*-squared rising by about 10 percent (from 0.49 to 0.55). The root mean squared error declined by 6 percent (from 3.3 to 3.1 percent). This improvement is sizeable, especially since the exclusion of the financial center dummy in the refined model in itself worsened the model's fit.

- **Parameter estimates:** The coefficients of the regressors of the new model largely coincide with economic priors and are statistically significant in most cases. The refined demographic specification shows statistically significant coefficients, with expected signs, for variables that capture both static and dynamic effects. As discussed earlier, changes in size of the coefficients are also generally consistent with findings in the literature.: (1) the smaller fiscal coefficient is consistent with the growing literature suggesting that financial cycles accentuate the procyclicality of fiscal policy and the sample of advanced economies; (2) the larger coefficient for FXI is more in line with that of recent studies suggesting that the intervention can have meaningful medium-term effects on imbalances; and (3) the higher coefficient on the NFA variables, resulting from the exclusion of the financial center dummy variable, is consistent with the view that this stock position is partly capturing biases in the measurement of the current account.[32] Finally, global uncertainty variables (proxied by the Chicago Board Options Volatility Index (VIX) are no longer significant following the extension of the sample period.

[32] As discussed in IMF (2006, 2013) this coefficient captures a confluence of factors, including underlying solvency constraints as well as the effect of the NFA position on the income balance. Disentangling such factors remains a methodological challenge and an area for future work.

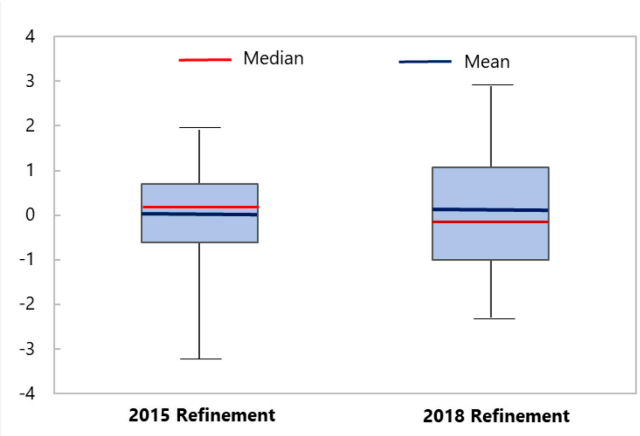
32. **The refined model resulted in generally small changes in EBA estimated current account norms, with some exceptions** (Tables 5–8 provide a breakdown of the contributions to country-specific norms under the previous and refined specification). The distribution of current account norms does not vary significantly relative to the previous specification, with richer economies that are also more advanced in their demographic transition continuing to post higher current account norms (Figure 6). The refinements, however, led to a distribution of norms that is now more closely aligned across countries with similar income and demographic characteristics (for example, Denmark, Finland and Sweden, which had low or negative norms under the previous specification, now show much higher and positive norms that are comparable to their advanced economy peers). Changes in current account norms, however, were large in a few cases, reflecting a series of factors, including: (1) the new approach for considering measurement biases, in which exclusion of the financial center dummy led to lower "estimated" norms for the Netherlands and Switzerland; (2) refinements to the demographics specification, where disentangling static and dynamic effects led to downward revisions in the contribution of demographics in some cases (Germany, Italy, Spain), and upward revisions in others (China, Denmark, Finland, Sweden); (3) changes in the modeling of credit, which led to higher norms in some cases (Denmark, Sweden, the Netherlands); and (4) broadening the set of institutional indicators (that is, to include the role of political stability), which led to an upward reassessment of some countries' (China, Thailand) ability to borrow externally to meet investment needs. The overall size and distribution of revisions to the norms were similar to the refinements adopted in the past (where only the demographic specification was altered),

Figure 6. Comparison of EBA Estimated Current Account Norms for 2017, Previous versus New Model *(Percent of GDP)*



Source: IMF staff estimates.
Note: Blue dots refer to advanced economies; red and pink dots refer to emerging market and developing economies.

Figure 7. Distribution of Current Account Norm Changes, 2015 versus 2018 Refinements [1/]



Source: IMF staff estimates.
1/ Box limits denote 25th and 75th percentiles.

although the dispersion this round was naturally somewhat higher (Figure 7).[33] That said, changes in numerical inputs, do not necessarily translate into changes in *staff-assessed* current account norms. In fact, and as discussed earlier, some of the refinements are necessarily associated with outside-the-model adjustments, for either measurement biases (Switzerland) or special demographic features (South Africa and Indonesia).

VI. COMPLEMENTARY TOOLS: THE ROLE OF STRUCTURAL POLICIES

33. **Background and motivation:** Publicly available data sources on structural policies currently lack the proper time or cross-country coverage to assess their implications directly in the EBA model. In light of these constraints, available data for a subset of countries and years were used to examine the relationship between the estimated unexplained residuals from the EBA current account model, which are large in some cases, and structural features in product and labor markets. The results help shed light on the potential effects structural policies could have on the current account in a multilaterally-consistent manner, which are qualitatively in line with estimates in the literature. That said, IMF staff assessments and policy recommendations in the structural area should continue to be informed by and tailored according to country-specific insights and analysis.

34. **Conceptual framework:** There are several channels through which product and labor market policies affect the current account (Obstfeld and Rogoff, 2006; Cacciatore and others 2016a, 2016b). The relationship between structural policies and the current account is complex, operating through at least three channels:

- *Productivity channel*. Changes in structural policies increase investment opportunities, resource availability, and productivity levels.[34] These reforms improve the current account if consumption rises less than income, and if the productivity gains are concentrated in the tradables sector. [35]
- *Price-competitiveness channel*. Reforms that reduce rigidities in labor and goods markets affect the current account through its effects on price-competitiveness. On the one hand, increased labor market flexibility can lower labor costs and boost competitiveness by allowing firms to adjust labor inputs more easily, and by reducing the bargaining power of the employed. On the other hand, more product market flexibility, reduces the price-setting power of firms, but it may have an inflationary

[33] The GDP-weighted average change in norms was similar to that of the 2015 refinements.

[34] Reforms to product and labor market regulations often lead to temporary increases in productivity growth and permanent gains in productivity levels. See Obstfeld and Rogoff (1996) and Aguiar and Gopinath (2007) for a discussion of the effects on the current account of temporary and permanent changes in productivity growth rates.

[35] Obstfeld and Rogoff (2006) show how higher productivity growth can reduce global imbalances. However, their results depend on which country (deficit or surplus) and sector (tradable or non-tradable sector) benefits from the productivity improvement. Fournier and Koske (2010) show that productivity-enhancing reforms in the tradable sector unambiguously lead to a weakening of the current account, while structural reforms that boost productivity in the nontradables sector may or may not improve the current account, depending on consumers' preferences.

general equilibrium effect—stemming from an increase in investment and labor demand by new entrant firms— which may hurt competitiveness.

- *Uncertainty channel*. Structural reforms affect precautionary savings and the current account through their effects on the degree of uncertainty faced by households and firms. For households, the relationship is ambiguous and depends on the implemented reform. For example, reduced employment protection increases the probability of dismissal—which raises households' precautionary saving—but it also reduces the expected length of unemployment spells—which decreases households' precautionary saving. For firms, reforms that reduce uncertainty would lower saving and raise investment (see Ghosh and Ostry, 1997).

35. **Empirical approach:** Available Organisation for Economic Co-operation and Development (OECD) and World Economic Forum (WEF) structural indicators for a subset of country-years were used to examine their relationship with the estimated unexplained residual from the EBA current account model.[36] The analysis identifies the extent to which unexplained current account gaps are associated with deviations of product or labor market regulations from best-practices or the frontier. The normative assessment is focused on identifying policies that help reduce both domestic structural gaps and excess current account imbalances, assuming that structural distortions in the rest of the world, on average, remain unchanged. Specifically, a country's distance to a particular structural benchmark is estimated relative to the world's average distance to the same benchmark.

36. **Summary of findings:** The results suggest that removing some types of business entry barriers can reduce the current account balance, while addressing certain labor market rigidities would do the opposite (Table 9). The baseline analysis uses OECD data for which empirical findings are more robust and for which there is a better conceptual understanding of their effects. The variables selected include (1) barriers to entrepreneurship in the form of *licenses and permits system regulations* (LPS) for product market regulations; and (2) the strictness of *employment protection laws* (EPLs) related to severance pay regulations and regulations on temporary labor contracts. In line with the related empirical literature, the results indicate that reducing burdens in LPS can lower the current account as investment by new firms rises and their additional demand for labor puts upward pressure on wages, reducing competitiveness. Meanwhile, addressing certain labor market rigidities by easing EPLs can improve the current account as labor costs decline, boosting competitiveness.[37] Since OECD variables are available for only 24 economies, the analysis for the remaining EBA countries relies on WEF indicators of de-facto product and labor market rigidities, which are available for all EBA countries but only for the past 10 years.

[36] OECD indicators are survey-based measures of hard data on product and labor market regulations. Additional information can be found at http://www.oecd.org/eco/growth/indicatorsofproductmarketregulationhomepage.htm http://www.oecd.org/els/emp/oecdindicatorsofemploymentprotection.htm. The WEF product market indicator relies on the World Bank Doing Business survey on the number of procedures required to start a business. Further details about the methodology employed and the assumptions made to compute this indicator, are available at http://www.doingbusiness.org/methodologysurveys/ The WEF labor market indicator is a survey-based measure, of firms' opinions about the degree of cooperation in labor employer relations. Additional information can be found here http://reports.weforum.org/global-competitiveness-index-2017-2018/downloads/

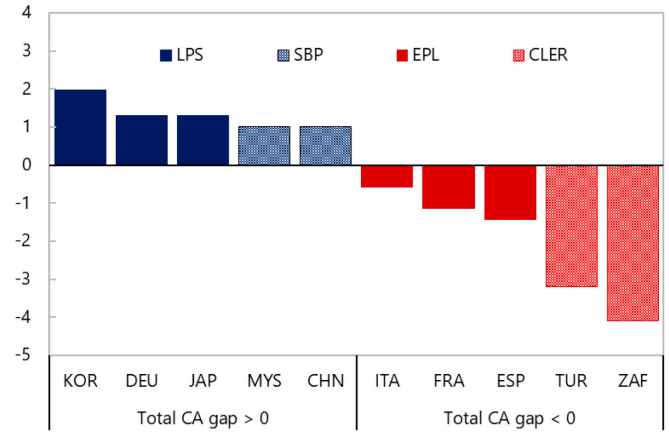
[37] These results confirm those of the existing empirical literature. See Jaumotte and Sodsriwiboon (2010); Cheung, Furceri, and Rusticelli (2013); IMF (2017); Culiuc and Kyobe (2017); and Kerdrain, Koske, and Wanner (2010).

(continued)

Comparable results hold for WEF indicators, signaling that the current account balance falls with a reduction in procedures to start a business (SBP), yet improves with better *cooperation in labor-employer relations*. Better cooperation in labor-employer relations is correlated with policies that increase labor market flexibility, including reductions to the strictness of EPLs, but also increased public spending on active labor market policies.[38]

37. **Operational implications:** These empirical findings are being used as a complementary tool by country teams to shed further light on the unexplained residuals and in the process help guide policy discussions. With a focus on policies that could help achieve the dual goal of reducing domestic structural distortions as well as current account imbalances, product market regulations were found to help explain the positive residuals in key economies—such as Germany, Japan and Korea— while distortions in labor markets explain negative residuals — including in France, Italy, and South Africa (see Figure 8). These complementary tools serve as guidance, by using the results from indicators that are available for an important subsample of EBA countries and years in a multilaterally-consistent manner. IMF staff assessments and related policy recommendation should rely on country-specific insights to properly tailor the structural advice. These tools are available to all country teams, and will continue to be refined as experience is gathered and data availability constraints are eased.

Figure 8. Structural Policy Gaps and Excess Current Account Imbalances *(Percent of GDP)*



Sources: OECD, WEF, WEO, IMF staff estimates.
Note: Bars denote contributions of various structural policies to excess imbalances. LPS: licenses and permits system regulation; SBP: procedures to start a business; EPL: employment protection laws; CLER: cooperation in labor-employer relations.

VII. REER MODELS

38. **The REER-Index and REER-Level models were also refined, incorporating most aspects of the new EBA current account model while keeping the overall frameworks unchanged.** For this round, efforts focused on refinements to the current account model. The general features of the REER models were left broadly unchanged, although for comparability and consistency, changes in modeling of demographics, institutions, FXI and credit excesses were also included where applicable. The fit of the updated REER models was generally unchanged, and estimated coefficients were broadly in line with those coming from the current account models. The REER-Index model, which includes country fixed effects, assumes that each country's real exchange rates is on average in equilibrium over the sample period. Since the REER-Index model does not shed light on the long- run differences in real exchange

[38] The cooperation in labor-employer relations result finds some support in empirical studies which have found that civic attitudes determine the design and functioning of labor market institutions (see Blanchard, Jaumotte, and Loungani 2014; Algan and Cahuc 2009; and Aghion, Algan, and Cahuc 2011).

rates across countries, the REER-Level model was introduced in 2015, exploiting cross-country information on Purchasing Power Parity (PPP) exchange rate levels. Although IMF staff provides estimates for REER gaps for both models, greater weight is increasingly given to the REER-Level model estimates, including because it exhibits a much better fit for external assessments, which parallel the current account model. A summary of the refinements and their overall implications follows:

- **The REER-Level model** refinements resulted in a similar fit to the previous version, although they also led to changes in some coefficients of policy variables (Table 10). The new measure of FX intervention resulted in a much larger coefficient which is more in line with those of other studies (i.e. a 1 percent of GDP increase in FXI would weaken the REER by about 3½ percent). Meanwhile, in the case of credit, the new detrended measure, while having the right sign (a positive credit gap appreciates the exchange rate) it is no longer statistically significant. Consistent with findings in the literature (Rose, Supaat, and Braude, 2009), only the static demographic effects, captured by population growth and the old-age dependency ratio and population growth, were included in the specification.[39]
- **The REER-Index model** refinements also resulted in a similar fit to the previous version (Table 11). Both the new FXI measure and the new credit gap measure were significant and with an estimated coefficient as predicted by theory. As in the case of the new REER-Level and current account models, reserve accumulation has a stronger effect than previously estimated. Meanwhile, the estimated effect of credit excesses on the exchange rate is significant yet relatively small (that is, a 10 percent increase in credit above its long-term trend appreciates the exchange rate by about 1 percent). The impact of demographic variables on the exchange rate was generally weak, especially those capturing the dynamic effects that led to their exclusion.

VIII. CONCLUSION

39. **Methodological refinements to the EBA models represent a step forward in delivering a more reliable assessment tool, yet lessons will continue to be drawn.** The overarching goal of these refinements was 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 and the latest advances in the academic literature. This search for "better" models should be viewed as a continuous and evolving process of incorporating new lessons into the conceptual framework. IMF staff will continue to seek feedback from IMF country teams and country authorities, follow recent developments in the literature, and conduct future revisions to the EBA models when these prove to be superior to the current framework.

[39] The share of prime-age savers and variables measuring the dynamic effect were not included because they were either not significant or did not have the expected sign.

Table 3. Credit-to-GDP Gap Estimates

Country Name	Staff (HP Filter, lambda=1600)		BIS	
	2016	2017	2016	2017
Spain	-41.4%	-37.7%	-50.0%	-49.3%
United Kingdom	-18.2%	-15.4%	-21.5%	-19.0%
Italy	-10.7%	-11.8%	-16.6%	-16.7%
Sweden	-8.7%	-9.0%	-11.3%	-12.3%
Australia	-2.5%	-7.8%	-1.0%	-6.6%
Netherlands	-8.5%	-6.9%	-19.8%	-22.3%
India	-5.8%	-6.3%	-7.7%	-8.8%
Brazil	-3.9%	-6.1%	-3.0%	-6.1%
South Africa	-3.9%	-4.2%	-2.6%	-2.5%
United States	-4.5%	-4.0%	-8.4%	-7.4%
Russia	-1.3%	-3.9%	-1.7%	-3.5%
Korea	0.6%	-1.3%	0.2%	-0.5%
Poland	3.9%	-0.7%	-0.6%	-4.0%
Germany	-0.1%	2.0%	-4.7%	-3.0%
Belgium	5.8%	2.3%	2.0%	-2.9%
Indonesia	4.7%	2.7%	9.3%	7.6%
Mexico	5.0%	3.2%	9.5%	6.4%
Malaysia	7.6%	3.5%	9.7%	6.2%
Canada	11.0%	5.2%	13.7%	9.4%
Turkey	8.9%	5.4%	9.8%	7.8%
France	5.9%	5.5%	4.6%	5.2%
Japan	2.5%	5.5%	5.8%	6.8%
Thailand	8.8%	6.1%	11.4%	8.7%
Switzerland	11.0%	9.0%	6.4%	6.3%
China	23.9%	14.0%	24.6%	18.9%

Sources: Bank for International Settlements; and IMF staff estimates..

Table 4. EBA Current Account Regression Results: 2013, 2015, and Refined 2018 Model

Variables	2013 Model	2015 Model (Current)		Refined Model (1986-2016)
	1986-2010	1986-2013	1986-2016	
L. NFA/Y	0.016**	0.015**	0.014**	0.023***
L. NFA/Y*(dummy if NFA/Y < -60%)	-0.012	-0.009	0.005	-0.006
L.Output per worker, relative to top 3 economies	0.007	0.033	0.025	0.023
L.Relative output per worker*K openness	0.065***	0.046**	0.046**	0.041*
GDP growth, forecast in 5 years #	-0.471***	-0.425***	-0.272***	-0.302***
L.Public Health Spending/GDP #	-0.551***	-0.503***	-0.310**	-0.399***
L.demeaned VIX*K openness	0.068***	0.040**	0.022	0.02
L.demeaned VIX*K openness*share in world reserves	-0.136*	-0.093	-0.008	0.002
Own currency's share in world reserves	-0.045***	-0.041***	-0.038***	-0.030***
Output Gap #	-0.400***	-0.385***	-0.392***	-0.356***
Commodity ToTgap*Trade Openness	0.230***	0.197***	0.139***	0.161***
Demeaned Private Credit/GDP #	-0.026***	-0.021***	-0.038***	
Detrended Private Credit/GDP #				-0.104***
Change in Reserves to GDP* K controls, instrumented #	0.346**	0.449**	0.261	
Change in Reserves to GDP* K controls, instrumented # (New)				0.754***
Population Growth #	-0.629	-0.565	-0.689*	-0.692*
Old-age Dependency Ratio #	-0.030	-0.057	-0.079	-0.069
rel. Dependency Ratio*Aging Speed		0.130***	0.101***	
rel. Aging Speed * Dependency Ratio		0.088**	0.107***	
Aging Speed (proj. change in old age dependency ratio) #	0.156***			
Prime Savers Share #				0.138**
Life Expectancy at Prime Age #				-0.005***
Life Expectancy at Prime Age # * Future OADR				0.013***
Institutional/Political Environment (ICGR-12) #				-0.047**
Institutional/Political Environment (ICRG-5) #	-0.109***	-0.109***	-0.104***	
Financial Center Dummy	0.033***	0.027***	0.028***	
Oil and Natural Gas Trade Balance * resource temporarines	0.615***	0.410***	0.398***	0.310***
Cyclically adjusted Fiscal Balance, instrumented #	0.324***	0.470***	0.543***	0.329***
Constant	-0.014***	-0.014***	-0.014***	-0.009***
Observations	1080	1,197	1,340	1,367
Number of countries	49	49	49	49
R-squared IV	0.520	0.544	0.511	0.524
R-squared Fit	---	---	*0.494*	*0.550*
Root MSE	0.033	0.032	0.033	0.031

* significant at 10%; ** significant at 5%; *** significant at 1% "L." denotes one year lag.
Variables denoted with # are constructed relative to a (GDP-weighted) country sample average, in each year.

Table 5. EBA Countries, 2015 Model: Summary of EBA Current Account Norms and Contributions for 2017 1/

Country	Constant+MLC	NFA	Demographics	Institutions	GDPPC/Future Growth	Country factors (Oil, FC, RC)	Policy Variables	Cyclically Adjusted EBA Norm
Argentina	-0.1%	0.1%	-1.6%	1.5%	-0.8%	-0.1%	-0.3%	-1.2%
Australia	-0.1%	-0.8%	-1.1%	-1.7%	1.3%	0.0%	0.9%	-1.5%
Austria	-0.1%	0.0%	1.6%	-0.8%	1.7%	-0.9%	1.8%	3.3%
Belgium	-0.1%	0.7%	0.2%	-0.5%	1.6%	-0.9%	0.8%	1.8%
Brazil	-0.1%	-0.5%	-0.6%	0.8%	-0.8%	-0.1%	-1.5%	-2.8%
Canada	-0.1%	0.2%	0.2%	-1.9%	1.5%	0.1%	0.1%	0.1%
Chile	-0.1%	-0.2%	-0.4%	-0.9%	-0.5%	-0.1%	-1.1%	-3.4%
China	-0.1%	0.3%	-0.1%	2.8%	-2.2%	-0.1%	-0.4%	0.2%
Colombia	-0.1%	-0.7%	-0.6%	1.5%	-1.4%	2.5%	-0.9%	0.3%
Costa Rica	-0.1%	-0.7%	-0.7%	0.6%	-1.2%	-0.1%	-3.7%	-5.9%
Czech Republic	-0.1%	-0.4%	-0.3%	0.0%	0.3%	-0.1%	-0.2%	-0.7%
Denmark	-0.1%	0.7%	-0.9%	-1.2%	1.7%	-0.1%	1.2%	1.3%
Egypt	-0.1%	-0.6%	-1.0%	3.8%	-2.4%	-0.1%	-2.8%	-3.1%
Finland	-0.1%	0.1%	-0.8%	-1.8%	1.6%	-0.9%	1.1%	-0.8%
France	-0.1%	-0.3%	0.4%	0.0%	1.4%	-0.9%	0.7%	1.2%
Germany	-0.1%	0.7%	2.0%	-1.5%	1.8%	-0.9%	1.3%	3.4%
Greece	-0.1%	-1.4%	1.8%	0.9%	0.5%	-0.9%	-0.3%	0.6%
Guatemala	-0.1%	-0.3%	-1.1%	1.3%	-1.7%	-0.1%	-0.9%	-2.9%
Hungary	-0.1%	-0.9%	-0.6%	0.1%	0.0%	-0.1%	1.0%	-0.6%
India	-0.1%	-0.4%	-0.6%	1.7%	-3.7%	-0.1%	-1.2%	-4.3%
Indonesia	-0.1%	-0.5%	-0.5%	2.5%	-2.4%	0.0%	0.2%	-0.9%
Ireland	-0.1%	-1.6%	-0.2%	-0.9%	2.6%	-0.9%	5.8%	4.7%
Israel	-0.1%	0.5%	-1.9%	0.3%	0.4%	-0.1%	-0.2%	-1.0%
Italy	-0.1%	-0.2%	3.8%	0.2%	1.4%	-0.9%	0.3%	4.4%
Japan	-0.1%	0.9%	1.4%	-1.1%	1.9%	-0.3%	0.9%	3.6%
Korea	-0.1%	0.3%	1.4%	-0.7%	0.3%	-0.1%	1.0%	2.0%
Malaysia	-0.1%	0.1%	-0.8%	1.0%	-1.1%	1.1%	0.8%	0.9%
Mexico	-0.1%	-0.7%	-0.9%	1.0%	-0.8%	-0.1%	-0.3%	-1.8%
Morocco	-0.1%	-0.9%	-0.9%	1.2%	-2.1%	-0.1%	0.5%	-2.4%
Netherlands	-0.1%	0.9%	1.4%	-0.8%	1.8%	2.1%	-0.6%	4.7%
New Zealand	-0.1%	-0.9%	-0.2%	-2.2%	0.6%	-0.1%	1.3%	-1.5%
Norway	-0.1%	3.0%	-1.0%	-2.0%	3.0%	6.9%	-0.6%	9.3%
Pakistan	-0.1%	-0.5%	-0.9%	3.0%	-2.5%	-0.1%	0.1%	-0.9%
Peru	-0.1%	-0.6%	-0.9%	0.9%	-1.6%	-0.1%	-0.3%	-2.6%
Philippines	-0.1%	-0.2%	-0.7%	1.8%	-3.1%	-0.1%	0.3%	-2.1%
Poland	-0.1%	-0.9%	0.3%	0.0%	-0.2%	-0.1%	0.2%	-0.8%
Portugal	-0.1%	-1.2%	2.1%	0.0%	0.6%	-0.9%	-0.2%	0.2%
Russia	-0.1%	0.2%	-0.2%	2.3%	0.3%	1.6%	2.0%	6.1%
South Africa	-0.1%	0.1%	-0.5%	1.3%	-0.7%	-0.1%	-0.9%	-0.9%
Spain	-0.1%	-1.0%	2.6%	0.2%	0.9%	-0.9%	0.8%	2.5%
Sri Lanka	-0.1%	-0.8%	-0.2%	3.0%	-2.0%	-0.1%	-0.5%	-0.8%
Sweden	-0.1%	0.1%	-1.7%	-2.1%	1.8%	-0.1%	1.0%	-1.0%
Switzerland	-0.1%	1.6%	0.7%	-1.5%	2.4%	2.6%	2.2%	7.9%
Thailand	-0.1%	-0.1%	0.3%	2.7%	-1.3%	-0.1%	-0.5%	0.9%
Tunisia	-0.1%	-1.3%	-0.8%	2.2%	-1.7%	-0.1%	-1.2%	-3.0%
Turkey	-0.1%	-0.7%	-1.1%	2.2%	-0.7%	-0.1%	-0.2%	-0.6%
United Kingdom	-0.1%	-0.1%	-0.4%	-1.6%	1.4%	-0.3%	0.8%	-0.3%
United States	-0.1%	-0.7%	-0.5%	-1.5%	2.3%	-2.9%	2.1%	-1.2%
Uruguay	-0.1%	-0.5%	-1.7%	-0.2%	-0.6%	-0.1%	-0.6%	-3.8%

Sources: IMF Staff Assessments and IMF International Financial Statistics (IFS).
1/ MLC refers to Multilateral Consistency Adjustment, FC to Financial Center, RC to Reserve Currency. Assumes 2015 Model coefficients with updated demographics data (2017 UN vintage).

Table 6. EBA Countries, 2015 Model: Contribution of Policy Variables to EBA Current Account Norms for 2017 1/

Country	Policy Variables			Fiscal			Health			Credit			FXI*Capital control			K-Controls
	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign	Total
Argentina	-0.3%	-4.4%	-4.1%	-0.5%	-0.9%	-0.5%	0.4%	-2.8%	-3.2%	0.6%	0.0%	-0.5%	0.1%	0.1%	0.0%	-0.8%
Australia	0.9%	-3.2%	-4.1%	0.5%	0.0%	-0.5%	-0.3%	-3.4%	-3.2%	-0.6%	-1.2%	-0.5%	0.0%	0.0%	0.0%	1.4%
Austria	1.8%	-2.4%	-4.1%	0.2%	-0.2%	-0.5%	-0.1%	-3.3%	-3.2%	0.4%	-0.2%	-0.5%	0.0%	0.0%	0.0%	1.3%
Belgium	0.8%	-3.3%	-4.1%	0.5%	0.0%	-0.5%	-1.0%	-4.1%	-3.2%	0.0%	-0.6%	-0.5%	0.0%	0.0%	0.0%	1.4%
Brazil	-1.5%	-5.6%	-4.1%	-1.0%	-1.4%	-0.5%	0.8%	-2.4%	-3.2%	0.0%	-0.6%	-0.5%	0.0%	0.0%	0.0%	-1.3%
Canada	0.1%	-4.1%	-4.1%	-0.1%	-0.6%	-0.5%	-0.7%	-3.8%	-3.2%	-0.4%	-0.9%	-0.5%	0.0%	0.0%	0.0%	1.2%
Chile	-1.1%	-5.3%	-4.1%	0.0%	-0.5%	-0.5%	0.4%	-2.8%	-3.2%	-0.7%	-1.2%	-0.5%	0.0%	0.0%	0.0%	-0.8%
China	-0.4%	-4.5%	-4.1%	-0.1%	-0.6%	-0.5%	1.2%	-1.9%	-3.2%	-0.1%	-0.7%	-0.5%	0.0%	0.0%	0.0%	-1.3%
Colombia	-0.9%	-5.1%	-4.1%	0.1%	-0.4%	-0.5%	0.5%	-2.7%	-3.2%	0.0%	-0.6%	-0.5%	0.0%	0.0%	0.0%	-1.4%
Costa Rica	-3.7%	-7.8%	-4.1%	-2.4%	-2.9%	-0.5%	0.4%	-2.8%	-3.2%	-0.2%	-0.7%	-0.5%	0.0%	0.0%	0.0%	-1.5%
Czech Republic	-0.2%	-4.4%	-4.1%	0.0%	-0.5%	-0.5%	-0.7%	-3.9%	-3.2%	0.4%	-0.2%	-0.5%	0.0%	0.0%	0.0%	0.1%
Denmark	1.2%	-3.0%	-4.1%	0.5%	0.0%	-0.5%	-0.8%	-4.0%	-3.2%	-0.1%	-0.6%	-0.5%	0.0%	0.0%	0.0%	1.6%
Egypt	-2.8%	-7.0%	-4.1%	-3.6%	-4.0%	-0.5%	1.6%	-1.5%	-3.2%	0.8%	0.3%	-0.5%	0.0%	0.0%	0.0%	-1.7%
Finland	1.1%	-3.1%	-4.1%	0.3%	-0.1%	-0.5%	-0.5%	-3.6%	-3.2%	0.0%	-0.5%	-0.5%	0.0%	0.0%	0.0%	1.2%
France	0.7%	-3.4%	-4.1%	0.5%	0.0%	-0.5%	-1.3%	-4.5%	-3.2%	0.3%	-0.2%	-0.5%	0.0%	0.0%	0.0%	1.3%
Germany	1.3%	-2.9%	-4.1%	0.2%	-0.2%	-0.5%	-1.2%	-4.4%	-3.2%	0.6%	0.1%	-0.5%	0.0%	0.0%	0.0%	1.6%
Greece	-0.3%	-4.4%	-4.1%	0.3%	-0.2%	-0.5%	0.5%	-2.6%	-3.2%	-0.8%	-1.3%	-0.5%	0.0%	0.0%	0.0%	-0.3%
Guatemala	-0.9%	-5.1%	-4.1%	-0.5%	-0.9%	-0.5%	1.4%	-1.8%	-3.2%	0.3%	-0.3%	-0.5%	0.0%	0.0%	0.0%	-2.1%
Hungary	1.0%	-3.1%	-4.1%	0.5%	0.0%	-0.5%	0.5%	-2.7%	-3.2%	0.5%	0.0%	-0.5%	0.0%	0.0%	0.0%	-0.4%
India	-1.2%	-5.3%	-4.1%	-1.9%	-2.4%	-0.5%	2.4%	-0.8%	-3.2%	0.2%	-0.3%	-0.5%	0.0%	0.0%	0.0%	-1.9%
Indonesia	0.2%	-4.0%	-4.1%	-0.7%	-1.2%	-0.5%	1.9%	-1.2%	-3.2%	0.5%	-0.1%	-0.5%	0.0%	0.0%	0.0%	-1.5%
Ireland	5.8%	1.7%	-4.1%	0.1%	-0.4%	-0.5%	0.8%	-2.4%	-3.2%	1.4%	0.9%	-0.5%	0.0%	0.0%	0.0%	3.6%
Israel	-0.2%	-4.4%	-4.1%	-1.0%	-1.4%	-0.5%	-0.1%	-3.3%	-3.2%	0.3%	-0.3%	-0.5%	0.0%	0.0%	0.0%	0.6%
Italy	0.3%	-3.9%	-4.1%	0.5%	0.0%	-0.5%	-0.4%	-3.6%	-3.2%	-0.4%	-1.0%	-0.5%	0.0%	0.0%	0.0%	0.7%
Japan	0.9%	-3.2%	-4.1%	0.5%	0.0%	-0.5%	-1.1%	-4.2%	-3.2%	0.3%	-0.2%	-0.5%	0.0%	0.0%	0.0%	1.2%
Korea	1.0%	-3.2%	-4.1%	0.5%	0.0%	-0.5%	0.5%	-2.7%	-3.2%	-0.1%	-0.7%	-0.5%	0.0%	0.0%	0.0%	0.2%
Malaysia	0.8%	-3.3%	-4.1%	-0.5%	-0.9%	-0.5%	1.2%	-1.9%	-3.2%	0.4%	-0.2%	-0.5%	0.2%	0.2%	0.0%	-0.4%
Mexico	-0.3%	-4.5%	-4.1%	-0.7%	-1.2%	-0.5%	1.1%	-2.0%	-3.2%	0.3%	-0.3%	-0.5%	0.0%	0.0%	0.0%	-1.0%
Morocco	0.5%	-3.6%	-4.1%	0.0%	-0.5%	-0.5%	2.3%	-0.9%	-3.2%	-0.2%	-0.7%	-0.5%	0.2%	0.2%	0.0%	-1.8%
Netherlands	-0.6%	-4.8%	-4.1%	0.2%	-0.2%	-0.5%	-1.6%	-4.8%	-3.2%	-1.2%	-1.7%	-0.5%	0.0%	0.0%	0.0%	1.9%
New Zealand	1.3%	-2.9%	-4.1%	1.1%	0.7%	-0.5%	0.1%	-3.0%	-3.2%	-0.6%	-1.1%	-0.5%	0.0%	0.0%	0.0%	0.6%
Norway	-0.6%	-4.7%	-4.1%	-2.7%	-3.1%	-0.5%	-1.0%	-4.1%	-3.2%	-0.4%	-0.9%	-0.5%	0.0%	0.0%	0.0%	3.5%
Pakistan	0.1%	-4.1%	-4.1%	-1.0%	-1.4%	-0.5%	2.2%	-1.0%	-3.2%	0.7%	0.1%	-0.5%	0.2%	0.2%	0.0%	-2.0%
Peru	-0.3%	-4.5%	-4.1%	0.0%	-0.5%	-0.5%	1.2%	-1.9%	-3.2%	0.1%	-0.4%	-0.5%	0.0%	0.0%	0.0%	-1.7%
Philippines	0.3%	-3.9%	-4.1%	0.0%	-0.5%	-0.5%	2.1%	-1.0%	-3.2%	0.3%	-0.3%	-0.5%	0.0%	0.0%	0.0%	-2.1%
Poland	0.2%	-4.0%	-4.1%	0.0%	-0.5%	-0.5%	0.5%	-2.6%	-3.2%	-0.1%	-0.7%	-0.5%	0.2%	0.2%	0.0%	-0.4%
Portugal	-0.2%	-4.4%	-4.1%	0.5%	0.0%	-0.5%	-0.2%	-3.4%	-3.2%	-0.3%	-0.8%	-0.5%	0.0%	0.0%	0.0%	-0.1%
Russia	2.0%	-2.1%	-4.1%	1.6%	1.2%	-0.5%	0.5%	-2.7%	-3.2%	0.4%	-0.2%	-0.5%	0.0%	0.0%	0.0%	-0.5%
South Africa	-0.9%	-5.0%	-4.1%	-0.5%	-1.0%	-0.5%	1.1%	-2.0%	-3.2%	-0.2%	-0.7%	-0.5%	0.1%	0.1%	0.0%	-1.4%
Spain	0.8%	-3.4%	-4.1%	0.5%	0.0%	-0.5%	-0.4%	-3.5%	-3.2%	0.2%	-0.4%	-0.5%	0.0%	0.0%	0.0%	0.5%
Sri Lanka	-0.5%	-4.7%	-4.1%	-1.2%	-1.6%	-0.5%	1.6%	-1.5%	-3.2%	0.4%	-0.2%	-0.5%	0.1%	0.1%	0.0%	-1.5%
Sweden	1.0%	-3.1%	-4.1%	0.9%	0.5%	-0.5%	-0.8%	-4.0%	-3.2%	-1.0%	-1.5%	-0.5%	0.0%	0.0%	0.0%	1.9%
Switzerland	2.2%	-2.0%	-4.1%	0.5%	0.0%	-0.5%	-0.6%	-3.8%	-3.2%	-0.1%	-0.7%	-0.5%	0.0%	0.0%	0.0%	2.5%
Thailand	-0.5%	-4.6%	-4.1%	-0.4%	-0.9%	-0.5%	1.5%	-1.7%	-3.2%	-0.3%	-0.9%	-0.5%	0.0%	0.0%	0.0%	-1.2%
Tunisia	-1.2%	-5.3%	-4.1%	-1.1%	-1.6%	-0.5%	1.1%	-2.1%	-3.2%	0.3%	-0.2%	-0.5%	0.1%	0.1%	0.0%	-1.6%
Turkey	-0.2%	-4.3%	-4.1%	-0.8%	-1.2%	-0.5%	1.3%	-1.8%	-3.2%	-0.4%	-0.9%	-0.5%	0.1%	0.1%	0.0%	-0.5%
United Kingdom	0.8%	-3.3%	-4.1%	0.5%	0.0%	-0.5%	-0.8%	-4.0%	-3.2%	0.1%	-0.5%	-0.5%	0.0%	0.0%	0.0%	1.1%
United States	2.1%	-2.0%	-4.1%	0.1%	-0.4%	-0.5%	-0.5%	-3.7%	-3.2%	-0.1%	-0.6%	-0.5%	0.0%	0.0%	0.0%	2.7%
Uruguay	-0.6%	-4.7%	-4.1%	-0.7%	-1.2%	-0.5%	0.5%	-2.7%	-3.2%	0.5%	0.0%	-0.5%	0.0%	0.0%	0.0%	-0.9%

Sources: IMF Staff Assessments and IMF International Financial Statistics (IFS).
1/Assumes 2015 Model coefficients with updated demographics data (2017 UN vintage).

Table 7. EBA Countries, Refined 2018 Model: Summary of EBA Current Account Norms and Contributions for 2017 1/

Country	Constant+MLC	NFA	Demographics	Institutions	GDPPC/Future Growth	Country factors (Oil, FC, RC)	Policy Variables	Cyclically Adjusted EBA Norm
Argentina	-0.2%	0.2%	-0.8%	0.4%	-0.5%	-0.1%	-0.6%	-1.7%
Australia	-0.2%	-1.3%	-0.5%	-0.5%	0.9%	0.0%	1.0%	-0.6%
Austria	-0.2%	0.1%	0.9%	-0.4%	1.2%	-0.7%	1.1%	1.9%
Belgium	-0.2%	1.0%	0.1%	-0.2%	1.1%	-0.7%	1.0%	2.2%
Brazil	-0.2%	-0.8%	-0.2%	0.5%	-0.5%	-0.1%	-1.2%	-2.4%
Canada	-0.2%	0.2%	0.5%	-0.6%	1.0%	0.1%	1.2%	2.2%
Chile	-0.2%	-0.4%	0.1%	-0.1%	-0.4%	-0.1%	0.1%	-0.9%
China	-0.2%	0.4%	0.8%	0.8%	-1.6%	-0.1%	-0.4%	-0.3%
Colombia	-0.2%	-1.0%	0.1%	0.6%	-1.0%	1.9%	-0.6%	-0.2%
Costa Rica	-0.2%	-0.6%	-0.3%	0.1%	-0.9%	-0.1%	-1.9%	-3.9%
Czech Republic	-0.2%	-0.6%	-0.6%	-0.1%	0.2%	-0.1%	0.0%	-1.5%
Denmark	-0.2%	1.2%	0.0%	-0.2%	1.2%	-0.1%	2.2%	4.1%
Egypt	-0.2%	-0.9%	0.3%	1.1%	-1.7%	-0.1%	-2.1%	-3.6%
Finland	-0.2%	0.0%	-0.1%	-0.6%	1.1%	-0.7%	1.2%	0.8%
France	-0.2%	-0.4%	0.5%	0.1%	1.0%	-0.7%	0.6%	0.9%
Germany	-0.2%	1.1%	0.8%	-0.5%	1.3%	-0.7%	1.0%	2.8%
Greece	-0.2%	-2.6%	0.6%	0.2%	0.3%	-0.7%	0.8%	-1.6%
Guatemala	-0.2%	-0.5%	-1.7%	0.6%	-1.2%	-0.1%	-0.8%	-4.0%
Hungary	-0.2%	-1.3%	-0.3%	-0.1%	0.0%	-0.1%	0.4%	-1.6%
India	-0.2%	-0.6%	0.9%	0.6%	-2.5%	-0.1%	-1.1%	-3.0%
Indonesia	-0.2%	-0.8%	1.4%	0.8%	-1.7%	0.0%	-0.3%	-0.8%
Ireland	-0.2%	-3.2%	-0.3%	-0.5%	1.8%	-0.7%	6.2%	3.2%
Israel	-0.2%	0.8%	-1.5%	0.3%	0.3%	-0.1%	0.5%	0.1%
Italy	-0.2%	-0.3%	1.7%	0.0%	1.0%	-0.7%	1.0%	2.5%
Japan	-0.2%	1.4%	0.9%	-0.4%	1.3%	-0.2%	0.5%	3.2%
Korea	-0.2%	0.4%	1.7%	-0.2%	0.2%	-0.1%	1.1%	3.0%
Malaysia	-0.2%	0.1%	-0.2%	0.1%	-0.8%	0.8%	0.7%	0.6%
Mexico	-0.2%	-1.1%	-0.9%	0.5%	-0.5%	-0.1%	-0.1%	-2.5%
Morocco	-0.2%	-1.5%	-0.2%	0.4%	-1.5%	-0.1%	-0.5%	-3.6%
Netherlands	-0.2%	1.4%	0.9%	-0.5%	1.3%	-0.4%	1.0%	3.5%
New Zealand	-0.2%	-1.4%	0.3%	-0.7%	0.4%	-0.1%	1.0%	-0.6%
Norway	-0.2%	4.6%	-0.2%	-0.7%	2.1%	5.2%	1.2%	12.0%
Pakistan	-0.2%	-0.8%	0.3%	1.1%	-1.8%	-0.1%	-0.1%	-1.4%
Peru	-0.2%	-0.9%	-0.6%	0.5%	-1.2%	0.0%	-0.2%	-2.6%
Philippines	-0.2%	-0.3%	1.2%	0.6%	-2.2%	-0.1%	0.4%	-0.6%
Poland	-0.2%	-1.3%	-0.2%	-0.2%	-0.2%	-0.1%	0.4%	-1.7%
Portugal	-0.2%	-2.2%	0.8%	-0.1%	0.4%	-0.7%	1.9%	-0.1%
Russia	-0.2%	0.3%	0.2%	0.8%	0.2%	1.2%	1.3%	3.8%
South Africa	-0.2%	0.1%	1.5%	0.5%	-0.5%	-0.1%	-0.7%	0.7%
Spain	-0.2%	-1.7%	1.3%	0.1%	0.6%	-0.7%	2.0%	1.4%
Sri Lanka	-0.2%	-1.3%	0.3%	0.8%	-1.4%	-0.1%	0.0%	-2.0%
Sweden	-0.2%	0.1%	-0.4%	-0.6%	1.3%	-0.1%	1.7%	1.8%
Switzerland	-0.2%	2.5%	0.6%	-0.7%	1.7%	-0.1%	2.4%	6.2%
Thailand	-0.2%	-0.2%	0.9%	0.8%	-0.8%	-0.1%	0.1%	0.5%
Tunisia	-0.2%	-2.4%	0.0%	0.5%	-1.2%	-0.1%	-1.5%	-4.9%
Turkey	-0.2%	-1.0%	-0.8%	1.0%	-0.5%	-0.1%	0.7%	-0.9%
United Kingdom	-0.2%	-0.1%	0.0%	-0.4%	1.0%	-0.2%	0.9%	1.0%
United States	-0.2%	-1.1%	0.1%	-0.4%	1.6%	-2.1%	1.4%	-0.7%
Uruguay	-0.2%	-0.7%	-0.4%	0.1%	-0.5%	-0.1%	-0.7%	-2.5%

Sources: IMF Staff Assessments and IMF International Financial Statistics (IFS).
1/ MLC refers to Multilateral Consistency Adjustment, FC to Financial Center, RC to Reserve Currency. Estimated using new 2018 refined specification and new data through 2016.

Table 8. EBA Countries, Refined 2018 Model: Contribution of Policy Variables to EBA Current Account Norms for 2017 1/

Country	Policy Variables			Fiscal			Health			Credit			FXI*Capital control			K-Controls
	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign	Total
Argentina	-0.6%	-3.7%	-3.0%	0.0%	-0.4%	-0.4%	0.1%	-2.6%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	-0.7%
Australia	1.0%	-2.0%	-3.0%	-0.1%	-0.5%	-0.4%	-0.1%	-2.8%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	1.3%
Austria	1.1%	-1.9%	-3.0%	0.3%	-0.2%	-0.4%	-0.3%	-2.9%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	1.2%
Belgium	1.0%	-2.0%	-3.0%	0.4%	0.0%	-0.4%	-0.5%	-3.2%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	1.2%
Brazil	-1.2%	-4.2%	-3.0%	-1.1%	-1.6%	-0.4%	1.1%	-1.5%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	-1.1%
Canada	1.2%	-1.8%	-3.0%	0.2%	-0.2%	-0.4%	-0.1%	-2.8%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	1.2%
Chile	0.1%	-2.9%	-3.0%	0.1%	-0.3%	-0.4%	0.7%	-2.0%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	-0.6%
China	-0.4%	-3.4%	-3.0%	-0.1%	-0.5%	-0.4%	0.9%	-1.8%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	-1.1%
Colombia	-0.6%	-3.7%	-3.0%	-0.5%	-0.9%	-0.4%	1.1%	-1.6%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	-1.2%
Costa Rica	-1.9%	-5.0%	-3.0%	-0.7%	-1.1%	-0.4%	0.0%	-2.6%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	-1.2%
Czech Republic	0.0%	-3.0%	-3.0%	0.2%	-0.2%	-0.4%	-0.4%	-3.1%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.2%
Denmark	2.2%	-0.9%	-3.0%	0.4%	0.0%	-0.4%	-0.5%	-3.2%	-2.7%	0.7%	0.8%	0.1%	0.0%	0.0%	0.0%	1.5%
Egypt	-2.1%	-5.1%	-3.0%	-2.3%	-2.7%	-0.4%	1.7%	-0.9%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	-1.4%
Finland	1.2%	-1.8%	-3.0%	0.3%	-0.2%	-0.4%	-0.1%	-2.8%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	1.1%
France	0.6%	-2.4%	-3.0%	0.4%	0.0%	-0.4%	-0.8%	-3.5%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	1.1%
Germany	1.0%	-2.0%	-3.0%	0.3%	-0.2%	-0.4%	-1.1%	-3.8%	-2.7%	0.5%	0.5%	0.1%	0.0%	0.0%	0.0%	1.4%
Greece	0.8%	-2.2%	-3.0%	0.4%	0.0%	-0.4%	0.7%	-2.0%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	-0.3%
Guatemala	-0.8%	-3.8%	-3.0%	-0.2%	-0.7%	-0.4%	1.3%	-1.4%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	-1.8%
Hungary	0.4%	-2.7%	-3.0%	0.4%	0.0%	-0.4%	0.3%	-2.4%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	-0.3%
India	-1.1%	-4.2%	-3.0%	-1.5%	-1.9%	-0.4%	2.0%	-0.6%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	-1.6%
Indonesia	-0.3%	-3.3%	-3.0%	-0.4%	-0.8%	-0.4%	1.5%	-1.2%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	-1.3%
Ireland	6.2%	3.2%	-3.0%	0.2%	-0.2%	-0.4%	0.6%	-2.1%	-2.7%	2.3%	2.3%	0.1%	0.0%	0.0%	0.0%	3.2%
Israel	0.5%	-2.5%	-3.0%	-0.6%	-1.0%	-0.4%	0.5%	-2.2%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.6%
Italy	1.0%	-2.0%	-3.0%	0.6%	0.2%	-0.4%	-0.1%	-2.7%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.6%
Japan	0.5%	-2.5%	-3.0%	0.5%	0.0%	-0.4%	-1.0%	-3.6%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	1.1%
Korea	1.1%	-2.0%	-3.0%	0.4%	0.0%	-0.4%	0.5%	-2.2%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.2%
Malaysia	0.7%	-2.3%	-3.0%	0.1%	-0.4%	-0.4%	1.0%	-1.6%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	-0.3%
Mexico	-0.1%	-3.2%	-3.0%	-0.4%	-0.8%	-0.4%	1.1%	-1.6%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	-0.8%
Morocco	-0.5%	-3.5%	-3.0%	-0.8%	-1.2%	-0.4%	1.9%	-0.8%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	-1.5%
Netherlands	1.0%	-2.0%	-3.0%	0.3%	-0.2%	-0.4%	-0.9%	-3.5%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	1.7%
New Zealand	1.0%	-2.0%	-3.0%	0.1%	-0.3%	-0.4%	0.4%	-2.3%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.6%
Norway	1.2%	-1.8%	-3.0%	-1.2%	-1.6%	-0.4%	-0.6%	-3.3%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	3.2%
Pakistan	-0.1%	-3.1%	-3.0%	-0.6%	-1.0%	-0.4%	1.9%	-0.8%	-2.7%	-0.1%	0.0%	0.1%	0.4%	0.4%	0.0%	-1.7%
Peru	-0.2%	-3.2%	-3.0%	0.1%	-0.3%	-0.4%	1.2%	-1.5%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	-1.4%
Philippines	0.4%	-2.6%	-3.0%	0.3%	-0.1%	-0.4%	2.0%	-0.7%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	-1.8%
Poland	0.4%	-2.6%	-3.0%	0.1%	-0.3%	-0.4%	0.7%	-2.0%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	-0.3%
Portugal	1.9%	-1.1%	-3.0%	0.4%	0.0%	-0.4%	-0.1%	-2.8%	-2.7%	1.7%	1.8%	0.1%	0.0%	0.0%	0.0%	-0.1%
Russia	1.3%	-1.7%	-3.0%	1.2%	0.8%	-0.4%	0.5%	-2.2%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	-0.4%
South Africa	-0.7%	-3.7%	-3.0%	-0.4%	-0.8%	-0.4%	1.0%	-1.7%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	-1.2%
Spain	2.0%	-1.0%	-3.0%	0.4%	0.0%	-0.4%	0.1%	-2.5%	-2.7%	1.0%	1.0%	0.1%	0.0%	0.0%	0.0%	0.4%
Sri Lanka	0.0%	-3.1%	-3.0%	-0.2%	-0.7%	-0.4%	1.5%	-1.2%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	-1.2%
Sweden	1.7%	-1.3%	-3.0%	0.5%	0.1%	-0.4%	-0.5%	-3.2%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	1.7%
Switzerland	2.4%	-0.7%	-3.0%	0.4%	0.0%	-0.4%	-0.3%	-3.0%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	2.3%
Thailand	0.1%	-2.9%	-3.0%	-0.1%	-0.5%	-0.4%	1.3%	-1.4%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	-1.0%
Tunisia	-1.5%	-4.5%	-3.0%	-1.2%	-1.6%	-0.4%	1.1%	-1.6%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	-1.3%
Turkey	0.7%	-2.3%	-3.0%	-0.2%	-0.7%	-0.4%	1.2%	-1.4%	-2.7%	-0.1%	0.0%	0.1%	0.2%	0.2%	0.0%	-0.4%
United Kingdom	0.9%	-2.1%	-3.0%	0.4%	0.0%	-0.4%	-0.5%	-3.1%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	1.1%
United States	1.4%	-1.6%	-3.0%	-0.1%	-0.5%	-0.4%	-0.6%	-3.3%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	2.1%
Uruguay	-0.7%	-3.7%	-3.0%	-0.4%	-0.8%	-0.4%	0.4%	-2.2%	-2.7%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	-0.7%

Sources: IMF Staff Assessments and IMF International Financial Statistics (IFS).
1/ Estimated using new 2018 refined specification and new data through 2016.

Table 9. Effect of Product and Labor Market Policies on EBA Current Account Model Residuals

Dependent variable: EBA-CA residual		
	OECD	WEF
	(1)	(2)
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
* significant at 10%; ** significant at 5%; *** significant at 1%		

Sources: Organisation for Economic Co-operation and Development; World Economic Forum; and IMF staff estimates.

Table 10. EBA REER Levels Regression Results: 2015 and 2018 Model

Variables	2015 Model	2018 Model
Lag of NFA/GDP	0.11***	0.06***
Expected GDP growth of medium-term(5 years out), WEO project (rel to TRD PRT)	1.76*	1.96**
Lag of health expenditure to GDP (rel to TRD PRT)	1.74**	4.20***
Lag of VIX * capital account openness	-0.32**	-0.15
Lag of VIX * capital account openness *share of own currency in global reserve	1.01*	0.83
Lag of Trade Openness (avg. of exports and imports to GDP) (rel to TRD PRT)	-0.31***	-0.34***
Share of the country's currency held as FX reserve by central banks worldwide	-0.33***	-0.36***
Log Commodity ToT (43) levels in 2011 vs trading partner	0.06***	0.06***
Private credit/GDP (rel to TRD PRT), Demeaned	0.12***	
Private credit/GDP (rel to TRD PRT), Detrended		0.03
Change in reserves to GDP * cap controls (rel to TRD PRT)	-2.10*	
Change in reserves to GDP * cap controls (rel to TRD PRT) (New)		-3.56*
Population Growth (rel to TRD PRT)	6.02***	2.57
Dependency Ratio (rel to TRD PRT)	0.91***	0.36*
Aging Speed (rel to TRD PRT)	0.63**	
Political Risk Rating (rel to TRD PRT) (ICRG-5)	0.42***	
Political Risk Rating (rel to TRD PRT) (ICRG-12)		0.65***
Real interest rate differential demeaned interacted with K openness (rel to TRD	0.89**	0.59*
Lag Demeaned PPPGDP/Top3(PPP)]	0.16***	0.17***
Lag Capital stock per employed person at current PPPs (2005US$) (rel to TRD PRT)	0.09***	0.11***
Lag Ratio Traded/Non Traded relative to trd part (in logs)	0.22***	0.18***
Share of administered prices in CPI	-2.54***	-2.81***
VAT Revenue, % of GDP (rel to TRD PRT)	1.20**	0.66
Constant	0.19***	0.19***
Observations	876	990
R-squared	0.91	0.90
RMSE	0.140	0.146
Number of Countries	39	39

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 11. EBA REER Index Regression Results: 2015 and 2018 Model

Variables	2015 Model	2018 Model
Lagged NFA		-0.10***
Lag of Demeaned GDPpw/Top3GDPpw (PPP)]* capital openness	-0.49***	
Expected GDP growth of medium-term(5 years out), WEO project (rel to TRD PRT)	1.86***	1.74***
Lagged Public health expenditure to GDP (rel to TRD PRT)	1.23	2.40***
Lag of VIX * capital account openness	-0.26***	-0.17***
Lag of VIX * capital account openness *share of own currency in global reserve	0.84**	0.48*
Share of the country's currency held as FX reserve by central banks worldwide	0.04	-0.06
Output Gap (rel to TRD PRT)		0.43***
Log commodity Terms Of Trade	0.09*	0.17***
Lag of Trade Openness (avg. of exports and imports to GDP) (rel to TRD PRT)	-0.30***	-0.20***
Private credit/GDP (demeaned) (rel to TRD PRT)	0.13***	
Private credit/GDP gap (HP Detrended) (rel to TRD PRT)		0.09***
Change in reserves to GDP * cap controls (rel to TRD PRT)	-1.73***	
Change in reserves to GDP * capital controls (rel to TRD PRT) (New)		-2.34**
Population Growth (rel to TRD PRT)	0.86	1.38
Old age dependency ratio (rel to TRD PRT)		-0.35*
Real interest rate differential interacted with K openness (rel to TRD PRT)	0.66***	0.70***
Lag Demeaned PPPGDP/Top3(PPP)	0.70***	0.20***
Lagged Home bias (rel to TRD PRT)	0.37***	0.19***
Share of administered prices	-2.12***	-1.72***
Dummy south africa apartheid (pre-1994)	0.31***	
Country Fixed Effect Not Shown		
Constant	4.33***	4.48***
Observations	882	1,004
R-squared	0.61	0.58
RMSE	0.083	0.085
Number of countries	40	40

* significant at 10%; ** significant at 5%; *** significant at 1%

Annex I. Data Sources

Variable	Sources
1. Net Foreign Assets	External Wealth of Nations Dataset: Lane and Milesi-Ferretti (2001) (EWN)
2. Output Per Worker	World Economic Outlook
3. Capital Openness	Quinn Database
4. Oil and Natural Gas Trade Balance, Resource Temporariness	WEO; World Bank, World Integrated Trade Solution (WITS); BP Statistical Review
5. GDP growth, Forecast in 5 Years	WEO
6. Public Health Spending/GDP	Organisation for Economic Co-operation and Development (OECD); World Bank, World Development Indicators (WDI); United Nations Economic Commission for Latin America and the Caribbean (CEPAL); IMF, Financial Affairs Department (FAD); Asian Development Bank (ADB)
7. Chicago Board Options Exchange Volatility Index (VIX)	Haver Analytics
8. Own Currency's Share in World Reserves	IMF, Currency Composition of Official Foreign Exchange Reserves (COFER)
9. Output Gap	WEO
10. Commodity Terms of Trade and Trade Openness	WEO
11. Detrended Private Credit/GDP	Bank for International Settlements (BIS) (credit statistics); WDI
12. Cyclically adjusted Fiscal Balance	WEO
13. (ΔReserves)/GDP* K controls	WEO; EWN; Data Template on International Reserves and Foreign Currency Liquidity
14. ICGR-12	International Country Risk Guide (ICRG)
15. Prime Savers Share	UN World Population Prospects
16. Life Expectancy at Prime Age	UN World Population Prospects
17. Life Expectancy at Prime Age	UN World Population Prospects
18. Population Growth	UN World Population Prospects
19. Old-age Dependency Ratio	UN World Population Prospects

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