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Productive development, global integration, and fiscal response functions in developed and developing countries: An empirical study

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Productive development, global integration, and fiscal response functions in developed and developing countries: An empirical study

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Abstract

Multiple shocks since the Great Recession have had harsh effects on public finances in both developed and emerging and developing (ED) countries. The Bank of International Settlements, the World Bank and the International Monetary Fund now see fiscal consolidation as the primary goal of national governments. In this paper, we estimate Fiscal Response Functions, i.e., the reaction of fiscal policy and public budget to accumulated debt, for developed and ED economies. Our analysis covers the 1980 to 2018 time spell and adopts a two-stage least squares strategy. We use the cyclically-adjusted primary balance (CAPB) as dependent variable to control for business cycle's effects on the public budget via automatic stabilizers. We expand previous works by considering the role played by the structural features of the economy, namely its productive structure, and by global factors in determining structural fiscal balances. We obtain three main results. First, manufacturing development consistently emerges as a core determinant of improved CAPB and strengthened fiscal solidity in both developed and ED countries. Second, ED and developed countries respond asymmetrically to accumulated debt stocks. Pressures to undertake fiscal adjustments and debt intolerance emerge much earlier in the former than in the latter. Third, global factors play a more relevant role in ED countries than in developed ones. On average, the accumulation of negative net portfolio positions on international financial markets may induce ED countries to pursue more restrictive discretionary fiscal policies. However, periods of financial "bonanza", i.e., unusually large surges in net portfolio inflows, may cause pro-cyclical fiscal stances. The opposite holds true for advanced economies. Our analysis suggests that it may be hard to remove fiscal policy from hardships in poorly developed productive systems. Moreover, ED countries should pursue trade and financial integration in the global economy with significant degrees of caution.

Keywords: Fiscal response function; Public debt; Structural change

JEL: E62; H63; H30; O11

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1. Introduction

The sustainability of public finance has re-emerged as a pressing issue in the aftermath of successive global shocks. Fiscal actions taken in response to COVID-19, the cost-of-living crisis, and, before them, the Great Financial Crisis (GFC) in 2007–08 have raised public debt (as a ratio of GDP) to unprecedented levels in the post-WWII era in both developed and developing countries. Back in 2021, a World Bank publication by Kose *et al.* (2021) was titled "A mountain of Debt", a quite telling indication of mounting concern about excessive public debt. In a similar vein, the Bank for International Settlements (BIS) has more recently warned in its 2023 and 2024 reports that "there is an urgent need to consolidate fiscal positions" (BIS, 2023, p.69), since "long-term government debt trajectories pose the biggest threat to macroeconomic and financial stability" (BIS, 2024, p.62). The IMF fully shares this view as it calls for "durable fiscal consolidation efforts to safeguard sustainable public finances and rebuild buffers in a context of slowing medium-term growth and high real interest rates" (IMF, 2024, p.xi). Such concerns are even more justified since existing global challenges – such as the Sustainable Development Goals (SDGs) and the green transition (UNCTAD, 2019) – will place significant additional demands on public investment.

The widespread perception that governments should prioritise fiscal consolidation has sparked two distinct but interconnected lines of research. On the one hand, several technical and policy-oriented reports have focused on the adoption and reforms of fiscal rules to possibly combine fiscal solidity, namely declining public debts, and budget flexibility (Eyraud *et al.*, 2018; Caselli *et al.*, 2022; Alonso *et al.*, 2025; World Bank, 2026, among others). On the other hand, even before the disruptions caused by COVID-19, several economists have tried to estimate Fiscal Reaction Functions (FRFs), namely how fiscal policy stance and public budget respond to the accumulation of public debt (see, for instance, Ostry *et al.*, 2010; Ghosh *et al.*, 2013; Everaert and Jansen, 2018). Estimating FRFs may help identify threshold levels of public debt beyond which fiscal fatigue and unstable dynamics may emerge, increasing default probability.

In this paper, we aim to contribute to this second stream of analysis. More specifically, we advance the argument that public balance is not solely a function of debt dynamics or standard macroeconomic variables, but is structurally determined by the productive characteristics of the economy and its mode of integration into the global financial system. While the existing literature on Fiscal Response Functions has primarily focused on the relationship between public debt and fiscal balances, it has largely overlooked how underlying development processes shape governments' ability to sustain and adjust fiscal positions. We contend that the fiscal balance – and, by extension, fiscal capacity – is deeply rooted in the structure of production, the degree of technological sophistication, and exposure to volatile international capital flows (Chang and Lebdioui, 2020; Jensen, 2022; Botta *et al.*, 2023). In this sense, fiscal sustainability cannot be fully understood independently of structural transformation and development trajectories.

From this perspective, our paper speaks directly to broader debates in development economics on state capacity, structural change, and macroeconomic vulnerability. A growing body of literature highlights that the ability of states to mobilise resources and implement counter-cyclical policies depends on the composition of their economies, the size of the formal

sector, and the stability of their external accounts. However, empirical macroeconomic analyses of fiscal behaviour have seldom integrated these insights in a systematic way. Our approach contributes to bridging this gap by embedding fiscal response analysis within a structuralist development framework, where productive capabilities and external constraints jointly shape macroeconomic policy space.

Our work tries to fill these gaps and provide novel contributions to the literature on FRFs by extending it in three main ways. First, it considers a wider sample of countries that also include ED countries, mostly middle-income economies, on top of advanced ones. The purpose is to identify potential asymmetries in public budgets' responses to public debt and other "control" variables between "central" and "peripheral" economies given that lenders' "debt intolerance" is usually stronger in the latter (Reinhart *et al.*, 2003). Second, consistent with the structuralist tradition (de Paula *et al.*, 2024; Cimoli *et al.*, 2020), it extends fundamental FRF estimates by including structural factors that capture the degree of productive and technological development of the economy. Third, our econometric analysis also considers the role of international financial integration in shaping the economy's structural fiscal position, as measured by the cyclically-adjusted primary balance (CAPB).

We obtain three main results. First, productive development emerges as the more consistent positive determinant of the CAPB across developed and ED countries alike. Manufacturing development, in particular, seems to play a fundamental role in structurally strengthening a country's fiscal position, most likely via its effects on the employment structure and the degree of informality characterising the economy. In this sense, manufacturing development may emerge as a precondition of countries' capability to implement redistributive measures (Jensen, 2022) and undertake public spending in vital areas for social inclusion such as education and healthcare systems (Hartman *et al.*, 2017). Second, ED and developed countries respond asymmetrically to accumulated public debt. Consistent with previous findings by Ostry *et al.* (2010) and Ghosh *et al.* (2013), developed countries implement discretionary fiscal adjustments (i.e., positive variation of the CAPB) only with public debt levels around 75 per cent of GDP, and instability may emerge for debt-to-GDP ratios even above 250 per cent. ED countries immediately respond to rising public debt by pursuing discretionary fiscal consolidation instead. Instability, with ensuing higher default risks, may kick in as soon as public debt approaches about 35 per cent of GDP. This is a further demonstration of pressing fear for "debt intolerance" in ED countries. Third, global factors tend to play a more relevant role in ED countries than in developed ones. The accumulation of negative net portfolio positions on international financial markets induces the former to pursue more restrictive discretionary fiscal policies, whilst the opposite seems to be true for the latter. However, periods of financial "bonanza", i.e., unusually large surges in net portfolio inflows, and/or capital account liberalisation, i.e., increasing values of the Chinn-Ito index, tend to weaken the CAPB in ED countries (these variables are not statistically significant in advanced economies). This may constitute further evidence of pro-cyclical dynamics and boom-and-bust cycles triggered by financial integration reforms in ED countries (Diaz-Alejandro, 1985; Frenkel and Rapetti, 2009; Ghosh *et al.*, 2016; Alberola and Sousa, 2017).

These findings carry important policy implications. In particular, they suggest that improving fiscal space in ED economies cannot rely solely on fiscal consolidation strategies, but requires sustained efforts toward productive diversification, technological upgrading, and

the management of external financial exposure. Fiscal capacity should thus be understood not only as a macroeconomic outcome but also as a reflection of deeper structural and developmental processes.

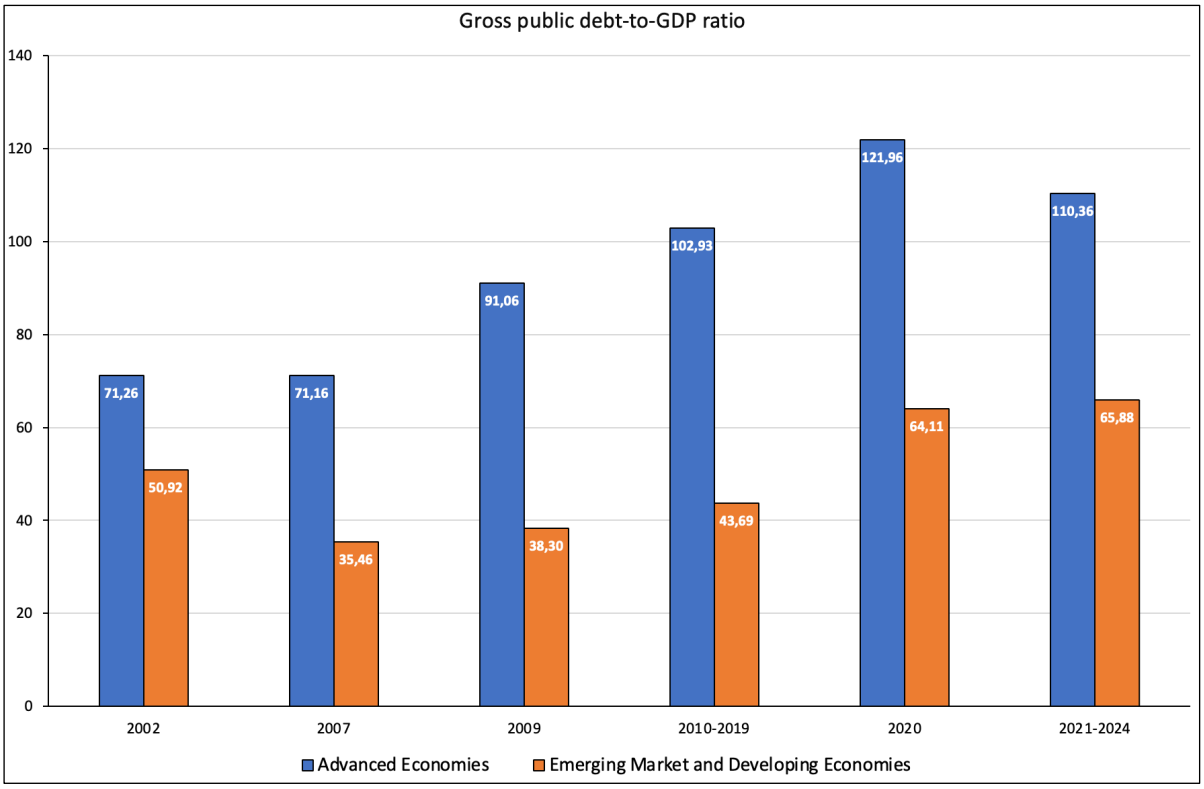
The rest of the paper is organised as follows. Section 2 reviews the relevant literature about FRFs. Section 3 outlines our methodology, data, and empirical model, including the "extended" specification of the FRF developed in this paper and the identification strategy we adopt, which uses Two-Stage Least Squares (2SLS). Section 4 presents the regression results focusing on the roles of debt, productive structure, and economic integration, financial integration in particular, over the structural fiscal position of developed and ED countries. Section 5 concludes.

2. Literature Review

There is little wonder that the sequence of shocks hitting the global economy since the 2007-2008 GFC has borne huge consequences for the fiscal variables of advanced and ED economies alike. Table 1 below shows that the public debt-to-GDP ratio has climbed well above levels observed in the early 2000s. As noted by Kose *et al.* (2021 and 2022), it now stands at the highest levels recorded in the last 4 decades in the case of ED countries.

Such an impressive and widespread rise in public debt stocks has prompted international institutions such as the BIS (2023, 2024), the IMF (2024), and the World Bank (2026) to identify bold and durable fiscal consolidation as a top priority. Such a call for immediate fiscal adjustments is primarily meant to ensure debt sustainability. On top of this, it may help to create more margins of manoeuvre to weather possible future shocks and fiscal space to tackle existing structural challenges. Indeed, according to UNCTAD (2019), public efforts to achieve SDGs 1 – 4 may imply public debt stocks rising to 100 – 150 per cent of GDP in low- and upper-middle-income countries. In low-income countries, this ratio might reach about 280 per cent of GDP. Ananthakrishnan *et al*. (2022) estimate that the required global financial commitments to keep global warming to 1.5 degrees may range from 3 to 6 trillion per year until 2050, with current green funds standing at 630 billion dollars per year. Public actors may need to play a role in filling this gap (Lamperti *et al*., 2019). Given existing debt records, it makes perfect sense to wonder whether countries will ever have enough fiscal space to accomplish at least part of these goals.

Table 1 – Gross public debt-to-GDP ratio in advanced and ED countries, 2002 – 2024.



Source: Authors' computation based on data from the IMF World Economic Outlook Dataset.

The literature on fiscal solidity and public debt sustainability is broad. The first research line investigates institutional factors that promote sound fiscal policy. It spans from studies on the impact of financial and capital account liberalisation on public budgets to analyses of the effectiveness of fiscal rules, independent fiscal councils, and sovereign wealth funds in safeguarding fiscal discipline. Furceri and Zdzienicka (2011), for instance, find that fiscal deficits have been generally smaller and that discretionary government spending has been lower in more financially integrated OECD countries from 1970 to 2009. Frankel *et al.* (2013) somehow extend this result to ED countries by noting that stronger *de jure* financial integration in the global financial system (i.e., a higher Chinn-Ito index) reduces the cyclical component of public spending. According to them, lower restrictions on international capital mobility strengthen international investors' oversight of government behaviour, reduce procyclical fiscal stances, and avoid fiscal dominance[1]. This finding is not undisputed, though. Indeed, Alberola *et al.* (2016), Alberola and Sousa (2017), and Benetrix and Lane (2017) suggest that global financial factors may still bear pro-cyclical effects over fiscal policy and economic dynamics in ED countries, albeit they may have improved their capability to counteract "normal" and natural resource-related business cycles.

Better management of windfall revenues may result from improvements in the institutions governing fiscal policy. Chile, for instance, is usually referred to as the poster child of the

[1] At the beginning of the 1970s, McKinnon (1973) and Shaw (1973) theorised financial and capital account liberalisation as a fundamental remedy against fiscal dominance and fiscal profligacy, i.e., the main culprit, in their view, of macro instability in developing countries.

effective introduction of spending-based fiscal rules and independent fiscal councils. According to Frankel (2013), such institutional arrangements helped Chile to graduate from natural resource-related fiscal and economy-wide procyclicality. Frankel (2010) thus advocates adopting Chilean-type fiscal rules and commodity (wealth) funds in resource-dependent countries to sterilise the destabilising effects of resource booms. A widening range of ED countries is, in fact, following Chile (Alonso *et al.*, 2025; The World Bank, 2026). Brändle and Elsener (2024) find that fiscal rules, particularly balanced budgets and spending rules, have positive effects on fiscal variables (improving surpluses or squeezing deficits). In a similar way, the World Bank (2026) documents that fiscal rules contribute to improving CAPBs in the medium term in both advanced and ED countries. In the latter, however, such improvements last over time only in the presence of strong and credible institutions[2].

A second stream of analysis focuses on how fiscal stances and, hence, fiscal variables may respond to accumulated debt stock. From a theoretical point of view, public debt is usually deemed sustainable if the government respects an intertemporal budget constraint, such that current deficits (and accumulated debt) are matched by future surpluses. In a seminar paper, Bohn (1998) finds that the US government accomplishes this sustainability requirement by estimating that it increases primary surpluses (reduces primary deficits) whenever the debt-to-GDP ratio rises. More recently, Ostry *et al*. (2010), Ghosh *et al.* (2013), and Everaert and Jansen (2018) have expanded this type of study further by estimating FRFs for a wider set of advanced countries. They generally envision (and estimate) a non-linear cubic relation between the primary balance and the accumulated (i.e., lagged) public debt stock. Governments may largely forego stabilisation programs and run larger primary deficits (declining surpluses) insofar as public debt is low (a negative coefficient connected to the "straight" debt variable). Fiscal stabilisation is undertaken, and primary balances improve at moderate levels of public debt, around 50 per cent of GDP (positive coefficient on the *squared* debt term). Unstable dynamics and "fiscal fatigue" may eventually kick in if public debt reaches levels of about 150 per cent of GDP (depending on countries' specificities). Indeed, if markets perceive debt as excessively high and question the political/economic viability of consolidation plans, the primary budget may even start spiralling downward (negative coefficient of the *cubic* debt term), and a debt crisis may unfold[3].

[2] There are several institutional aspects that, according to the papers and reports mentioned in the main text, can make institutions "strong" and fiscal rules effective. A synthetic list includes: (i) the design of fiscal rules, (i.e., their target – spending-based vs. revenue-based or structural balance-based rules – and their transparency); (ii) the accountability and political independence of the bodies implementing them (ex: a committee of experts independent from ruling political coalitions); (iv) the level of commitment with which fiscal rules are enforced (ex: fiscal rules having the rank of constitutional laws); (v) the consensus and "ownership" of fiscal rules by the public.

[3] Ostry *et al.* (2010) and Ghosh *et al.* (2013) define "fiscal space" as the difference between the current debt level and the one beyond which fiscal solvency is under threat. It refers to the room for manoeuvre countries have without risking debt sustainability. Kose *et al.* (2022) provide an alternative definition, according to which fiscal space is the gap between the current public deficit and the one consistent with the intertemporal budget constraint. They also compile a comprehensive database of indicators influencing fiscal space across more than 200 countries. On top of the level of public debt and deficit, they also consider the level of private debt, the domestic or foreign ownership of private and public liabilities, balance sheet exposure to interest and exchange rate shocks, the degree of financial market accessibility (as captured by Credit Default Swaps on and international agencies' rating of sovereign bonds).

In the above-mentioned estimations of FRFs, the primary budget is typically treated as a function of debt and "pure" macro variables, such as the output gap, the level of government spending, and the rate of inflation. Low attention, if any, is paid to the productive structure of the economy, its sectoral composition and/or its technological capabilities. This is understandable given that such studies look at advanced economies where (in most cases) the formal sector (either manufacturing or services) represents the bulk of the economy; the tax base is large; and the tax system, particularly direct income taxation, is well developed.

Things do change if we extend our analysis to ED countries. In fact, following Jensen (2022), there is a positive relation between economic development and the development of the taxation system, as well as of public engagement in social and educational policy (Hartmann *et al.*, 2017). More generally, structuralist theory emphasises that structural change and productive transformation, by affecting the external constraints on growth (among other things), are fundamental determinants of macroeconomic performance, including fiscal soundness (Cimoli *et al.*, 2020; Porcile *et al.*, 2023). Pinto (1970), discussing the case of Latin American economies, coined the term "structural heterogeneity" back in the 1970s. This refers to the co-existence of highly productive enclaves (mining, for instance) with broad swaths of low-productivity traditional sectors. Such heterogeneity gives rise to unequal income distribution and chronic fiscal weakness. On the one hand, large informality, low wages and unequal incomes narrow the tax base and reduce tax collection. On the other hand, governments largely rely on volatile commodity-related export revenues. Even if commodity booms may temporarily swell revenues (via royalties, corporate taxes, or public companies' profits), the lack of diversification means that reversals in commodity prices may quickly drain tax receipts, making fiscal planning more difficult regardless of formal fiscal rules. It is not by chance that recent reports (OECD, 2025) document a far lower and more volatile average tax revenue-to-GDP ratio in Latin America (around 23 per cent of GDP) than in OECD countries (34 per cent).

More recently, some neo-structuralist contributions have provided a comprehensive theoretical overview of the complex relation between structural change, productive development and fiscal variables (Ocampo, 2011; Neto and Porcile, 2017; Botta *et al.*, 2023). Mutually reinforcing mechanisms are at work. Developed productive systems may have positive implications for the solidity of fiscal balances and, hence, for available fiscal space for public investment. Productive development may, in turn, benefit from public investment (Neto and Porcile, 2017), as well as counter-cyclical macro policies, among them fiscal policy (Ocampo, 2011). Botta *et al.* (2023) formally describe the boom-and-bust cycles that may unfold in ED countries in the aftermath of financial liberalisation reforms or during periods of financial "bonanza". In their model, more advanced and diversified productive structures make economies more resilient and capable of "affording" higher levels of external debt, albeit they may not suffice to eradicate finance-led instability.[4] Moreover, excessive fiscal austerity driven by rising foreign debt may heighten instability rather than tame it. These mechanisms may eventually force ED countries into "middle-income traps" or development "gridlocks"

[4] It is perhaps quite telling that tough financial crises also hit catching-up East Asian countries such as Thailand, Malaysia and, more importantly, South Korea, back in 1997-1998 after periods of financial liberalisation and surges in foreign capital inflows. More developed, productive structures do not make countries immune to financial crashes. However, they certainly contribute to prompt quicker and more robust recoveries than what is observed in other, more structurally fragile ED countries (see Cerra and Saxena, 2008; Frenkel and Rapetti, 2009).

(Jankowska *et al.*, 2012; Hartmann *et al.*, 2016 and 2020; Botta *et al.*, 2025). Weak productive and technological capabilities not only increase vulnerability to external shocks but also constrain fiscal actions in downturns due to tight financing and Balance of Payments (BoP) constraints. Forced fiscal inaction, in turn, protracts and exacerbates productive/technological backwardness. Integration in the global financial system can make such development hurdles more challenging in the context of a BoP-dominated development pattern (Ocampo, 2015a). Indeed, just a few successful East Asian countries managed to escape these traps. They managed to combine structural change and productive diversification with stronger (than other ED countries) emphasis on *pro-development* social policy such as education that, together with active industrial policy, further boosted the build-up of productive and technological capabilities[5] (Jankowska *et al.*, 2012; Hartmann *et al.*, 2016 and 2020).

The aim of this paper is to extend the empirical analysis of FRFs to ED countries. In these countries, debt-related constraints to fiscal policy are likely even more paramount than in advanced economies. The contribution to the literature on FRFs is twofold. First, given the increasing integration of ED countries into the global financial system (UNCTAD, 2019; Erten et al., 2021), we integrate more "conventional" estimates of FRFs with studies on the role of globalisation, particularly financial globalisation, on fiscal balances. Second, we give a neo-structuralist "twist" to our analysis by considering how productive and technological development, as well as natural resource revenues, may structurally influence the solidity of public budgets. In this sense, this paper "embraces" the neo-structuralist theory described above and seeks to complement it from an empirical perspective. We build upon a previous companion work by Botta *et al.* (2025). We further develop it on several fronts: the range of variables capturing financial factors affecting countries' structural fiscal balances; the estimation strategy that controls for endogeneity; and the role of autocorrelation in the evolution of the structural public budget. The following methodological section will dig into all these aspects in detail.

3. Empirical analysis

The starting point of our empirical analysis is the non-linear cubic relation between accumulated public debt (as a share of GDP) and primary balance at the centre of previous benchmark studies by Ostry *et al*. (2010), Ghosh *et al*. (2013), and Everaert and Jansen (2018). They assume that fiscal policy, and hence the primary public budget, may react differently at different debt levels. Whilst governments may indulge in lax fiscal policy and let primary deficits grow (surpluses shrink) when debt is low, fiscal consolidation (and improving primary balances) becomes a preeminent policy goal at moderate debt levels. Instability may emerge when debt reaches supposedly "unsustainability" thresholds. In this case, primary balances may deteriorate even in the presence of austerity measures, as the economy likely spirals into a deeper recession and financial markets no longer trust the economic/political feasibility of

[5] Cook and Kwon (2007) describe East Asian approach to social policy as "welfare developmentalism". Attention to some social policies (such as education) was seen as an additional tool to promote productive development alongside social mobility and a relatively low (with respect to other ED countries) inequality standards.

adjustment programs. We maintain the assumption of this non-linear relation but test whether it differs between ED countries and advanced economies.

Once given the common ground with previous studies, we depart from them both in terms of the dependent variable related to the primary fiscal balance and the set of independent factors explaining it. This can be better grasped from equation (1) below. It represents the baseline regression of our analysis:

$$CAPB_{i,t} = \alpha_i + \beta_t + \sum_{j=1}^{3} \gamma_j d_{i,t-1}^{j} + \delta ProdDev_{i,t} + \eta NR_{i,t} + \mu IF_i + \eta TO_{i,t} + \rho i_{i,t-1}^{CB} + \varepsilon_{it} \quad (1)$$

The above-mentioned previous studies, as well as Botta *et al.* (2025), use the public primary budget-to-GDP ratio as their dependent variable. In this paper, instead, we use the cyclically-adjusted primary balance (CAPB) as a ratio of potential output. This is the fiscal balance net of interest payments (hence, the primary balance), corrected for the output gap, i.e., the phase of the business cycle. It is the primary budget that would emerge if the economy were operating at full potential. The reason behind this modelling choice is twofold. First, (variations of) the CAPB represents a better, albeit imperfect, measure (see more on this below) of *discretionary* fiscal policy, i.e., changes in fiscal variables that are not related (or less related) to the business cycle and the state of the economy via automatic stabilisers. The CAPB can thus better control for endogeneity issues inherent to studies that involve government action and fiscal policy. Second, we are interested in investigating how the structural features of the economy, namely its productive structure and degree of integration in the global economy, may influence the "fundamentals" of the public budget. The CAPB may better reflect such fundamentals than actual (primary) fiscal balance values.

The CAPB is far from perfect and ideal as a measure of discretionary fiscal policy, though. On the one hand, it rests on theoretical constructs, such as the definition and measurement of potential output, that are highly debatable (Carnazza *et al.*, 2023). On the other hand, several contributions noted that the CAPB may not be able to account for or remove all business-cycle-related factors that may affect fiscal balances. This is the case of stock markets' capital gains or losses, for instance (Morris and Schuknecht, 2007). Moreover, some discretionary fiscal policies may still result from policymakers' desire to respond to business cycle dynamics, with endogeneity issues reappearing from the back door (Fatas and Mihos, 2009; Guajardo *et al.*, 2014). We address these problems with our methodological approach, which controls for endogeneity using a 2SLS estimation strategy and lagged explanatory variables. Also, we run a battery of robustness tests in which we include the output gap as a further possible determinant of the CAPB. This helps us to verify whether changes in the CAPB do reflect genuine government's concerns about debt sustainability (among other factors) or, alternatively, they are the result of endogenous discretionary measures (see Fatas and Mihos, 2009), i.e., *ad-hoc* fiscal actions that governments may take in response to the dismal short-run state of the economy[6]. Finally, although imperfect, the CAPB still allows us to stretch the

[6] In the post-GFC period, increasing evidence has emphasized that long-run dynamics cannot be considered independetly from short-run fluctuations, financial shocks in particular (Cerra and Saxena, 2008; Perez-Caldentey and Titelman, 2014). The inclusion of the output gap in our robustness tests may also control for the effect that the business cycle may carry out on long-run growth and potential output, hence the CAPB itself.

country and time dimensions of our sample as far as possible, compared with an alternative, anecdotal, history-based approach that identifies discretionary non-business cycle-related fiscal policy via country-by-country inspection of relevant fiscal documents (e.g., countries' annual budget laws).

When it comes to the set of explanatory factors on the right-hand side of equation (1), $d_{i,t-1}$ stands for the lagged value at time "t – 1" of the public debt-to-GDP ratio in country "i". As already discussed above, this term enters in cubic relation in our estimations, hence the expression $\sum_{j=1}^{3} \gamma_j d_{i,t-1}^{j}$ in equation (1). This is a common aspect across previous studies, now extended to ED countries (see more below). Asymmetries in how these debt terms may affect the CAPB in developed and ED countries are meant to capture possible greater debt intolerance in the latter and, hence, a quicker move toward discretionary fiscal consolidation (i.e., improving CAPBs).

The factor next to public debt on the right-hand side of equation (1) is "*ProdDev*". It is a vector of variables that captures the economy's productive and technological capabilities, i.e., its level of productive-technological development. This is part of the novel contributions of our paper. Following Jensen (2022), we aim at testing whether more advanced productive systems *structurally* strengthen (or not) the public budget (regardless of possible business cycle-related variations) and, hence, the government's fiscal capacity. We use two proxies for productive-technological development. The first one is the manufacturing GDP share *gap* (see equation (2) below). This is the difference (in percentage terms) between *actual* manufacturing contribution to nominal GDP $\left(GDP_{i,t}^{M}/GDP_{i,t}\right)$ in country "i" at time "t" versus its *expected* value $(GDP_{i,t}^{M^E}/GDP_{i,t})$ based on fundamental factors of industrialisation/de-industrialisation à la Rodrik (2016). These are, in turn, related to the general degree of development of the economy and to its size[7].

$$Man.GDP\ Share\ Gap = \frac{(GDP_{i,t}^{M}/GDP_{i,t}) - (GDP_{i,t}^{M^E}/GDP_{i,t})}{(GDP_{i,t}^{M^E}/GDP_{i,t})} \qquad (2)$$

A positive manufacturing GDP share gap indicates a country with a larger manufacturing sector than would be expected given the stage of development of its economy. In a Kaldorian fashion, this is taken as a positive indicator of higher productive-technological capabilities, given the usually positive association between manufacturing and innovation, product diversification and/or productivity dynamics. A negative manufacturing GDP share gap stands for signs of *premature* de-industrialisation instead (Botta *et al.*, 2023), and a possible weakening of domestic production-technological capabilities. The second proxy for production-technological development is the more general Economic Complexity Index (ECI) proposed by Hidalgo and Hausmann (2009).

In equation (1), $NR_{i,t}$ represents natural resource rents. Following Lange *et al.* (2018), they are measured as the difference between revenues from the sale of natural resources and production costs (as a share of GDP). The exploitation of natural resources has controversial

[7] Manufacturing contribution to GDP is expected to follow an inverted U-shaped trajectory throughout the development process of an economy (see Rowthorn and Ramaswamy (1997), among many others).

effects on the public budget. Windfall revenues from natural resources have been traditionally associated with more pro-cyclical and profligate fiscal policy in ED countries (Talvi and Vegh, 2005; Frankel, 2012; Arroyo Marioli and Vasishtha, 2025). In the presence of weak institutions, governments of (resource-rich) ED countries may not resist the temptation to (over-)spend rising fiscal revenues during commodity booms. Larger (lower) public deficits (surpluses) and the accumulation of debt may then force countries to painful discretionary fiscal adjustments when the boom bursts. Institutional improvements over the last two decades may have helped ED countries graduate from commodity-related procyclicality (Frankel et al., 2013; Céspedes and Velasco, 2014). The introduction of commodity-related fiscal rules and sovereign wealth funds could have made resource revenues conducive to more solid structural fiscal balances. The inclusion of $NR_{i,t}$ in equation (1) aims at addressing such controversy.

An additional novel aspect of our work is the inclusion of international finance as a determinant of FRFs. We do this via the vector term IF_i in equation (1). More specifically, IF_i consists of three elements:

- Net Portfolio Position $\left(NPP_{i,t-1}\right)$: This is the *net stock* of foreign portfolio assets (debt securities and equities) held by country "*i*" at time "*t* – 1" as a share of GDP. This variable is meant to capture the role of international capital in "disciplining" the government's discretionary fiscal policy decisions, as reflected in the CAPB. In a way, whilst public debt variables may measure both domestic and foreign "bonds vigilantes" concerns about debt sustainability, $NPP_{i,t-1}$ may reflect vulnerability to broader shocks on international financial markets. Their effects on fundamental macro prices such as the exchange rate can equally impair the fiscal and broader financial solidity of an economy. Countries with higher stocks of domestic liabilities held in foreign hands (i.e., lower or negative values of $NPP_{i,t-1}$) may adopt more diligent fiscal stances and pursue larger (lower) structural primary surpluses (deficits) to preserve foreign investors' trust. We look at portfolio investment because this is typically the most volatile component of international capital. It may quickly react to any loss of confidence in the domestic government's ability to manage the public budget, thereby tightening market-imposed discipline. In this sense, we also consider investment in private bonds and equities that are not directly interested in the solidity of public finances. An indirect link may exist, though. Indeed, governments may be induced to run structural public surpluses to compensate for larger private sector foreign indebtedness (Kose *et al.*, 2022). Positive CAPBs may constitute public buffers to deploy in the event of private sector's financial difficulties. Structurally more conservative fiscal stances, hence better CAPB, may also reinforce investors' perception about the stability of some crucial macro prices, the exchange rate for instance. A stable exchange rate is often fundamental to keep (foreign indebted) private companies' balance sheets solid and to avoid volatility in the stock exchange.
- Chinn-Ito index: This is the most common index of *de jure* capital account liberalization. It ranges from 0 to 1 (when normalized), with higher values associated to more deregulated international financial transactions. It represents the easiness with which investors could move capital in and out of an economy, thus capital mobility. In principle, we would expect a positive correlation between the Chinn-Ito index and the CAPB. In presence of possibly

higher international capital responsiveness to bad news, pressures to target larger structural surpluses (lower deficits) are likely stronger.

- Financial boom dummy ($d_{i,t}^{FIN}$): This is a dummy variable that is meant to capture episodes of "financial bonanza", i.e., periods characterised by "unusually" high *levels* of net non-FDI capital inflows. The financial boom dummy takes the value 1 during such periods and 0 otherwise. We identify episodes of financial bonanza according to the following two criteria: (i) positive values of net non-FDI capital inflows for at least three years in a row; (ii) sub-period average that is higher than the full-period country-specific average adjusted (increased) by ten per cent of one standard deviation.[8] We include the financial dummy in our estimations, consistent with the literature on the effects of international finance on pro-cyclical discretionary fiscal policy. The other way around, we want to test whether the "when it rains, it pours" adagio can be applied to the relation between international capital and fiscal variables.

Equation (1) also considers two additional pretty standard control variables. The first one is the degree of trade openness of country "*i*" at time "*t* – 1". As usual, it is defined as the sum of import (IMP) and export (EXP) flows over GDP (see equation (3) below):

$$TO_{i,t} = \frac{(IMP_{i,t} + EXP_{i,t})}{GDP_{i,t}} \qquad (3)$$

Trade openness can affect the structural fiscal budget in various ways. On the one hand, according to Bachas *et al.* (2024), trade integration may favour the relative expansion of the formal sector, which, in turn, increases the effective tax rate, tax collection, and overall tax revenues. On the other hand, in many highly open economies, Mexico for instance, the export sector has weak linkages with the rest of the economy, and hence it does not automatically allow for an expansion of formal employment and improvement of effective tax collection. Moreover, trade openness may be associated with a reduction in indirect taxes such as tariffs, usually an important source of revenues in many ED countries. According to Cagé and Gadenne (2018), since the 1970s, trade liberalisation has more likely reduced tax revenues in ED countries and impaired their spending capacity. In the end, the signal of the coefficient of this variable on the CAPB is indeterminate from a theoretical point of view, depending on which forces are stronger – those that expand the tax rate or those that limit tax collection. These facts provide valid motivation for including this factor in our analysis. The second control variable is the central bank policy rate ($i_{i,t-1}^{CB}$). Following Afonso and Sousa (2024) and Wolswijk (2026), this measures the impact of monetary policy decisions on discretionary fiscal policy and the CAPB. Positive (negative) values of the coefficient (ρ) may stand for monetary-fiscal policy complementary (substitutability).

[8] As in any "event identification-based" analysis, defining episodes of financial bonanza is somehow discretional. Yet, the two criteria we use have some useful properties. First, they emphasize periods of large capital inflows that extend beyond the very short run and exclude isolated spikes in international capital inflows. Second, they select periods of time characterized by some form of consensus among investors about recipient economies, thus making capital flows relatively stable. Third, they pay attention to countries' peculiarities by considering country-specific averages and variability. Forth, they capture all major episodes of large capital inflows already spotted by the economic literature for our countries sample from 1980s onward.

As indicated by equation (1), all regressions we run include country (α_i) and time (β_t) fixed effects. The former aims to capture time-invariant country-specific characteristics, such as institutional design or quality, as well as social/cultural factors that may influence structural fiscal balances. Considering country fixed effects is further motivated by extending our country sample to include ED countries, which are likely to exhibit higher institutional heterogeneity and a more pronounced role for country-specific factors. The latter is meant to account for common cross-country shocks instead. Given the time horizon of our study, the clearest example of global shocks is the 2007-2008 GFC. The same line of reasoning may apply to the 2013 "taper tantrum" shock in the case of ED countries.

The time horizon of our analysis spans 1980 to 2018. Following Botta et *al.* (2025), we extend the analysis of FRFs to ED countries. Our sample comprises 51 countries, of which 21 are ED economies. The distinction between developed and ED countries is based on the 2024 World Bank country income classification[9]. The full list of countries is reported in Table A.1 in the Appendix. Table A.2 reports the sources from which data are taken. Tables A.3 – A.5 present descriptive statistics for the full sample and for developed and ED countries separately.

From a methodological perspective, following Everaert and Jansen (2018), we adopt a 2SLS estimation strategy. We do so because this addresses the endogeneity issue that may naturally emerge when dealing with macro and policy-related variables. More specifically, we instrumented the manufacturing gdp gap with its first and second lag, as they are expected to be both correlated with and have no direct impact on the endogenous variable[10]. Moreover, similar to previous studies, we use lagged values for public debt and the net portfolio position, which are the most obvious candidates for endogeneity with the primary balance. Using the CAPB instead of the actual primary public budget also reduces this problem since the CAPB, being corrected for the business cycle, does not directly influences the evolution of debt variables as actual primary budget does. Finally, we perform additional estimations including the output gap and the lagged value of the CAPB (i.e., $CAPB_{i,t-1}$) among explanatory variables as a robustness test. We have already discussed the role of the output gap as related to what Fatas and Mihos (2009) label endogenous discretionary fiscal policy. The lagged CAPB is meant to capture persistence in fiscal policy and autocorrelation problems. As it will become clearer later, the robustness test largely confirms the core results of our analysis described in the main text[11].

All regressions are estimated with robust standard errors, clustered by income level to account for within-panel correlation. The validity of the instrumental variable strategy is assessed through a comprehensive set of diagnostic tests, the full results of which are reported in Tables A.6 – A.8 in the Appendix. We check instrument relevance using first-stage F-statistics and validity through overidentification tests, where applicable. Across all

[9] See https://blogs.worldbank.org/en/opendata/world-bank-country-classifications-by-income-level-for-2024-2025.

[10] As argued by Everaert and Jansen (2018), lagged variables are predetermined and have no direct impact on the dependent variable provided that there is no autocorrelation in the error terms. Although their strategy applied to the instrumentation of the output gap, we believe that a similar argument can be extended to our endogenous regressor, the manufacturing share GDP gap.

[11] The use of fixed-effects 2SLS helps address potential biases arising from the inclusion of lagged dependent variables in a panel context. Given the moderate time dimension of the dataset, this approach is appropriate and avoids the need for more complex dynamic panel estimators such as system GMM.

specifications, the results comfortably pass standard thresholds, with very large first-stage statistics indicating strong instruments for debt and the other endogenous variables. This provides clear support for the relevance condition and suggests that weak instrument concerns are not a major issue in our setting. While in some specifications the Kleibergen–Paap rk LM test does not strongly reject the null of underidentification, this appears to reflect limited variation in specific subsamples rather than a structural weakness of the instruments. In most cases, the combination of strong first-stage results and robust inference suggests that the model is adequately identified. Regarding instrument validity, the Hansen J test generally fails to reject the null hypothesis of exogeneity, supporting the use of the chosen instruments. In one subset of models focusing exclusively on developed countries, the Sargan test rejects the null. However, this result should be interpreted with caution, as these specifications cannot accommodate clustered standard errors, making the Sargan statistic less reliable in the presence of heteroskedasticity. Accordingly, greater weight is placed on the Hansen test results from specifications that allow for robust inference.

4. Results

We run batteries of estimations for the full sample and for the two subgroups of countries, separately. Specific regressions for advanced and ED countries aim to uncover heterogeneity and possible asymmetries in the FRFs of these economies. The baseline regression (R1) is grounded in the "standard" public debt variables in cubic form and control variables. It also takes into account our main "structuralist-type" explanatory factor, the manufacturing GDP share gap, and the natural resource variable. Regressions (R2) and (R5) gradually expand the array of explanatory variables to include the ECI index proxying broader technological capabilities and to the various elements related to international finance. Table 1 below presents the estimated determinants of the CAPB for the full sample. The coefficients can be interpreted as the semi-elasticities of CAPB (in percentage of potential GDP) with respect to the regressors.

The coefficients associated with the various debt terms are consistent with previous findings by Ostry *et al.* (2010), Ghosh *et al.* (2013), and Everaert and Jansen (2018). They confirm the existence of a complex, non-linear cubic relationship between accumulated debt stock (as a percentage of GDP) and the public budget, even when the CAPB is used as the dependent variable rather than the actual primary fiscal balance. When public debt is low, governments may embark in discretional fiscal expansions (i.e., $\gamma_1 < 0$ in equation (1)). Fiscal adjustments are implemented at moderate debt levels (i.e., $\gamma_2 > 0$ associated with the squared debt variable – gov debt lag sqr. – in Table 1) instead. Unstable dynamics may finally set in when debt is likely perceived as excessively high (see $\gamma_3 < 0$ connected to the cubic debt term – gov debt lag cub – in Table 1). Although they show the expected signs, such coefficients are often statistically insignificant. This is likely due to the higher level of cross-country heterogeneity in our study compared to previous ones (more on this below). Somehow, this is the expected result of including 21 ED countries alongside 30 advanced ones in the regressions reported in Table 1. In the case of regression (R5), low statistical significance is also due to the considerable reduction in available observations when more granular data on non-FDI capital flows are needed to compute the financial boom dummy variable.

Turning our attention to the role of the productive structure, we find strong evidence that it matters for fiscal outcomes. Coefficients associated with the manufacturing GDP share gap are consistently positive and significant across the board (except for regression R5). A higher manufacturing contribution to GDP (relative to its "expected" value) leads to a more solid CAPB. Indeed, a stronger manufacturing base may improve institutional capacity to tax by boosting formal employment and reducing informality-related leakages. It may broaden the tax base by favouring the expansion of the formal corporate sector (Jensen, 2022) and export activities (Gnangnon, 2020; Cagé and Gadenne, 2018; Gnangnon and Brun, 2017). Moreover, whilst it is normally associated with faster productivity and real wage dynamics (Szirmai and Verspagen, 2015; Taylor and Omer, 2019), it may also reduce vulnerability to commodity cycles. Both facts enable governments to raise tax revenue in a structural way without stifling growth. From a quantitative point of view, with average point estimate equal to 0.38 (across regressions R1 and R4 where this term is statistically significant), given the mean sample values for the manufacturing GDP share gap and CAPB, a 1 percentage point increase in manufacturing contribution to GDP can lead up to 0.5 percentage improvement in the CAPB: 0.53 = 0.38x(3.28/2.37). This is a substantial effect, underscoring the crucial role that manufacturing development can play in building fiscal capacity (Hartmann *et al.*, 2017).

When we also consider the ECI as a broader measure of technological capabilities (regression R2), we get the expected positive effect on the CAPB. However, it is statistically not significant. Once again, this might partially depend on mixing quite heterogeneous advanced and ED countries. Subsample regressions reported in Tables 2 and 3 offer clearer-cut findings, particularly for ED countries.

Economic literature has traditionally portrayed natural resource booms as a "double-edged sword", for ED countries in particular. In principle, they have the potential to significantly improve fiscal variables. In reality, they often encouraged overborrowing, heightened fiscal procyclicality, and eventually led to more acute macro vulnerability. Consistent with Frankel *et al.* (2013) and Cespedes and Velasco (2014), our regressions suggest countries may have significantly reduced their exposure to commodity-led instability. In most regressions, natural resource rents present a statistically significant *positive* effect on the CAPB. Whilst this finding becomes statistically insignificant in advanced economies (see Table 2 below), it is confirmed in the case of ED countries alone (see Table 3). Very likely, this is the result of profound institutional improvements in how resource rents have been managed during the period under scrutiny. By the beginning of the 2000s, i.e., the most relevant period in our sample characterised by high commodity prices (the well-known commodity super-cycle of the 2000s), most ED countries had already introduced commodity-related fiscal rules and sovereign wealth funds. These reforms significantly helped them counter commodity-led fiscal procyclicality and create structural public savings from windfall revenues.

When our attention moves to the role of international finance, coefficients associated to the NPP (regressions 2 and 3) are positive and statistically significant. Countries with more positive international portfolio positions also score higher on structural primary balances. By the same token, countries with largely negative NPPs are generally characterised by lower fiscal "discipline" as underscored by lower (or negative) CAPBs. This is contrary to our expectations, as we hypothesised a negative relation. In our view, higher (net) exposure to volatile foreign capital via debt instruments and equity holdings would have forced countries to run structurally

more conservative fiscal budgets. In reality, what matters most seems to be the "privilege" of some countries like the USA and the UK to pursue structurally more relaxed fiscal balances thanks to easier access to international financial markets. At the same time, Northern European "frugal" ones that may have "in-built" institutional predispositions towards structural fiscal surpluses, are also those "investing" their savings abroad and accumulating positive net portfolio positions. In this sense, it is worth wondering whether there might be asymmetries between advanced and ED countries in the way they respond to net portfolio assets (liabilities). We will discuss this point in more detail below, emphasising the significant differences between these two sets of countries.

Table 1 – Econometric models comparing CAPB determinants across all countries, 1980-2018.

VARIABLES	Full sample R1	Full sample R2	Full sample R3	Full sample R4	Full sample R5
Gov Debt Lag	-0.124	**-0.105***	-0.117	-0.114	-0.00780
	(0.0803)	(0.0567)	(0.0743)	(0.0807)	(0.0180)
Gov Debt Lag Sqr	**0.00119***	**0.00116*****	**0.00120****	**0.00118***	-0.000101
	(0.000635)	(0.000413)	(0.000582)	(0.000630)	(0.000340)
Gov Debt Lag Cub	-1.71e-06	**-1.98e-06***	-1.90e-06	-1.81e-06	7.99e-08
	(1.70e-06)	(1.14e-06)	(1.59e-06)	(1.66e-06)	(9.08e-07)
CB policy rate	-0.0816	-0.0901	-0.0797*	-0.0874	-0.0399***
	(0.0533)	(0.0554)	(0.0460)	(0.0650)	(0.00901)
Trade openness	-0.0112	-0.00778	-0.00965	-0.0119	0.00488
	(0.0234)	(0.0238)	(0.0244)	(0.0223)	(0.00971)
Resource Rent	**0.213****	**0.264****	**0.229*****	**0.199***	0.136
	(0.0976)	(0.106)	(0.0865)	(0.101)	(0.169)
Manuf Share GDP Gap	**0.451*****	**0.444*****	**0.460*****	**0.434*****	0.0914
	(0.0866)	(0.0491)	(0.0835)	(0.0932)	(0.109)
ECI		0.0441			
		(0.0500)			
Net Total Portfolio Position		**0.0140*****	**0.00709*****		
		(0.00314)	(0.000915)		
Chinn-Ito Index				**-0.0100*****	
				(0.00291)	
Fin Boom Episode					-0.237
					(0.509)
Constant	-2.752	-6.522	-3.162*	-2.335	-4.977***
	(2.032)	(4.041)	(1.746)	(2.440)	(0.450)
Observations	734	714	734	693	302
Number of countries	51	49	51	49	33
R^2	0.360	0.397	0.377	0.349	0.326
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1					

Both the Chinn-Ito and the financial boom dummy show the expected negative coefficients, though only the former is statistically significant. These findings seem to confirm that

processes of capital account liberalisation may be accompanied by deteriorations in the CAPB as governments become more inclined to discretionary fiscal expansions. In this sense, capital account liberalisation may be a source of heightened fiscal procyclicality and macro instability, particularly in ED countries (Kaminsky *et al.*, 2004; Ocampo, 2015b). Several mechanisms can be at play. For instance, greater integration into the global financial system may initially boost growth and improve the actual public budget. Governments may be persuaded that liberalisation reforms bear lasting positive effects on growth and the dynamics of potential output, thus making improvements in the fiscal balance permanent. In this environment, it is easy to see how governments could be tempted to distribute the "dividends" of faster growth to the public via structurally more generous fiscal policies. Given the positive sign of the estimated coefficient for NPP, this scenario appears somewhat sustainable across the full country sample, including both developed and developing countries. However, it is questionable whether this would also apply to ED countries alone, given the previous history of finance-led boom-and-bust cycles. We investigate this topic further below, when we conduct our analysis of the two sets of countries separately.

4.1 Comparing ED and developed countries

Tables 2 and 3 present the results of our estimations for developed and ED countries, respectively. When we look at the response of developed countries' structural primary balance to public debt (see lines 1 to 3 in Table 2), our findings are fully consistent with those coming from previous studies on this matter, albeit now related to the CAPB rather than the actual primary budget. Moreover, they are more often statistically significant than those reported in Table 1. This is likely the consequence of considering a subset of more homogeneous countries when moving from the "all countries" setting to developed ones only. In fact, interesting for the purpose of our study, Table 3 showcases considerable asymmetries in the FRFs characterising ED countries with respect to advanced economies. Coefficients γ_1 to γ_3 are significant across all specifications and with opposite signs in comparison to the corresponding estimations in Table 2. ED countries tend to implement discretionary fiscal adjustments and target structural improvements in their primary balances even at low levels of the accumulated public debt stock (i.e., $\gamma_1 > 0$). This sudden corrective reaction to increasing public debt seems to be justified by the fact that instability may kick in much earlier than in developed countries when public debt has not even reached moderate levels (i.e., $\gamma_2 < 0$). The other way around, ED countries are somehow forced to do "whatever it takes" to keep debt ratios from becoming unmanageably high at levels that would otherwise be considered "normal" in advanced economies. The "fundamentals" of the primary public budget appear to get back on track, retrieve credibility and rejoin a stabilising path (i.e., $\gamma_3 > 0$) when even higher debt-to-GDP ratios are likely associated to the implementation of debt rescheduling programs. Improving CAPBs may be the result of the implementation of structural adjustment plans that often come along with debt restructuring.

Table 2 – Econometric models comparing CAPB determinants, developed countries, 1980-2018.

VARIABLES	DEV R1	DEV R2	DEV R3	DEV R4	DEV R5
Gov Debt Lag	**-0.200*** **	**-0.159*** **	**-0.186*** **	**-0.196*** **	-0.0458
	(0.0354)	(0.0351)	(0.0348)	(0.0383)	(0.0632)
Gov Debt Lag Sqr	**0.00182*** **	**0.00160*** **	**0.00175*** **	**0.00186*** **	0.000386
	(0.000365)	(0.000356)	(0.000357)	(0.000387)	(0.000760)
Gov Debt Lag Cub	**-3.40e-06*** **	**-3.20e-06*** **	**-3.41e-06*** **	**-3.61e-06*** **	-1.06e-06
	(1.13e-06)	(1.10e-06)	(1.10e-06)	(1.19e-06)	(2.09e-06)
CB policy rate	**-0.174*** **	**-0.188*** **	**-0.153** **	**-0.207*** **	-0.0508
	(0.0671)	(0.0671)	(0.0659)	(0.0745)	(0.0834)
Trade openness	0.00859	0.0127	0.0114	0.00676	0.0127
	(0.0110)	(0.0107)	(0.0107)	(0.0114)	(0.0153)
Resource Rent	0.0640	0.101	0.0913	0.0422	-0.0137
	(0.0825)	(0.0816)	(0.0810)	(0.0861)	(0.109)
Manuf Share GDP Gap	**0.377*** **	**0.419*** **	**0.390*** **	**0.349*** **	0.0574
	(0.0900)	(0.0903)	(0.0883)	(0.0956)	(0.181)
ECI		-0.0272			
		(0.0325)			
Net Total Portfolio Position		**0.0163*** **	**0.00762*** **		
		(0.00334)	(0.00165)		
Chinn-Ito Index				-0.00598	
				(0.0144)	
Fin Boom Episode					0.363
					(0.401)
Constant	-0.503	-0.397	-1.475	0.401	-4.560*
	(1.696)	(2.858)	(1.673)	(2.318)	(2.558)
Observations	497	482	497	456	182
Number of countries	30	29	30	28	15
R^2	0.433	0.474	0.458	0.419	0.353

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3 – Econometric models comparing CAPB determinants, ED countries, 1980-2018.

VARIABLES	EDE R1	EDE R2	EDE R3	EDE R4	EDE R5
Gov Debt Lag	**0.429*** **	**0.345*** **	**0.386*** **	**0.427*** **	**0.376*** **
	(0.107)	(0.0733)	(0.0824)	(0.107)	(0.0280)
Gov Debt Lag Sqr	**-0.00963*** **	**-0.00815*** **	**-0.00890*** **	**-0.00960*** **	**-0.00995*** **
	(0.00282)	(0.00188)	(0.00221)	(0.00282)	(0.000349)
Gov Debt Lag Cub	**6.34e-05*** **	**5.31e-05*** **	**5.72e-05*** **	**6.32e-05*** **	**6.85e-05*** **
	(1.61e-05)	(1.05e-05)	(1.28e-05)	(1.61e-05)	(4.61e-06)
CB policy rate	0.0368	0.0400	0.0336	0.0357	0.0237
	(0.0436)	(0.0439)	(0.0456)	(0.0441)	(0.0436)
Trade openness	**-0.0695*** **	**-0.0677*** **	**-0.0695*** **	**-0.0692*** **	**-0.0490*** **
	(0.00375)	(0.00150)	(0.00323)	(0.00376)	(0.00667)
Resource Rent	**0.252*** **	**0.291*** **	**0.228*** **	**0.252*** **	**0.451*** **
	(0.00876)	(0.00533)	(0.00516)	(0.00888)	(0.0213)
Manuf Share GDP Gap	**0.744*** **	**0.653*** **	**0.764*** **	**0.746*** **	**0.509*** **
	(0.117)	(0.110)	(0.123)	(0.118)	(0.0949)
ECI		**0.0336*** **			
		(0.00258)			
Net Total Portfolio Position		**-0.0686*** **	**-0.0746*** **		
		(0.00356)	(0.00403)		
Chinn-Ito Index				**-0.00190*** **	
				(0.000663)	
Fin Boom Episode					**-0.346*** **
					(0.0687)
Constant	-12.40***	-12.53***	-12.10***	-12.30***	-9.491***
	(0.965)	(1.110)	(0.839)	(1.001)	(1.170)
Observations	237	232	237	237	120
Number of countries	21	20	21	21	18
R^2	0.412	0.479	0.441	0.411	0.534
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1					

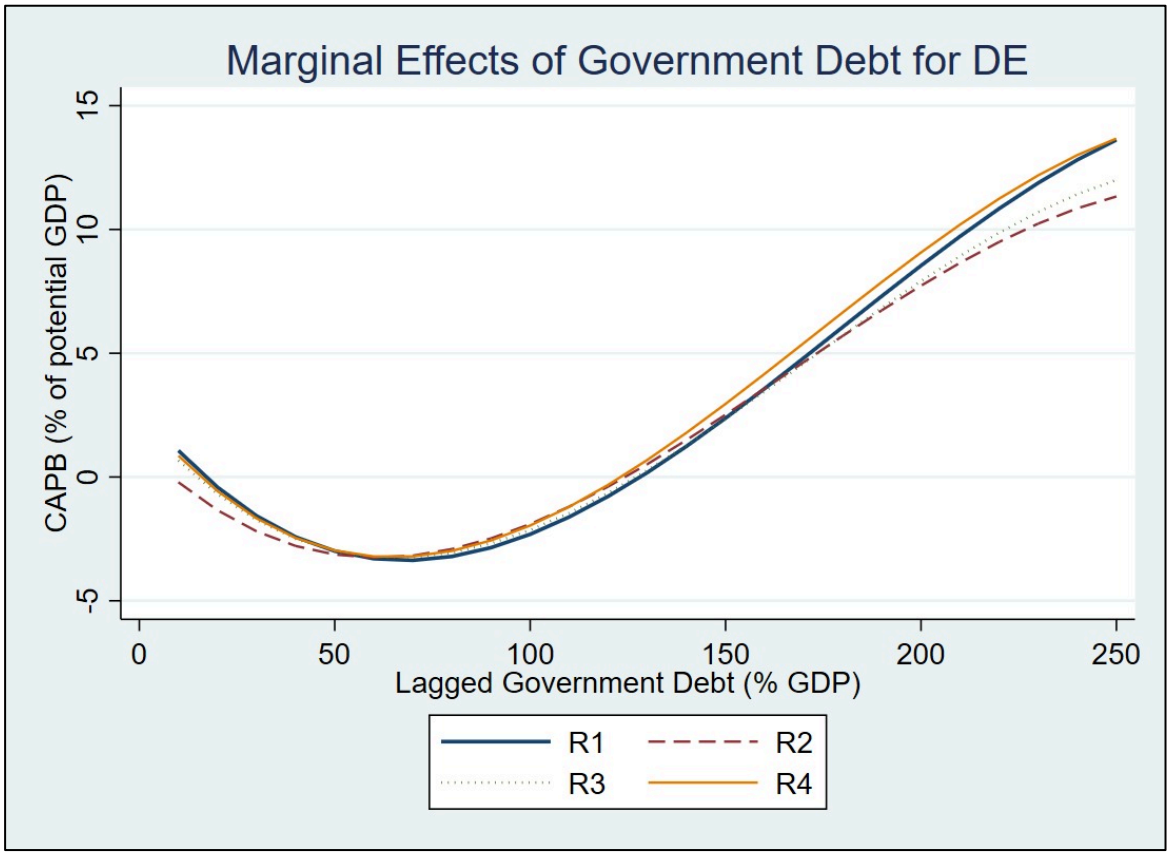
Estimated debt thresholds indicate that developed countries begin to pursue discretionary fiscal policies to improve the CAPB when public debt is about 75 per cent of GDP. Serious risks of instability seem to materialise at substantially higher levels. Despite considerable cross-country differences, on average, the upper boundary of the debt stability region may be as high as 270 per cent of GDP. This is consistent with the estimations of very large fiscal space (the difference between current debt and the instability threshold) provided by Ostry *et al.* (2015) and Zandi (2019) for a wide range of advanced economies.[12] The situation of ED countries is strikingly different. Provided that corrections to the structural primary balance are implemented

[12] As Zandi (2019) himself notes, estimations of FRFs and of fiscal space are strongly influenced by the time horizon of the analysis. The protracted period of very low interest rates and abundant liquidity on international financial markets that followed the outbreak of the GFC have certainly contributed to make substantial increase in public debt levels far more sustainable than in the early 2000s.

immediately when public debt increases, signs of instability may emerge as early as when public debt approaches 35–40 per cent of GDP. Interestingly, this threshold seems to be in line with the one related to the external debt (to GNP ratio) originally put forward by Reinhart *et al*. (2003) when introducing the concept of "debt intolerance" in ED countries. Debt restructuring and adjustment programs may finally bring ED countries' CAPBs under control in accordance with debt levels of up to 70 per cent of GDP. Figures 2 and 3 below plot the marginal response of the CAPB to accumulated debt in developed and ED countries, respectively. They help to better visualise the asymmetries dividing these two sets of countries.

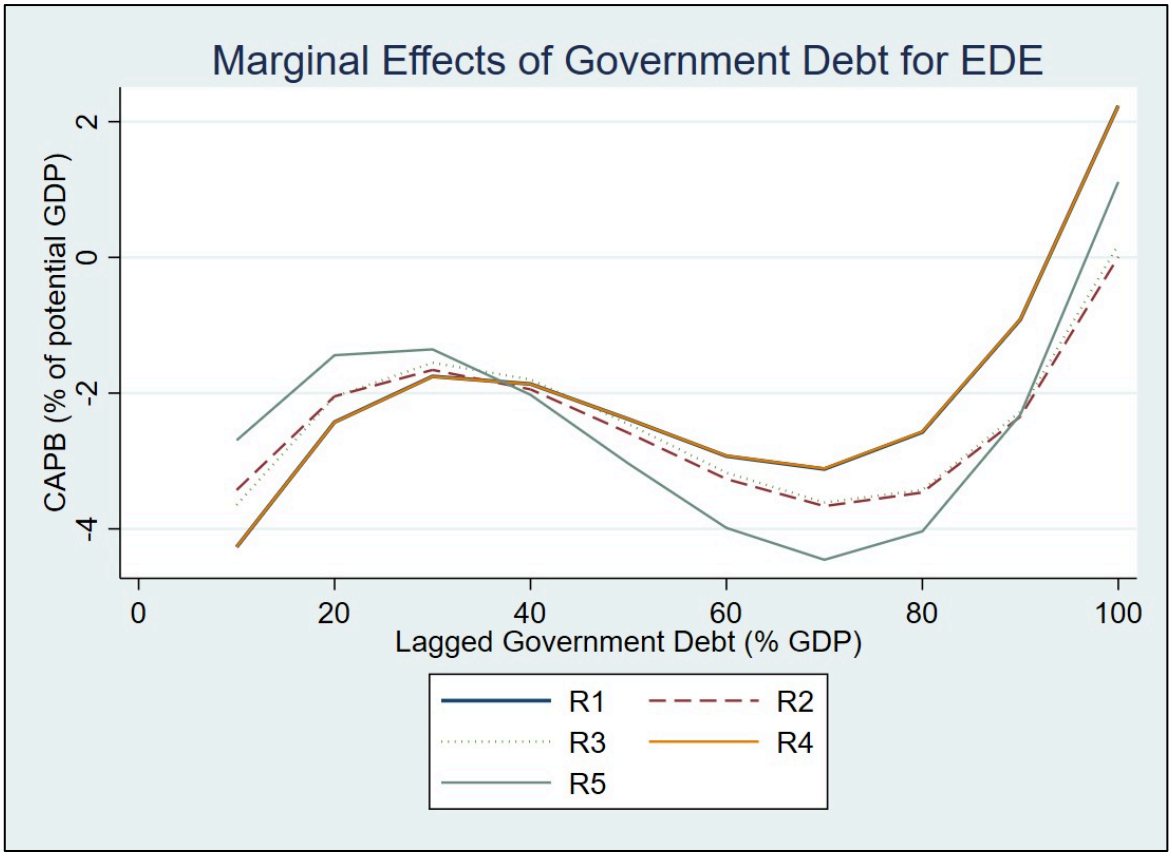
Some additional results further corroborate the view that space for discretionary fiscal expansion is much wider in developed countries than in emerging ones. Table 2 reports a significant negative relation between the central bank's policy rate and the CAPB of advanced economies. This finding confirms what was argued in other recent empirical studies spotting substitutability rather than complementarity between fiscal and monetary policy (Afonso and Sousa, 2024; Wolswijk, 2026). When the latter becomes more restrictive, governments may resort to expansionary fiscal measures as concerns about economic slowdown or recession rise. This option seems not to be available to the governments of ED countries. In Table 3, the estimated coefficient connected the CAPB to the central bank's policy rate is positive, albeit not significant. If anything, ED countries may adopt more cautious fiscal stances in the presence of a higher central bank policy rate and, hence, higher borrowing costs.

Figure 2 – Marginal effect of accumulated public debt over CAPB in developed countries



When we move to the international dimension of our study, splitting developed and ED countries unveils another element of asymmetry. Table 2 confirms the somewhat unexpected positive correlation between the NPP and the CAPB. Exposure to foreign capital (as reflected in lower and/or possibly negative NPP values) does not seem to pressure developed countries to adopt structurally more restrictive fiscal positions. The contrary may well apply. Easy access to international capital can create more room for discretionary fiscal expansions. The degree of capital account openness (as measured by the Chinn-Ito index) and periods of financial "bonanza" do not alter this relation. Indeed, both variables are statistically not significant. The picture is different in ED countries. On the one hand, Table 3 confirms that ED countries may lean towards discretionary fiscal expansions (i.e., lower CAPBs) as a consequence of financial liberalisation and surges in capital inflows. On the other hand, the progressive accumulation of foreign liabilities pushes in the opposite direction and may urge ED countries to undertake fiscal corrections. In Table 3, unlike in Tables 1 and 2, the NPP variable becomes negative and significant. Taken together, these findings seem to portray different stages of a typical finance-led procyclical dynamics in ED countries (Ocampo, 2015). The initial expansion gets momentum, also thanks to discretionary fiscal expansion that may take advantage of cheap international credit. However, when (perhaps excessive) foreign liabilities pile up, the cycle may revert and force countries to painful discretionary fiscal contractions. Whilst ED countries may have reduced exposure to commodity-led cycles (more on this below), finance-led cycles still largely remain unsorted issues (Alberola *et al.*, 2016; Alberola and Sousa, 2017).

Figure 3 – Marginal effect of accumulated public debt over CAPB in ED countries



Despite these relevant differences, there is one important element of similarity between developed and ED countries. In both cases, the manufacturing GDP share gap shows a statistically significant positive structural effect on the primary public budget across almost all our estimations. Our interpretation is that manufacturing development is essential for improving the fundamentals of public budgeting and building fiscal capacity. Consistent with structuralist theory (Lavopa and Szirmai, 2018), this relation hinges upon the positive contribution that manufacturing development gives to the expansion of the formal sector, the dynamics of productivity and wages, and the diversification of the export pattern. Taking the mean values of our samples as a point of reference, a 1 percentage point increase in the manufacturing GDP share gap may improve the CAPB by 0.85 per cent in ED countries: 0.85 = 0.74x(2.74/2.40). In developed countries, manufacturing-led improvement in the CAPB is in the order of 0.57 per cent: 0.57 = 0.37x(3.61/2.35). In the case of ED countries, the ECI index also bears a positive and significant effect on the CAPB. This result can be taken as additional confirmation that, in ED countries, productive and, more broadly, technological capabilities are the most relevant and robust determinants of solid structural budgets and, therefore, fiscal and macro stability (Chang and Lebdioui, 2020). It is very hard to achieve the latter without paying due attention to the development of the productive system.

Two more points are worth stressing. First, Table 3 confirms that increases in resource revenues may lead to improved CAPBs, at least in ED countries over the last two and a half decades. As said above, we consider this result consistent with Frankel *et al*. (2013) and Cespedes and Velasco (2014): the implementation of ad-hoc institutional arrangements that generate structural public savings and, hence, better CAPBs, out of windfall revenues can graduate fiscal policy from procyclicality during commodity booms. Rents from natural resources appear statistically not significant in advanced economies instead. Second, higher trade integration may structurally weaken the primary public budget in ED countries (see row 5 in Table 3). This finding is in contrast with Bachas *et al*. (2024), who document, for a very large set of countries, a positive effect of trade integration on the effective tax rate and, hence, public balances. However, it aligns with Cagé and Gadenne (2018), who stress the increasing difficulty for ED countries to follow the historical example of advanced economies and capture fiscal benefits from trade integration since the 1970s. More often than not, after the 1970s, ED countries have observed deteriorations in their fiscal balances, along with rising trade openness and integration. To some extent, our results may be driven by the fact that our sample of ED countries is predominantly composed of upper-middle-income and a few lower-middle-income countries. In such economies, the negative effects (on fiscal balance) of the reduction in trade-related revenues (due to the elimination of trade tariffs, for instance) may more than offset the positive effects associated with the effective income tax rate. As already mentioned above, this may also reflect weaker linkages of the tradable sector with the rest of the economy, a lower trade multiplier, and hence a reduced impact of trade liberalization on income and tax revenues.

4.2 Robustness test

Following Everaert and Jansen (2018), we perform a series of robustness checks by rerunning all our estimations after adding the lagged CAPB value to the explanatory variables. The inclusion of $CAPB_{i,t-1}$ on the right-hand side of equation (1) is meant to control for

autocorrelation and hysteresis in the evolution of the cyclically-adjusted primary balance. For the sake of space, we report results for the two different batteries of regressions for developed and ED countries, taken separately, rather than those for the full sample. These are available from the authors on request. Our findings are reported in Tables 4 and 5 below for developed and ED countries, respectively.

The coefficients for the lagged CAPB are all positive and significant across all specifications for both types of countries. This indicates the persistence of the structural fiscal position pursued by the countries in our sample. Hysteresis is particularly relevant in developed countries (more on this below). The inclusion of $CAPB_{i,t-1}$ among regressors do not change the main findings of our analysis. They are all confirmed, in particular in the case of ED countries.

As far as advanced economies are concerned (see Table 4), the signs of the most relevant variables of interest remain the same as discussed above. More specifically, the manufacturing GDP share gap remains a statistically significant positive contributor to a strengthened primary public budget. Manufacturing development is a fundamental precondition for countries' fiscal capacity and, hence, their ability to implement development-enhancing programs (related, for instance, to education and public investment). Also, the relationship between the CAPB and the NPP remains positive and significant. Reliance on international finance does not seem to constitute a relevant constraint to possible discretionary fiscal actions for this set of countries. The estimated coefficients capturing the non-linear relationship between CAPB and accumulated public debt all have the expected signs. However, they now turn out to be statistically insignificant quite often. Once the possible hysteresis in the evolution of the CAPB is accounted for, the role of public debt relative to discretionary fiscal policy seems to be downplayed in advanced economies. The only coefficient that remains somewhat relevant (statistically) is the one associated with the public debt-squared term, suggesting the implementation of discretionary improvements in the CAPB when public debt reaches moderate levels.

The reduced significance of debt-related variables relative to CAPBs, as shown in Table 4, warrants specific attention. This outcome is closely linked to the inclusion of the post-2008 period in our analysis. Indeed, most developed countries took immediate, bold, discretionary fiscal actions to address the consequences of the GFC. In the following years, a considerable divergence emerged among them, though. In the case of eurozone Member States, political pressures in favour of a quick return to more conservative fiscal positions forced them to implement discretionary austerity packages and to pursue positive or close-to-balance CAPBs over a quite prolonged time horizon. This certainly applied to Southern European countries, but also to so-called Northern European "frugal" ones, regardless of country-specific debt levels. On the other hand, the implementation of discretionary fiscal policy became less affected by the accumulated public debt. The dominant factor became the generalised "institutional" quest for fiscal discipline, with a loosened reference to the specific country's debt burden. The case of non-eurozone "monetarily sovereign" countries (Botta and Tori, 2018) is somewhat opposite but leads to similar statistical consequences. In the aftermath of the 2007-2008 financial shock, institutional constraints on fiscal policy were de facto loosened, amended, or temporarily suspended. This allowed such countries to record largely negative CAPB over an extended period and return sluggishly to more restrictive fiscal positions. Once

again, accumulated public debt did not play a crucial role in guiding discretionary fiscal policy, as it had before.

Consistent with this narrative, our robustness check also shows that, in developed countries, the central bank's interest rate became statistically irrelevant as a determinant of discretionary fiscal policy. In Table 4, the estimated coefficient for the central bank's policy rate is never significant, and its sign is inconsistent across regressions. In our view, this is a further demonstration that, in the aftermath of the 2007-2008 crisis, the behaviour of the CAPB became less responsive to accumulated debt and to the policy choices of monetary authorities.

Table 4 – Robustness check: inclusion of lagged CAPB among regressors, developed countries, 1980-2018.

VARIABLES	DEV R1	DEV R2	DEV R3	DEV R4	DEV R5
CAPB Lag.	**0.763*** **	**0.738*** **	**0.744*** **	**0.760*** **	**0.704*** **
	(0.0339)	(0.0354)	(0.0340)	(0.0357)	(0.0612)
Gov Debt Lag	-0.0176	-0.00803	-0.0144	-0.0166	-0.00108
	(0.0250)	(0.0250)	(0.0247)	(0.0272)	(0.0476)
Gov Debt Lag Sqr	**0.000418***	0.000384	**0.000416***	0.000444	0.000183
	(0.000252)	(0.000250)	(0.000249)	(0.000270)	(0.000575)
Gov Debt Lag Cub	-9.63e-07	-9.93e-07	-1.04e-06	-1.06e-06	-5.06e-07
	(7.62e-07)	(7.56e-07)	(7.54e-07)	(8.09e-07)	(1.57e-06)
CB policy rate	-0.000521	-0.0206	0.00876	0.00863	0.0390
	(0.0485)	(0.0495)	(0.0480)	(0.0548)	(0.0657)
Trade openness	0.000480	0.00226	0.00261	-0.000740	-0.00193
	(0.00740)	(0.00740)	(0.00732)	(0.00772)	(0.0113)
Resource Rent	0.0189	0.0327	0.0336	-0.00410	0.0175
	(0.0562)	(0.0566)	(0.0557)	(0.0592)	(0.0774)
Manuf Share GDP Gap	**0.169*** **	**0.199*** **	**0.180*** **	**0.153** **	0.107
	(0.0623)	(0.0639)	(0.0618)	(0.0665)	(0.147)
ECI		-0.0101			
		(0.0229)			
Net Total Portfolio Position		**0.00619*** **	**0.00398*** **		
		(0.00238)	(0.00113)		
Chinn-Ito Index				0.00940	
				(0.0105)	
Fin Boom Episode					0.185
					(0.293)
Constant	-2.929**	-2.797	-3.444***	-3.797**	-3.064
	(1.157)	(2.028)	(1.153)	(1.643)	(1.894)
Observations	490	475	490	450	178
Number of countries	30	29	30	28	15
R^2	0.751	0.760	0.757	0.742	0.678

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 5 – Robustness check: inclusion of lagged CAPB among regressors, ED countries, 1980-2018.

VARIABLES	EDE R1	EDE R2	EDE R3	EDE R4	EDE R5
CAPB Lag.	**0.486*** **	**0.479*** **	**0.459*** **	**0.487*** **	**0.606*** **
	(0.0137)	(0.000922)	(0.0148)	(0.0134)	(0.0282)
Gov Debt Lag	**0.339*** **	**0.266*** **	**0.321*** **	**0.335*** **	**0.346*** **
	(0.0427)	(0.0440)	(0.0385)	(0.0408)	(0.0309)
Gov Debt Lag Sqr	**-0.00675*** **	**-0.00551*** **	**-0.00654*** **	**-0.00667*** **	**-0.00656*** **
	(0.00109)	(0.000955)	(0.000935)	(0.00106)	(0.00144)
Gov Debt Lag Cub	**4.16e-05*** **	**3.40e-05*** **	**3.96e-05*** **	**4.10e-05*** **	**4.16e-05*** **
	(5.95e-06)	(5.33e-06)	(5.36e-06)	(5.72e-06)	(1.33e-05)
CB policy rate	0.00321	0.00865	0.00163	0.00111	0.0422
	(0.0312)	(0.0335)	(0.0332)	(0.0315)	(0.0416)
Trade openness	**-0.0456*** **	**-0.0450*** **	**-0.0468*** **	**-0.0448*** **	**-0.0250*** **
	(0.00164)	(0.00179)	(0.00145)	(0.00151)	(0.00184)
Resource Rent	**0.118*** **	**0.188*** **	**0.112*** **	**0.118*** **	**0.248*** **
	(0.00983)	(0.0195)	(0.00821)	(0.00957)	(0.0326)
Manuf Share GDP Gap	**0.498*** **	**0.428*** **	**0.516*** **	**0.501*** **	**0.120** **
	(0.0763)	(0.0637)	(0.0831)	(0.0755)	(0.0544)
ECI		**0.00702*** **			
		(0.000370)			
Net Total Portfolio Position		**-0.0348*** **	**-0.0396*** **		
		(0.0119)	(0.0121)		
Chinn-Ito Index				**-0.00406*** **	
				(0.000376)	
Fin Boom Episode					**-0.876*** **
					(0.152)
Constant	-9.141***	-8.265***	-9.047***	-8.891***	-9.441***
	(0.576)	(0.901)	(0.579)	(0.598)	(1.149)
Observations	232	227	232	232	117
Number of countries	21	20	21	21	18
R^2	0.603	0.634	0.610	0.603	0.722
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1					

In the case of ED countries (see Table 5), the robustness check confirms both the signs and the statistical significance of the explanatory variables included in our analysis. This is particularly true for the explanatory factors capturing the effects of the public debt stock on the CAPB. In a way, this finding may suggest that the degree of discretion in the conduct of fiscal policy in ED countries is significantly lower than that characterising advanced economies, at least the "monetarily sovereign" ones. In ED countries, discretionary fiscal actions continued to be dictated by the need to confront considerably sharper "debt intolerance" and by tough

international investor pressure to keep indebtedness low (as captured by the negative coefficient on the NPP variable). In this context, despite post-2008 contingencies demanding expansionary interventions, most ED countries had to prioritise debt control. They had considerably less fiscal leeway than advanced economies and adopted less expansionary, if not restrictive, discretionary fiscal measures.

To verify the robustness of our results, we run a second robustness test that also includes the output gap among the explanatory variables of the CAPB. The CAPB, by definition, is computed by removing the effects of the business cycle, via automatic stabilisers, from the primary public budget. However, following Fatas and Mihov (2009) and Alberola and Sousa (2017), it may still be affected by endogenous discretionary fiscal policies that governments may equally decide to implement due to concerns about unsatisfactory economic performance. For instance, in the presence of an unusually deep recession (like the one induced by the GFC), the CAPB is corrected for automatic endogenous fiscal responses taking place via automatic stabilisers. It may nevertheless change to reflect ad-hoc measures adopted by the government to tackle exceptional circumstances. The inclusion of the output gap in our regressions constitutes an additional robustness check to verify that our results do not change even when we consider the possible role of endogenous discretionary fiscal measures. The other way around, in this new battery of regressions, we want to detect changes in the CAPB that are "genuinely" determined by governments' discretionary choice to respond to debt variables and international financial factors. Following Everaert and Jansen (2018), we use the lagged value of the output gap to avoid endogeneity. This test is implemented both with and without lagged CAPB on the right-hand side of equation (1). The results are presented in Tables 6 and 7.

The output gap enters with a positive sign in all our estimations, both for developed and ED countries. In principle, this would indicate governments may generally take counter-cyclical discretionary fiscal measures in response to changes in the business cycle. It is never significant, though, so that the so-called endogenous discretionary fiscal policy is not effectively in place. All our results are fully confirmed both when we consider the lagged value of the output gap alone (see Table 6) and when we consider it in conjunction with the lagged value of the CAPB (see Table 7).

As an additional robustness check, we also run regressions using the current value of the output gap rather than the lagged one. In this case, the estimated coefficient on the output gap is negative and significant for ED countries. However, following Everaert and Jansen (2018), this might be due to reverse causality: larger discretionary fiscal expansions (i.e., a lower CAPB) may improve the output gap. We thus tend to take this result with caution. Apart from that, even in this case, all the results of our estimations are fully confirmed and remain unchanged. There are deep asymmetries in the way FRFs in developed and ED countries are influenced by accumulated public debt or international finance. The former set of countries has considerably more fiscal leeway than the latter. In line with Hartmann *et al.* (2017, 2020), productive and technological development are a fundamental requirement for structurally improving public budgets, building fiscal capacity, and, ultimately, creating (fiscal) space for development-enhancing policies.

Table 6 – Robustness check: inclusion of lagged output gap among regressors, developed and ED countries, 1980-2018.

VARIABLES	DEV R1	DEV R2	DEV R3	DEV R4	DEV R5	ED R1	ED R2	ED R3	ED R4	ED R5
Gov Debt Lag	**-0.197*** **	**-0.161*** **	**-0.187*** **	**-0.194*** **	-0.0456	**0.377*** **	**0.325*** **	**0.355*** **	**0.377*** **	0.125
	(0.0365)	(0.0363)	(0.0361)	(0.0383)	(0.0635)	(0.100)	(0.0583)	(0.0727)	(0.100)	(0.0975)
Gov Debt Lag Sqr	**0.00180*** **	**0.00161*** **	**0.00176*** **	**0.00183*** **	0.000384	**-0.00905*** **	**-0.00804*** **	**-0.00859*** **	**-0.00904*** **	**-0.00534** **
	(0.000371)	(0.000365)	(0.000366)	(0.000387)	(0.000765)	(0.00276)	(0.00169)	(0.00200)	(0.00275)	(0.00250)
Gov Debt Lag Cub	**-3.35e-06*** **	**-3.23e-06*** **	**-3.41e-06*** **	**-3.54e-06*** **	-1.06e-06	**6.03e-05*** **	**5.29e-05*** **	**5.56e-05*** **	**6.02e-05*** **	**4.64e-05*** **
	(1.14e-06)	(1.12e-06)	(1.13e-06)	(1.19e-06)	(2.11e-06)	(1.66e-05)	(1.01e-05)	(1.19e-05)	(1.66e-05)	(1.25e-05)
CB policy rate	**-0.173** **	**-0.185*** **	**-0.152** **	**-0.212*** **	-0.0510	0.0310	0.0221	0.0329	0.0306	0.0246
	(0.0683)	(0.0688)	(0.0676)	(0.0748)	(0.0838)	(0.0556)	(0.0557)	(0.0595)	(0.0549)	(0.0506)
Trade openness	0.00714	0.0132	0.0110	0.00560	0.0128	**-0.0522*** **	**-0.0550*** **	**-0.0560*** **	**-0.0520*** **	**-0.0691*** **
	(0.0110)	(0.0108)	(0.0108)	(0.0113)	(0.0153)	(0.0150)	(0.0107)	(0.0127)	(0.0146)	(0.000601)
Output gap	3.40e-08	3.46e-08	3.22e-08	2.84e-08	-2.22e-09	1.25e-08	1.08e-08	1.13e-08	1.25e-08	9.25e-09
	(7.32e-08)	(7.18e-08)	(7.22e-08)	(7.45e-08)	(7.38e-08)	(8.63e-09)	(9.41e-09)	(9.31e-09)	(8.76e-09)	(7.17e-09)
Resource Rent	0.0670	0.0976	0.0878	0.0568	-0.0139	**0.356*** **	**0.328*** **	**0.318*** **	**0.355*** **	**0.356*** **
	(0.0839)	(0.0835)	(0.0830)	(0.0868)	(0.109)	(0.0184)	(0.0214)	(0.0232)	(0.0189)	(0.0192)
Manuf Share GDP Gap	**0.375*** **	**0.420*** **	**0.387*** **	**0.357*** **	0.0547	**0.653*** **	**0.655*** **	**0.666*** **	**0.653*** **	**0.497*** **
	(0.0917)	(0.0930)	(0.0906)	(0.0956)	(0.184)	(0.202)	(0.181)	(0.186)	(0.202)	(0.136)
ECI		-0.0284					**0.0384*** **			
		(0.0330)					(0.00799)			
Net Total Portfolio Position		**0.0163*** **	**0.00713*** **				**-0.0622*** **	**-0.0647*** **		
		(0.00344)	(0.00191)				(0.00439)	(0.00139)		
Chinn-Ito Index				-0.0128					-0.000577	
				(0.0146)					(0.00126)	
Fin Boom Episode					0.363					**-0.606*** **
					(0.403)					(0.127)
Constant	-0.393	-0.0831	-1.234	0.934	-4.567*	-11.46***	-12.10***	-11.31***	-11.42***	-4.514***
	(1.877)	(3.006)	(1.865)	(2.330)	(2.567)	(0.0821)	(0.322)	(0.143)	(0.172)	(1.223)
Observations	484	470	484	449	182	196	196	196	196	113
Number of countries	29	27	29	27	15	18	18	18	18	17
R^2	0.440	0.473	0.456	0.427	0.353	0.435	0.458	0.453	0.435	0.571

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7 – Robustness check: inclusion of lagged CAPB and output gap among regressors, developed and ED countries, 1980-2018.

VARIABLES	DEV R1	DEV R2	DEV R3	DEV R4	DEV R5	ED R1	ED R2	ED R3	ED R4	ED R5
CAPB Lag.	**0.760*** **	**0.741*** **	**0.748*** **	**0.759*** **	**0.704*** **	**0.499*** **	**0.484*** **	**0.484*** **	**0.499*** **	**0.558*** **
	(0.0345)	(0.0358)	(0.0344)	(0.0362)	(0.0614)	(0.0161)	(0.0189)	(0.0187)	(0.0165)	(0.0286)
Gov Debt Lag.	-0.0155	-0.00663	-0.0121	-0.0171	-0.00187	**0.270*** **	**0.265*** **	**0.266*** **	**0.270*** **	**0.157*** **
	(0.0258)	(0.0257)	(0.0256)	(0.0272)	(0.0479)	(0.0451)	(0.0402)	(0.0400)	(0.0440)	(0.00370)
Gov Debt Lag Sqr.	0.000398	0.000368	0.000397	0.000439	0.000195	**-0.00531*** **	**-0.00526*** **	**-0.00528*** **	**-0.00530*** **	**-0.00336*** **
	(0.000257)	(0.000255)	(0.000255)	(0.000270)	(0.000580)	(0.00108)	(0.000903)	(0.000902)	(0.00105)	(0.000293)
Gov Debt Lag Cub.	-9.09e-07	-9.46e-07	-9.92e-07	-1.04e-06	-5.43e-07	**3.32e-05*** **	**3.24e-05*** **	**3.25e-05*** **	**3.31e-05*** **	**2.67e-05*** **
	(7.74e-07)	(7.69e-07)	(7.67e-07)	(8.11e-07)	(1.58e-06)	(5.79e-06)	(4.83e-06)	(4.83e-06)	(5.60e-06)	(3.44e-06)
CB policy rate	0.00568	-0.0138	0.0170	0.0157	0.0389	0.0285	0.0279	0.0283	0.0277	0.0288
	(0.0495)	(0.0505)	(0.0491)	(0.0553)	(0.0659)	(0.0465)	(0.0487)	(0.0484)	(0.0456)	(0.0436)
Trade openness	0.000206	0.00230	0.00307	-0.000822	-0.00198	**-0.0456*** **	**-0.0469*** **	**-0.0470*** **	**-0.0452*** **	**-0.0395*** **
	(0.00745)	(0.00744)	(0.00738)	(0.00773)	(0.0114)	(0.00827)	(0.00739)	(0.00741)	(0.00775)	(0.00334)
Output gap	4.66e-08	5.07e-08	4.56e-08	4.65e-08	1.82e-08	1.20e-08	1.17e-08	1.17e-08	1.19e-08	3.29e-09
	(4.89e-08)	(4.85e-08)	(4.84e-08)	(5.01e-08)	(5.25e-08)	(8.27e-09)	(8.54e-09)	(8.51e-09)	(8.43e-09)	(7.66e-09)
Resource rent	0.0113	0.0230	0.0234	-0.00725	0.0152	**0.211*** **	**0.203*** **	**0.202*** **	**0.210*** **	**0.198*** **
	(0.0572)	(0.0576)	(0.0568)	(0.0598)	(0.0777)	(0.0351)	(0.0336)	(0.0333)	(0.0357)	(0.00938)
Manuf. Share GDP Gap	**0.166*** **	**0.195*** **	**0.176*** **	**0.155** **	0.109	**0.461*** **	**0.469*** **	**0.469*** **	**0.460*** **	0.136
	(0.0634)	(0.0654)	(0.0630)	(0.0666)	(0.149)	(0.120)	(0.119)	(0.119)	(0.121)	(0.0926)
ECI		-0.0112					**0.00143*** **			
		(0.0232)					(0.000518)			
Net Total Portfolio Position		**0.00601** **	**0.00421*** **				**-0.0216*** **	**-0.0217*** **		
		(0.00243)	(0.00130)				(0.00693)	(0.00682)		
Chinn-Ito Index				0.00866					-0.00143	
				(0.0107)					(0.00140)	
Fin Boom Episode					0.190					**-0.977*** **
					(0.294)					(0.193)
Constant	-3.089**	-2.790	-3.614***	-3.783**	-3.060	-9.138***	-9.140***	-9.112***	-9.040***	-5.258***
	(1.284)	(2.117)	(1.280)	(1.663)	(1.902)	(0.407)	(0.503)	(0.510)	(0.306)	(0.583)
Observations	477	463	477	443	178	192	192	192	192	110
Number of countries	29	27	29	27	15	18	18	18	18	17
R^2	0.753	0.762	0.758	0.744	0.678	0.619	0.620	0.620	0.619	0.733

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

5. Conclusion

This paper sets out to revisit the notion of Fiscal Response Function (FRF) by embedding it within a structuralist development framework. While the existing literature has primarily focused on the relationship between public debt and fiscal balances, we argued that such an approach remains incomplete if it abstracts from the structural characteristics of the economy and its integration into the global financial system. By extending the empirical analysis of FRFs to a broad sample of developed and emerging and developing (ED) economies over the period 1980–2018, and by incorporating measures of productive development and international financial integration, we sought to provide a more comprehensive account of the determinants of fiscal capacity.

Three main findings emerge from our analysis. First, productive development plays a central and robust role in shaping structural fiscal outcomes. Economies with stronger manufacturing bases and more advanced productive capabilities tend to exhibit more solid cyclically-adjusted primary balances. This result is consistent with the idea that productive transformation supports the expansion of the formal sector, strengthens productivity and wage dynamics, and contributes to a broader and more stable tax base. In this sense, fiscal capacity should not be seen as a purely institutional or policy-driven outcome, but rather as deeply rooted in the structure of production.

Second, we find clear asymmetries in fiscal responses to public debt across development levels. While advanced economies tend to adjust their fiscal stance only at moderate levels of public debt, ED countries react much earlier, with signs of instability emerging at substantially lower debt thresholds. This pattern is consistent with the notion of "debt intolerance" and highlights the more constrained fiscal environment faced by developing economies. It also suggests that similar debt ratios can carry very different implications depending on the economy's structural characteristics.

Third, global financial integration introduces an additional layer of asymmetry. In advanced economies, access to international capital markets appears to be associated with greater fiscal flexibility. In contrast, ED countries remain exposed to procyclical dynamics, in which capital inflows surge with more expansionary fiscal stances, while the accumulation of external liabilities eventually triggers pressures for fiscal adjustment. These findings point to the continued relevance of finance-led boom-and-bust cycles in shaping fiscal outcomes in developing contexts.

Taken together, these results suggest that fiscal positions cannot be adequately assessed solely through debt metrics. Instead, they should be understood as an outcome of deeper structural and external conditions, including the level of productive development, the degree of diversification, and the nature of integration into global financial markets. From this perspective, policies aimed at strengthening fiscal capacity in ED countries should go beyond fiscal consolidation and focus on supporting productive transformation, technological upgrading, and the expansion of the formal economy.

More broadly, our findings speak to the need to rethink the design of fiscal frameworks in developing contexts. Standard approaches centred on uniform debt thresholds or rules-based consolidation may fail to account for structural heterogeneity across countries and may impose procyclical adjustments on economies already constrained by external vulnerabilities. A

development-oriented approach to fiscal policy should instead recognise that building fiscal capacity is a long-term process, closely tied to structural change and the evolution of productive capabilities.

Future research could extend this analysis in several directions. In particular, further work could explore the interaction between fiscal policy and industrial policy in shaping development trajectories, as well as the role of institutional quality in mediating the relationship between productive structure and fiscal outcomes. More granular data on sectoral composition, taxation systems, and financial flows could also help to refine the empirical identification of these mechanisms.

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Appendix

Table A.1 – List of countries included in the econometric analysis

Country	Income group	Country classification	Country	Income group	Country classification
Argentina	UM	ED	Japan	H	Dev.
Australia	H	Dev.	Jordan	LM	ED
Austria	H	Dev.	Malaysia	UM	ED
Belarus	UM	ED	Mauritius	UM	ED
Belgium	H	Dev.	Mexico	UM	ED
Brazil	UM	ED	Netherlands	H	Dev.
Bulgaria	H	Dev.	New Zealand	H	Dev.
Canada	H	Dev.	Norway	H	Dev.
Chile	H	Dev.	Paraguay	UM	ED
China	UM	ED	Peru	UM	ED
Colombia	UM	ED	Philippines	LM	ED
Costa Rica	UM	ED	Poland	H	ED
Denmark	H	Dev.	Portugal	H	Dev.
Finland	H	Dev.	Romania	H	Dev.
France	H	Dev.	Russian Federation	H	Dev.
Georgia	UM	ED	Singapore	H	Dev.
Germany	H	Dev.	South Africa	UM	ED
Ghana	LM	ED	Spain	H	Dev.
Greece	H	Dev.	Suriname	UM	ED
Hungary	H	Dev.	Sweden	H	Dev.
Iceland	H	Dev.	Switzerland	H	Dev.
India	LM	ED	Thailand	UM	Dev.
Indonesia	UM	ED	United Kingdom	H	Dev.
Ireland	H	Dev.	United States	H	Dev.
Israel	H	Dev.	Uruguay	UM	ED
Italy	H	Dev.			

Legend: H = High income country; UM = Upper-middle income country; LM = Lower-Middle income country; Dev. = Developed country; ED = Emerging-developing country group.

Table A.2 – Key economic variables and sources

Variable	Explanation	Data Source
Cyclically-adjusted primary balance	Difference between a government's revenues and expenditures, excluding interest payments on debt, corrected for the business cycle and reported as a share of potential output	IMF Fiscal Monitor
Gov Debt Lag.	Government debt from the previous period as a percentage of GDP.	World Bank, IMF World Economic Outlook
Gov Debt Lag Sqr.	Squared term of the government debt from the previous period, to capture nonlinear effects.	Calculated from Gov Debt Lag data
Gov Debt Lag Cub.	Cubed term of the government debt from the previous period, to capture further nonlinear effects.	Calculated from Gov Debt Lag data
Output Gap	The difference between actual GDP and potential GDP, indicating the economic performance relative to capacity.	IMF World Economic Outlook, OECD
Central bank policy rate	The average interest rate set by the national central bank or monetary authority.	International Monetary Fund
Manuf. Share GDP Gap	The deviation of the manufacturing sector's share of GDP from its trend level.	UNIDO, World Bank
ECI	Economic complexity index	Atlas of Economic Complexity
Trade openness	The sum of exports and imports as a percentage of GDP, indicating the level of integration into global trade.	World Trade Organization, World Bank
Resource rent	Revenue generated from natural resources as a percentage of GDP.	World Bank's World Development Indicators
Net Total Portfolio Position	Lagged value of the net stock of country foreign portfolio assets/liabilities over GDP.	IMF Balance of Payments Statistics
Chinn-Ito Index	An index measuring a country's degree of financial openness.	Chinn-Ito Index dataset (University of Oregon)
Fin Boom Episode	Binary financial dummy variable taking value “1” in periods of unusually large net capital non-FDI inflows	IMF Balance of Payments Statistics

Table A.3 – Descriptive statistics, full country sample, 1980-2018.

VARIABLES	N	Mean	SD	Min.	Max
Gov Debt Lag.	1,561	56.37	33.27	1.027	289.6
Gov Debt Lag Sqr.	1,561	4,284	6,168	1.054	83,842
Gov Debt Lag Cub.	1,561	429,077	1.286e+06	1.082	2.428e+07
CB policy rate	958	5.708	6.812	0	58
Man. GDP Share Gap	1,703	3.282	6.625	-13.26	32.53
Resource rent	1,695	2.705	4.254	0	31.93
ECI	1,514	58.03	17.79	0	100
Trade openness	1,668	85.36	56.96	14.99	437.3
Fin Boom Episode	611	0.588	0.493	0	1
Chinn-Ito Index (normalized)	1,627	66.98	35.36	0	100
NPP (share of GDP)	1,480	6.205	114.3	-205.1	1,492
CAPB	1,354	-2.367	3.188	-18.21	11.79
Number of countries	51	51	51	51	51

Table A.4 – Descriptive statistics, Developed countries, 1980-2018.

VARIABLES	N	Mean	SD	Min.	Max.
Gov Debt Lag.	964	61.03	35.12	1.027	249.1
Gov Debt Lag Sqr.	964	4,957	6,561	1.054	62,058
Gov Debt Lag Cub.	964	514,815	1.324e+06	1.082	1.546e+07
Man. GDP Share Gap	1,058	3.610	5.667	-11.52	27.12
CB policy rate	615	3.913	5.445	0	58
Resource rent	1,038	1.069	2.026	0	17.35
ECI	906	67.08	15.03	26.25	100
Trade openness	1,033	94.12	64.52	15.81	437.3
Fin Boom Episode	383	0.598	0.491	0	1
Chinn-Ito index (normalized)	976	83.62	27.18	0	100
NPP Lag. (share of GDP)	952	15.74	141.5	-205.1	1,492
CAPB	875	-2.348	3.123	-14.42	11.79
Number of countries	30	30	30	30	30

Table A.5 – Descriptive statistics, ED countries, 1980-2018.

VARIABLES	N	Mean	SD	Min.	Max
Gov Debt Lag	597	48.85	28.50	4.981	289.6
Gov Debt Lag Sqr.	597	3,197	5,301	24.81	83,842
Gov Debt Lag Cub.	597	290,633	1.212e+06	123.6	2.428e+07
Man. GDP Share Gap	645	2.744	7.927	-13.26	32.53
CB policy rate	343	8.925	7.776	0	45
Resource rent	657	5.288	5.414	0.00138	31.93
ECI	608	44.53	12.14	0	68.96
Trade openness	635	71.12	37.77	14.99	220.4
Fin Boom Episode	228	0.570	0.496	0	1
Chinn-Ito index (normalized)	651	42.02	31.31	0	100
NPP Lag. (share of GDP)	528	-10.98	10.09	-57.03	6.638
CAPB	479	-2.401	3.306	-18.21	7.763
Number of countries	21	21	21	21	21

Table A.6 – IV Tests, Full sample.

Test / Model	R1	R2	R3	R4	R5
Cragg-Donald Wald F statistic	308.09	293.83	308.44	281.61	133.05
Kleibergen-Paap Wald rk F statistic	59743.89	28311.19	58918.77	88778.33	264.02
Stock–Yogo (10%)	19.93	19.93	19.93	19.93	19.93
Weak instrument	Strong	Strong	Strong	Strong	Strong
KP rk LM (p-val)	0.381	0.3674	0.38	0.3795	0.3894
Underidentification	Not rejected	Not rejected	Not rejected	Not rejected	Not rejected
AR test (p-val)	0.0071	0.0168	0.0083	0.0064	0.0363
Weak-instrument-robust inference	Strong	Strong	Strong	Strong	Strong
Hansen J (p-val)	0.3431	0.3605	0.342	0.3446	0.2228
Overidentification	Valid	Valid	Valid	Valid	Valid
# Clusters	3	3	3	3	3

Table A.7 – IV Tests, Developed countries.

Test / Model	R1	R2	R3	R4	R5
Cragg-Donald Wald F statistic	193.78	180.15	193.48	170.36	65.6
Kleibergen-Paap Wald rk F statistic	—	—	—	—	—
Stock–Yogo (10%)	19.93	19.93	19.93	19.93	19.93
Weak instrument	Strong	Strong	Strong	Strong	Strong
KP rk LM (p-val)	0	0	0	0	0
Underidentification	Rejected	Rejected	Rejected	Rejected	Rejected
AR test (p-val)	0	0	0	0	0.2256
Weak-instrument-robust inference	Strong	Strong	Strong	Strong	Weak
Sargan (p-val)	0	0.0002	0.0001	0.0001	0.0591
Overidentification	Rejected	Rejected	Rejected	Rejected	Rejected
# Clusters	—	—	—	—	—

Table A.8 – IV Tests, ED countries.

Test / Model	R1	R2	R3	R4	R5
Cragg-Donald Wald F statistic	88.64	90.58	91.3	88.18	45.77
Kleibergen-Paap Wald rk F statistic	43.4	52.74	62.05	41.95	181.59
Stock–Yogo (10%)	19.93	19.93	19.93	19.93	19.93
Weak instrument	Strong	Strong	Strong	Strong	Strong
KP rk LM (p-val)	0.3679	0.3679	0.3679	0.3679	0.3679
Underidentification	Not rejected	Not rejected	Not rejected	Not rejected	Not rejected
AR test (p-val)	0	0	0	0	0
Weak-instrument-robust inference	Strong	Strong	Strong	Strong	Strong
Hansen J (p-val)	0.6808	0.9935	0.9301	0.6795	0.3165
Overidentification	Valid	Valid	Valid	Valid	Valid
# Clusters	2	2	2	2	2