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Demand-led growth decomposition and trade structures: towards a spectrum of export-led models

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Abstract
This article links different approaches to analysing demand and growth regimes with the structure of international trade. We apply the national income and financial accounting as well as the Sraffian supermultiplier demand-led growth decomposition approaches to analyse the growth regimes of two advanced economies (Germany and Spain) and five emerging economies (Argentina, Brazil, India, South Africa and Turkey) over the period 2000-2019. Our analysis shows that exports have become an increasingly important autonomous source of growth in most countries. However, structural changes in exports are uneven and reveal growing polarisation. We therefore identify a spectrum of export-led regimes and propose a classification typology based on technological content, economic complexity rankings, and the dominance of different autonomous demand components. The findings highlight the limitations of treating export-led growth as a homogeneous model or regime and underscore the importance of considering the country-specific structural characteristics that shape different export-led regimes.

Keywords: accounting, economic growth, trade, structural change, political economy
JEL classification: E11 Macroeconomics and Monetary Economics: Keynes; Keynesian; Post-Keynesian, F43 International Economics: Economic Growth of Open Economies, P51 Political Economy and Comparative Economic Systems

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1. Introduction

The analysis of demand and growth regimes (DGRs) has had long history in post-Keynesian economics (PKE) (Hein, 2023). First, from a theoretical model perspective, a DGR refers to the main growth determinants in a demand-led growth theory, such as investment-led growth, distribution-led growth or autonomous demand-led growth. More specifically, a regime from this perspective may then refer to the type of response of the equilibrium solution of a macroeconomic model towards a change in model parameters or exogenous variables, like the wage or profit share, income inequality, the rate of interest, the debt-capital ratio, shareholder power, or autonomous demand components. Second, in post-Keynesian empirical-historical analysis, a DGR refers to the development path of an economy over time and in comparison to others, which then addresses the potential co-existence of regimes. As we will explain further in Section 2 of this paper, a regime may then refer to the main sources and the financing of demand and growth, or to so-called 'growth drivers', that is those factors which determine the development of the different components of aggregate demand.

The discovery of post-Keynesian DGRs and their empirical applications for comparative and international political economy (CPE, IPE) debates on varieties of capitalism and growth models (GMs) by Baccaro and Pontusson (2016) led to a rich interdisciplinary research programme of PKE, CPE and IPE (Akcay et al., 2023, 2024; Baccaro et al., 2022). Within this literature, the different levels of analysis should be kept in mind to avoid unnecessary confusions and unproductive debates. Reviewing PKE contributions to the empirical-historical analysis of DGRs or GMs, Hein (2023) proposes distinguishing the following complementary levels of analysis:

1. The national income and financial accounting (NIFA) decomposition approach focusses on the sources of demand growth and their financing. Since the approach is based on national income and financial accounting conventions, it is foundational and compatible with any theory of growth drivers.
2. The Sraffian supermultiplier (SSM) growth decomposition distinguishes between components viewed as autonomous from current output and income versus components that are induced and hence dependent on current output and income. In doing so, it applies a basic theoretical lens on demand-led growth decomposition.
3. The analysis of growth drivers aims to identify the main determinants of the dynamics of the different components of demand. This may include distribution in different respects (functional income, personal income, wealth), financial boom-bust cycles, house price dynamics, commodity price dynamics, the relevance of multinational enterprises and foreign direct investment in interaction with government policies, fiscal policies and/or the macroeconomic policy regimes as a whole.
4. The political economy dimension aims at identifying the socio-institutional forces behind the growth drivers. This dimension has focused on growth strategies of different social groups, and on the concepts of growth coalitions and dominant social blocs.

The focus of this contribution is on the first and second levels of analysis, i.e. on the NIFA and SSM demand-led growth decompositions, complemented with an analysis of export

structures. First, we present and compare the NIFA and the SSM demand-led growth decomposition approaches and provide a condensed review of the empirical results obtained in the literature on the changes of DGRs and dominant autonomous growth components from the period before to the period after the Global Financial Crisis (GFC) and the Great Recession (GR), 2007-2009, both for advanced (ACEs) and emerging capitalist economies (ECEs). Second, we apply the NIFA and SSM decomposition methods to a sample of countries including Germany and Spain as ACEs from the European core and periphery respectively, and Argentina, Brazil, India, South Africa and Turkey as ECEs for the periods 2000-2007 and 2011-2019, i.e. the periods before and after the GFC and GR. We find some shift towards export-led regimes and that exports have become an increasingly important autonomous component of demand. In light of this, and given that different export-led regimes have recently come into focus, we examine the structure of international trade for our seven countries. Our analysis identifies a spectrum of export-led regimes, for which we propose a classification typology. Recognising heterogeneity across these regimes highlights the limitations of universal analytical frameworks that might obscure important structural differences.

Our paper hence contributes to three areas. First, we develop a systematic comparison of NIFA and SSM demand-led growth decomposition approaches, applied to our set of seven ECEs and ACEs. Second, we contribute to the emerging literature on the relationship between demand-driven growth regimes and structural features, and the need to integrate these dimensions (Bürgisser & Di Carlo, 2023; Casaú & Herrero, 2025; Kalanta, 2024). Third, our results lay the groundwork for an analysis of growth drivers and the political economy dimension supporting the observed regime changes, both at the domestic and global levels.

We proceed as follows. Section 2 reviews the NIFA and SSM demand-led growth decomposition approaches and the recent empirical results applying them. Section 3 presents our results applying these approaches to the seven countries in our sample. In Section 4 we take a closer look at international trade and the structure of exports. Section 5 presents a typology of (export-led) regimes, and Section 6 summarises and concludes.

2. Demand-led growth decomposition and growth regimes

2.1. The national income and financial accounting (NIFA) approach

The NIFA decomposition was used initially by Hein (2011, 2012) to study different regimes in finance-dominated capitalism, however without yet terming this approach the 'NIFA decomposition'. This approach first looks at the contributions of the different demand components, private consumption (C), public consumption (G), private and public investment (I), as well as exports (X) and imports (M), and hence net exports of goods and services (NX) to GDP growth ($\hat{Y}$):

$$(1) \qquad \hat{Y}_t = \frac{\Delta Y_t}{Y_{t-1}} = \frac{\Delta C_t}{Y_{t-1}} + \frac{\Delta G_t}{Y_{t-1}} + \frac{\Delta I_t}{Y_{t-1}} + \frac{\Delta X_t}{Y_{t-1}} - \frac{\Delta M_t}{Y_{t-1}} = \frac{\Delta C_t}{Y_{t-1}} + \frac{\Delta G_t}{Y_{t-1}} + \frac{\Delta I_t}{Y_{t-1}} + \frac{\Delta NX_t}{Y_{t-1}}$$

Second, the financial balances of the private sector (FB_P), composed of private households and corporations, of the public sector (FB_G), and of the external sector (FB_E) are considered, in order to identify financial surplus and deficit sectors:

(2) $FB_P + FB_G + FB_E = 0$

The private sector financial balance ($FB_P = S - I$) is given as the difference between private saving (S) and private investment (I), and we have the private household sector, and the financial and non-financial corporate sectors as sub-sectors. The government sector financial balance ($FB_G = T - G$) is the difference between tax revenues and social security contributions (T) and government expenditures (G). The external sector financial balance ($FB_E = M - X + FI^{net}$), as the difference of domestic imports (M) generating foreign sector revenues and domestic exports (X) which are equivalent to foreign sector expenditures. The external sector balance also includes the net revenues from the cross-border payments for factors of production, i.e. wages and capital incomes, as well as cross border transfers (FI^{net}). The external sector balance is thus equal to the current account balance of the domestic economy multiplied by minus one.

Based on these two sets of indicators, the literature has classified four DGRs, as shown in Table 1: the export-led mercantilist (ELM), the weakly export-led (WEL), the domestic demand-led (DDL) and the debt-led private demand boom (DLPD) regimes.

Table 1. Classification of demand-led growth regimes according to sources and financing of demand

Export-led mercantilist (ELM)	• positive financial balances of the private sector, • negative financial balances of the external sector, • positive balance of goods and services, • positive growth contributions of net exports.
Weakly export-led (WEL)	Either • positive financial balances of the private sector, • negative financial balances of the external sector, • positive balance of goods and services, • negative growth contributions of net exports, or • negative but improving financial balances of domestic sectors, • positive but declining financial balances of the external sector, • negative but improving net exports, • positive growth contributions of net exports.
Domestic demand-led (DDL)	• positive financial balances of the private household sector and positive or balanced private sector balances as a whole, • balanced or positive financial balances of the external sector, • domestic demand is the almost exclusive source of growth, • around zero growth contribution of net exports.
Debt-led private demand boom (DLPD)	• negative or close to balance financial balances of the private sector, • positive financial balances of the external sector, • significant growth contributions of domestic demand, and private consumption demand in particular, • negative growth contributions of net exports.

Sources: based on Dünhaupt and Hein (2019, p. 458).

The NIFA demand-led growth decomposition provides insights into the structure of demand dynamics and it reveals potential imbalances and causes for stagnationary tendencies (Hein,

2019, 2022). The financial balances are linked with debt dynamics and provide insights into emerging financial fragilities. Since the regimes are complementary with regard to their current account positions, this analysis also provides insights into regional or global current account imbalances. Finally, as has already been pointed out, this approach is compatible with different theories about growth drivers. Indeed, it has been embedded (in rudimentary ways) in the considerations of growth drivers by the initial proponents, focussing on distribution, private household sector indebtedness, share and house price indices, and indicators of international competitiveness as potential drivers of specific regimes (Hein, 2011, 2012).

Table 2. Shift of DGRs in advanced capitalist economies according to studies making use of the NIFA decomposition approach

		Post 2007-09 crisis			
		Debt-led private demand (DLPD)	Domestic demand-led (DDL)	Weakly export-led (WEL)	Export-led mercantilist (ELM)
Pre-2007-09 crisis	DLPD		New Zealand[7] UK [4,6,7] USA [4,6,7]	Australia[7] Greece[4,7,8] Portugal[7] Slovakia[7] Spain[7]	Estonia [4,5,7] Hungary[7] Ireland[7,8] Latvia[5] **Spain[6,8]**
	DDL		France [4,6,7,8]	Italy[4,7] Poland[1,4,7,10] Portugal[4,8]	EA-12[6,8] Italy[2,8] Hungary[4,10]
	WEL	Canada[9]		Czech Rep.[7] Iceland[7] Norway[7]	Denmark[5,7] Slovenia[7]
	ELM		Finland[7,8]	Austria[7] Belgium[8] Japan [4,7] Sweden [4,6,7]	Austria[8] Belgium[7] **Germany[3,4,6,7,8]** Korea[7] Luxembourg[7] Netherlands[7,8] Switzerland[7]

Sources: [1] Akcay and Jungmann (2023), 1999-2008, 2009-20, [2] Bramucci (2024), 2001-09, 2010-19, [3] Campana and Hein (2025), 1999-2009, 2010-20, [4] Dodig et al. (2016), 2001-08, 2009-14; [5] Dünhaupt and Hein (2019), 1995-2008, 2009-16; [6] Hein (2019), 1999-2007, 2008-16; [7] Hein et al. (2021), 2000-08, 2009-16; [8] Hein and Martschin (2020), 2001-09, 2010-19, [9] Klassen (2024), 2001-09, 2010-20, [10] Kühnast (2024), 2000-08, 2009-19

Table 3. Shift of DGRs in emerging capitalist economies according to studies making use of the NIFA decomposition approach

		Post 2007-09 crisis			
		Debt-led private demand (DLPD)	Domestic demand-led (DDL)	Weakly export-led (WEL)	Export-led mercantilist (ELM)
Pre-2007-09 crisis	DLPD	**South Africa[2]**	**South Africa[4]**		
	DDL	**Turkey [1a,2,4]**	**India[2,3]**	**Brazil[3]** Mexico[2] **Turkey[1b]**	
	WEL		**Brazil[2]**		Russia[2,3]
	ELM		**Argentina[2,5]**	China[2,3]	

Sources: [1] Akcay and Jungmann (2023), 1999-2008, [1a] 2009-13, [1b] 2014-20; [2] Akcay et al. (2022), 2000-08, 2009-19; [3] Campana et al.(2024), 2001-10, 2011-19; [4] Dodig et al. (2016), 2001-08, 2009-14; [5] Ianni (2024), 2002-09, 2010-19

The NIFA demand-led growth decomposition has been applied in numerous studies. Starting almost a decade ago, several studies focused on the shift of regimes from the period before to the period after the GFC and the GR (2007-09). Table 2 contains studies on ACEs, while Table 3 presents studies on ECEs. The results for the seven countries that we will examine in Section 3 are highlighted. For the ACEs, after the 2007-09 crisis, we see a clear shift towards ELM or WEL regimes (in particular Eurozone and EU countries) on the one hand, or DDL with high public deficits on the other hand. For the ECEs, no clear tendency towards ELM or WEL regimes is visible. Instead, we see a tendency towards, or a continuation of, DDL regimes stabilised by government deficits and even DLPD regimes. However, for some emerging countries like Brazil, South Africa and Turkey, the classification varies between studies. Nonetheless, these results imply that the counterparts for the persistently high current account surpluses of the advanced ELM countries after the 2007-09 crisis have been provided by DLPD, DDL and partly WEL countries from both country groups, all accepting (high) current account deficits (Akcay et al., 2022).

Recent conceptual developments within the NIFA decomposition approach include the addition of an investment-led regime in order to better assess the GMs of ECEs (Mertens et al., 2022). The NIFA approach has also been applied to analyse regional growth regimes within a country, like Di Carlo et al. (2024) for Italy. Starting with the study by Alves-Passoni and Neria (2023) on Brazil and Mexico, authors have used input-output tables to generate import-adjusted growth contributions of consumption, investment, government expenditures, and exports, in order to assess the respective growth regimes. Baccaro and Hadziabdic (2024) have followed this approach and applied it to 66 countries. However, this approach shifts the focus away from the assessment of demand dynamics with regard to the different components of GDP as a criterion for the DGR to the dynamics of domestic production of value added, which could generate misleading conclusions.

Finally, another recent focus of studies has been on distinguishing different types of export-led regimes. Bürgisser and Di Carlo (2023) have focused on the role of tourism services in exports, and have argued that European Southern periphery countries (Greece, Italy, Portugal and Spain) have relied on a tourism-led DGR, which was particularly pronounced in Greece and Portugal after the 2007-09 crisis. Herrero et al (2025) have examined the role of price- and non-price competitiveness for the export-led growth regimes of Greece, Italy, Portugal and Spain after the 2007-09 crisis, and find a high reliance on the improvement of price competitiveness. Kalanta (2024) distinguishes different export-led regimes after the 2007-09 crisis towards which Estonia and Lithunia shifted from their pre-crisis debt-led private demand regimes. While Lithunia has shifted towards low-quality manufacturing and services exports, Estonia's export-led regime has been based on exports of high-quality dynamic services.

2.2. The Sraffian supermultiplier (SSM) approach

The SSM demand-led growth decomposition is based on the SSM autonomous demand-led growth model put forward by Serrano (1995). According to this model, long-run growth is determined by the dynamics of the autonomous non-capacity creating components of aggregate demand, which are assumed to be independent of current income: autonomous

consumption, residential investment, exports and government expenditures (Freitas & Serrano, 2015; Serrano & Freitas, 2017). Income financed consumption, firms' investment and imports are considered to be fully induced by current income.

For this approach, starting from the national accounts identity, we can distinguish autonomous and induced parts of aggregate demand:

(3) $$Y = C + I + G + X - M = C_a + cY + I_a + \beta Y + G_a + X_a - mY$$

with Y for GDP, C_a for autonomous consumption, c for the propensity to consume out of income, I_a for residential investment, β for the inducement to invest by domestic income, G_a for autonomous government expenditures, X_a for exports, and m for the inducement to import given domestic income. From this, we can derive the supermultiplier relationship between total autonomous demand (Z) and GDP:

(4) $$Y = \mu Z$$

with autonomous demand given by $Z = C_a + I_a + G_a + X_a$ and the supermultiplier by $\mu = \frac{1}{1-c-\beta+m}$. For the respective growth rates, we thus obtain:

(5) $$\hat{Y} = \hat{\mu} + \hat{Z}$$

With a constant supermultiplier ($\hat{\mu} = 0$), the autonomous growth rate ($\hat{Z}$) determines output growth ($\hat{Y}$), and we may have autonomous consumption-led, residential investment-led, government expenditures-led or export-led growth regimes – or combinations of these regimes. However, in empirical research, the constancy of the supermultiplier cannot be taken for granted, and changes in the propensities to consume, to invest and/or to import, will temporarily affect output growth. Also, changes in income distribution may affect these propensities, and thus the multiplier.

For the SSM demand-led growth decomposition with discrete data we distinguish direct and indirect (via the supermultiplier) contributions of autonomous demand components, and the contributions of changes in the supermultiplier:

(6) $$\hat{Y}_t = \frac{\Delta Y_t}{Y_{t-1}} = \Delta Z_t \frac{\mu_{t-1}}{Y_{t-1}} + \Delta \mu_t \frac{Z_t}{Y_{t-1}},$$

with $\Delta Z_t = \Delta C_{at} + \Delta I_{at} + \Delta G_{at} + \Delta X_{at}$ and $\Delta \mu_t = \frac{\mu_t(\Delta c_t + \Delta \beta_t - \Delta m_t)}{1-c_{t-1}-\beta_{t-1}+m_{t-1}}$

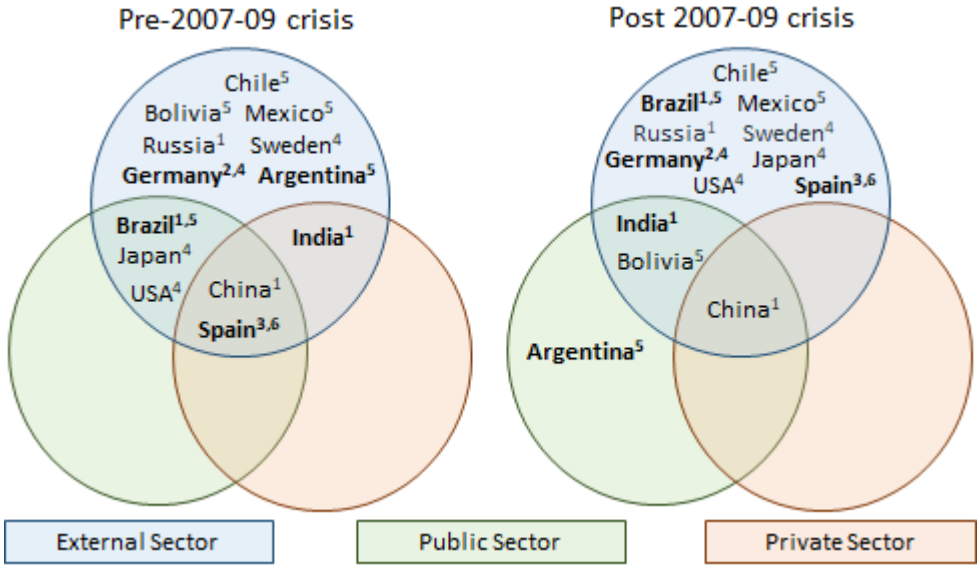
The SSM growth decomposition provides an important step towards the analysis of growth drivers and the political economy dimension of DGRs, because it allows to systematically analyse the determinants of the autonomous components of aggregate demand, on the one hand, and those of the supermultiplier, on the other hand. However, in case of more than one autonomous growth component, one dominant and the other(s) passive, the interaction between those components would have to be considered too, particularly in political economy analysis (Di Bucchianico et al., 2024; Woodgate et al., 2024).

Freitas and Dweck's (2013) study on Brazil, 1970-2005, was the first to apply this approach, finding public expenditure growth as the main autonomous demand source of GDP

growth. For the USA, Girardi and Pariboni (2016) have examined a longer period from 1947 – 2013, distinguishing four subperiods. Whereas in the periods from 1947-1960, 1960-78 and 1978-1991 government expenditure was the main autonomous demand component explaining GDP growth, in the period 1991-2013 this shifted to export growth. Some more recent studies, either on individual countries, like Campana and Hein (2025) for Germany and Labat-Moles and Summa (2024) and Segarra and Uxó (2025) for Spain, or comparative multi-country studies by Campana et al. (2024) for Brazil, Russia, India and China (BRICs), Morlin et al. (2024) for Germany, Japan, Sweden and the USA, and Passos and Morlin (2022) for Argentina, Bolivia, Brazil, Chile and Mexico have also studied potential changes in the dominant autonomous expenditure growth components for the periods before and after the GFC and the GR (2007-09). We summarise the results in Figure 1, where we have highlighted the results for the countries which we will examine further below. As can easily be seen, unlike the NIFA approach, SSM approach suggests that exports were already the only dominant component of autonomous demand growth before the 2007-09 crisis in many countries and have remained so thereafter, with the exception of Bolivia and Argentina. Some countries, which were not dominated by export growth alone, have shifted to the exclusive dominance of exports after the crisis (Brazil, Japan, Spain, USA), while India has changed the combination of dominant autonomous demand sources from exports and private expenditures to exports and public expenditures. China seems to be the only country in which a combination of external, public and private autonomous expenditure growth has dominated before and after the 2007-09 crisis.

From the empirical studies it becomes clear that the importance of the different components of autonomous demand may change over time and, of course, may vary across countries, albeit with a dominance of export-led growth. Furthermore, several studies show that supermultipliers are not constant over time and show some trends caused by changes in income distribution and behavioural parameters (i.e. inducements to consume, to invest or to import). Therefore, the dynamics of the main autonomous growth components are not the only source of demand growth in the respective countries.

Figure 1. SSM demand-led growth decomposition: dominant autonomous demand components in pre and post 2007-09 crisis periods - results of previous studies



Notes: autonomous expenditures of the private sector include: credit-financed consumption and residential investment; of the public sector: public consumption and public investment (also consumption out of transfers and public wages in Labat-Moles and Summa (2024)); of the external sector: exports. Concepts, definitions and periodization may vary among studies. Valencia Delgado and López Rogel (2025) is not included here because they consider remittances as autonomous source of growth, which differ in nature from the other sources of demand growth in the other studies considered here..

Sources: [1] Campana et al. (2024), 2001-10, 2011-19; [2] Campana and Hein (2025), 1999–2009, 2010–2020; [3] Labat-Moles and Summa (2024), 1998-2007, 2008-2019; [4] Morlin et al. (2024), 2000-2008, 2010-2018; [5] Passos and Morlin (2022), 1996-2008, 2010-2018; [6] Segarra and Uxó (2025). Authors' presentation.

Comparing the results for the NIFA and the SSM decomposition approaches in Tables 2 and 3 and Figure 1, we note that for some countries these classifications are in line with each other. Germany was classified as an ELM regime in the NIFA approach for both periods, this corroberates with exports being the exclusive dominant autonomous demand component in these two periods according to the SSM approach. Also for Argentina, the NIFA classification of ELM before the crises and DDL with high government deficits after the crises is in line with SSM results of exports as the main autonomous growth source before and public expenditures after the crises. For Brazil, we have mixed results in the NIFA approach, from DDL to WEL or vice versa, from the pre- to the post-crises period, while the SSM approach suggests a shift from joint dominance of public and external autonomous expenditures to the dominance of exports as the dominant autonomous source of growth, which does not contradict the NIFA result. However, for Spain and India no correspondences of the two decomposition approaches are apparent. While the NIFA approach classified Spain as DLPD before the crises, the SSM approach finds that a combination of public, private and external autonomous expenditures were the dominant sources of growth. For the post-crises period, however, the ELM classification of Spain is in line with exports as the dominant autonomous demand source of growth, according to the SSM approach. While India is classified as DDL both before and after the crises in the NIFA approach, the SSM approach implies that exports and autonomous private household expenditures dominated in the pre-crises period and that a combination of

export growth and public expenditure growth dominated in the post-crises period. Also for China, the two decomposition results are not compatible. The NIFA approach generates ELM and WEL regimes for the first and second period, while the SSM approach suggests that there was a joint dominance of private, public and external autonomous expenditure growth in both periods.

Recent developments in the SSM decomposition approach have extended the range of autonomous demand components considered. Febrero and Bermejo (2024) have included pensioners' expenditures on consumer goods and services in their analysis for Spain, while Labat-Moles and Summa (2024) have included consumption out of transfers and public wages in their study for the same country. Valencia Delgado and López Rogel (2025) have included consumption financed by remittances in their analysis of Central American countries. Furthermore, a few recent studies have not only compared the results of the NIFA and SSM approaches, but also started to analyse the growth drivers built on these demand-led growth decomposition approaches, like Campana et al. (2024) for the BRICS countries, Morlin et al. (2024) for Germany, Japan, Sweden and the USA, Passos and Morlin (2022) for Argentina, Bolivia, Brazil, Chile, and Mexico, Campana and Hein (2025) for Germany, and Valencia Delgado and López Rogel (2025) for Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

3. Demand and growth regimes and autonomous demand-led growth decomposition in seven selected countries, 2000-2007 and 2011-2019

We apply the NIFA and the SSM demand-led growth decomposition approaches to analyse the growth trajectories of seven countries: two ACEs, one from the European core and one from the periphery, Germany (DEU) and Spain (ESP), and five ECEs, Argentina (ARG), Brazil (BRA), India (IND), Turkey (TUR) and South Africa (ZAF). We distinguish two subperiods, 2000–2007 and 2011–2019, to avoid the distortive effects of the years of the GFC and the GR, as well as the Covid-19 Crisis. This allows us to analyse the changes that occurred after the GFC and GR and to focus on the growth slowdown experienced in the second subperiod in several countries in our sample. We exclude the subsequent subperiod, as our medium-run framework does not yet allow to assess the structural transformations that may have occurred since the Covid-19 Crisis, including the effects of the Russian invasion of Ukraine in 2022 and the further disruption to global trade caused by the tariffs introduced by the United States in 2025.

3.1. The NIFA decomposition

The results of the NIFA decomposition approach are shown in Table 4. Germany is characterised as ELM in both periods, and it maintained a relatively stable growth trajectory. Exports clearly show greater dynamism than any other component of demand throughout the period 2000-2019, however with a falling trend contribution.

Spain shifted from a DLPD to an ELM regime following the GFC and the GR, experiencing a sharp slowdown in its growth rate. In the first period it shows significant growth contributions from domestic demand, particularly private consumption, alongside negative contributions of net exports, as well as negative financial balances in the private sector and positive balances in the external sector. In the second period, financial balances reversed their

sign, as did the contribution of net exports to growth. However, the latter was mainly due to a fall in the contribution of imports to around a third of their previous value, while the contributions of exports slightly increased. Likewise, growth contributions of private consumption and investment fell significantly in the second period.

Among ECEs, Brazil and Turkey moved from a DDL regime in the first period to a WEL regime in the second. Although in both cases demand growth in the first period was almost exclusively based on domestic demand, the dynamics of the shift in DGRs differed. In Brazil, the growth rate fell sharply, while in Turkey it remained stable. Accordingly, the contribution of domestic demand fell considerably more in Brazil than in Turkey from one period to the next. The contribution of net exports in Brazil also declined but remained positive, as it had been in the first period. By contrast, in Turkey the contribution of net exports turned positive only in the second period, as the contribution of imports fell much more than that of exports. The growth contributions of public consumption also showed different trends, increasing in Brazil and decreasing in Turkey.

Argentina transitioned from an ELM to a DDL regime. Similar to Brazil, although for different reasons, the growth rate fell significantly between periods. There was a sharp decline in the contribution of exports, which turned net exports negative. There was also a reversal of the current account surplus in the second period, as well as a considerable increase in the public deficit. The main sources of growth in the 2011-2019 period were private and public consumption, even though they also slowed down significantly.

South Africa showed negative net export contributions and current account deficits in both periods, while the public deficit increased significantly in the second period, although it failed to prevent a pronounced reduction in the growth rate. In the second period, domestic demand and private consumption played a predominant role as sources of demand and the private sector financial balance turned positive. South Africa's DGR shifted from DLPD to DDL.

Finally, India is the only other country besides Germany where the DGR did not change between periods. India maintained a DDL regime with high contributions to growth from private consumption and investment, a roughly balanced contribution from net exports, positive or balanced external financial balances, and significantly negative public sector balances.

Table 4. NIFA demand-led growth decomposition. Annual averages for the periods 2000-2007 and 2011-2019

	Germany		Spain		Argentina		Brazil		India		South Africa		Turkey	
	2000-2007	2011-2019	2000-2007	2011-2019	2000-2007	2011-2019	2000-2007	2011-2019	2000-2007	2011-2019	2000-2007	2011-2019	2000-2007	2011-2019
Real GDP growth, %	1.57	1.73	3.63	1.20	3.46	0.41	3.62	0.77	6.49	6.43	4.29	1.60	5.52	5.57
Growth contributions by demand aggregates, pp.														
Domestic demand, including changes in inventories	0.59	1.62	4.36	0.58	3.11	0.51	3.21	0.70	6.75	6.07	5.16	1.87	6.02	5.28
Private consumption	0.44	0.74	2.27	0.29	1.90	0.61	1.84	0.94	3.22	3.81	3.12	1.31	2.75	2.95
Public consumption	0.17	0.39	0.76	0.03	0.26	0.21	0.54	0.11	0.42	0.58	0.74	0.37	0.69	0.75
Investment	0.07	0.51	1.34	0.23	1.01	-0.15	0.62	-0.23	2.68	1.98	1.29	0.14	2.58	1.58
Inventories	-0.09	-0.03	-0.01	0.02	-0.06	-0.16	0.21	-0.12	0.43	-0.29	0.01	0.04	-	-
Net exports of goods and services	0.90	0.11	-0.84	0.64	0.79	-0.09	0.41	0.18	-0.10	-0.04	-0.66	-0.34	-0.76	0.85
Exports	2.32	1.39	1.22	1.31	1.45	0.10	0.92	0.25	2.39	1.09	1.42	0.42	1.95	1.80
Imports	-1.42	-1.27	-2.06	-0.66	-0.66	-0.20	-0.51	-0.06	-2.49	-1.13	-2.09	-0.76	-2.71	-0.95
Balance of goods and services as % of nominal GDP	3.86	6.29	-3.68	2.84	6.23	0.06	1.19	-0.82	-1.91	-3.64	1.06	-0.32	-1.01	-2.75
Sectoral financial balances as % of nominal GDP														
Private sector	5.47	6.71	-6.20	7.38	2.21	2.35	3.48	2.68	8.68	5.11	-1.23	0.53	2.79	-1.65
Public sector	-2.64	0.73	0.35	-5.89	0.07	-4.72	-3.84	-5.76	-8.70	-7.18	-0.51	-4.05	-5.68	-1.81
External sector	-2.83	-7.44	5.85	-1.49	-2.28	2.38	0.35	3.08	0.02	2.07	1.74	3.53	2.89	3.46
Demand and growth regime (DGR)	ELM	ELM	DLPD	ELM	ELM	DDL	DDL	WEL	DDL	DDL	DLPD	DDL	DDL	WEL

Notes: Contributions may not sum to the growth rate of real GDP due to rounding, approximation, price adjustments and statistical discrepancies not included in expenditure estimates of GDP. Demand and growth regimes (DGR): Export-led mercantilist (ELM); Weakly export-led (WEL); Domestic demand-led (DDL); Debt-led private demand boom (DLPD).

Sources: World Bank (2025), IMF (2024), European Commission (2024); authors' calculations and presentation.

Table 5. NIFA demand and growth regime changes

		2011-2019			
		Debt-led private demand (DLPD)	Domestic demand-led (DDL)	Weakly export-led (WEL)	Export-led mercantilist (ELM)
Pre-2007-09 crisis	DLPD		South Africa		Spain
	DDL		India	Brazil; Turkey	
	WEL				
	ELM		Argentina		Germany

Sources: authors' presentation.

The changes in DGRs we have obtained with our new periodisation are broadly consistent with the results of the empirical literature using the NIFA decomposition approach, with slightly different periodisation (see Tables 2, 3 and 5). Only for Brazil, South Africa and Turkey, our results are deviating from some studies but are in line with others. For Brazil and Turkey our results suggest a change from a DDL to a WEL regime and are thus in line with Campana et al. (2024) for Brazil and Akcay and Jungmann (2023) for Turkey after 2013, but contradict the older studies by Akcay et al. (2022), Dodig et al. (2016) for both countries, and Akcay and Jungmann (2023) for Turkey before 2013. Regarding South Africa, we find a change from a DLPD to a DDL regime, which is in line with Dodig et al. (2016), but does contradict Akcay et al. (2022), who also find a DLPD regime for the second period. We also observe a relative polarisation of regimes following the GFC and the GR, as in several previous studies. We find WEL (Brazil and Turkey) or ELM (Spain and Germany) regimes for some countries, while others are DDL (Argentina, South Africa, India) as shown in Table 5. These two regimes are complementary: ELM economies run current account surpluses, while DDL and WEL economies accept the required current account deficits, with the WEL moving towards balanced current accounts or even surpluses. These dynamics thus contribute to persistent current account imbalances at the global level, as pointed out in more detail in Akcay et al. (2022).

3.2. The SSM decomposition

To better understand the dynamics of the sources of growth and provide the grounds for the analysis of the regime change drivers, we apply a second level of analysis, the SSM decomposition. As pointed out above, this approach distinguishes between autonomous and induced components of aggregate demand, with the former leading economic growth. Furthermore, it accounts for both the direct effects of changes in autonomous demand components and the indirect effects via changes in the supermultiplier. We apply the following growth decomposition formula (see Appendix A for derivation):

$$(7) \quad \hat{Y}_t = \mu_t \left(\frac{C_{a,t-1}}{Y_{t-1}}\right) \hat{C}_{a,t} + \mu_t \left(\frac{I_{a,t-1}}{Y_{t-1}}\right) \hat{I}_{a,t} + \mu_t \left(\frac{GC_{a,t-1}}{Y_{t-1}}\right) \widehat{GC}_{a,t} + \mu_t \left(\frac{GI_{a,t-1}}{Y_{t-1}}\right) \widehat{GI}_{a,t} + \mu_t \left(\frac{X_{a,t-1}}{Y_{t-1}}\right) \hat{X}_{a,t} + \mu_t \left(\frac{C_{i,t-1}}{Y_{t-1}}\right) \hat{c}_t + \mu_t \left(\frac{I_{i,t-1}}{Y_{t-1}}\right) \hat{\beta}_t - \mu_t \left(\frac{M_{i,t-1}}{Y_{t-1}}\right) \widehat{m}_t + \mu_t \left(\frac{E_{t-1}}{Y_{t-1}}\right) \hat{E}_t$$

with $\hat{Y}$ for GDP growth and μ for the supermultiplier, the autonomous components are C_a as credit-financed consumption, I_a as household residential investment, GC_a as government consumption, GI_a as government investment and X_a as exports, while the induced

components are C_i as consumption out of disposable income, I_i as corporate investment and M_i as imports. For accounting consistency, we include E as inventories. Following the SSM literature we identify autonomous consumption with credit-financed consumption. This may be problematic because in the short run credit-financed consumption may endogenously respond to changes in income, i.e. substituting a sudden fall in income. However, for our decomposition analysis targeting the medium to long run, we assume that the growth of consumer credit is rather independent of income and influenced by features of the financial system, like asset price dynamics, conditions of credit, etc. (Moore & Stockhammer, 2018; Stockhammer & Wildauer, 2016, 2018).

Given limited data availability for credit-financed consumption and household residential investment (together, private households' demand), we approximate them with household credit and household investment, respectively (Campana et al., 2024; Campana & Hein, 2025). This raises two issues that should be considered in a detailed interpretation. On the one hand, household credit series may contain housing loans in addition to consumer loans, implying potential double counting with residential investment and thus an upward bias for this component of autonomous demand. On the other hand, even though a significant part of household investment is in housing, it may also include investment in the capital stock of non-corporate businesses and may hence be induced by current income following the accelerator hypothesis (see Appendix B for methodology).

An initial examination of the data shows a high correlation between the growth rates of autonomous demand and GDP. Among the components of autonomous demand, exports account for the largest share of GDP in all countries in the sample, except for Brazil, where public consumption takes that position (see Appendix C, Table C1).

The results of the decomposition are shown in Table 6. It is clear that the growth performances in our countries were not only shaped by the dynamics of autonomous growth and its components, but also by changes in the components of the supermultiplier, leading to changing growth contributions of the elements of induced demand too. Here, for the sake of space, we focus on the main autonomous growth contributions and the respective changes over time and relate them to our results from the application of the NIFA approach.

In line with the ELM regime from the NIFA approach, exports were the dominant source of demand growth in Germany in both periods, consistently accounting for the largest contributions. However, a declining trend is observed. The slight increase in growth in the second period benefitted from an increase in the autonomous contributions of the public sector and also in the private household's autonomous expenditures, without undermining the dominant role of export growth.

High growth in Spain during the first period was based on the dynamics of multiple components of autonomous demand. Exports and private household's residential investment and credit-financed consumption were almost equally important, but public consumption and investment expenditures contributed significantly. This is not in line with the DLPD regime classification in the NIFA approach. The impact of the GFC, the GR, and the Eurozone Crisis shaped the developments during the second period. Exports remained the only dominant autonomous demand contribution to growth, while the growth contributions of public and private autonomous expenditures turned negative, which is in line with the ELM classification for this period in the NIFA approach.

Argentina transitioned from autonomous growth contributions dominated by exports, leading to significant growth in the first period, to a second period of stagnation in which public consumption was the dominant source of a meagre autonomous growth. This change is consistent with the shift from an ELM regime in the first period towards a DDL regime in the second, as a result of the NIFA approach.

In Brazil, exports were the highest autonomous component during the first period, followed by government consumption and investment expenditures, and household residential investment and credit-financed consumption, which is hardly in line with the NIFA DDL classification. The subsequent growth slowdown was accompanied by a reduction of the contribution of exports. However, this remained the only positive autonomous growth contribution, while the autonomous contributions of the government and private households turned negative. This is in line with the WEL classification from the NIFA approach.

In India, exports were the strongest autonomous demand source in the first period, with autonomous private household expenditures at a similar level. These two components continued to be among the most important in the second period, when the contribution of public expenditures also became considerable. While autonomous growth contributions decreased in the second period, the GDP growth rate was maintained because the induced components of demand increased significantly. This finding again is not in line with classifying India as a DDL regime as in the NIFA approach.

In South Africa exports were the main autonomous source of high growth in the first period, followed by private and public autonomous expenditures. In the second period with rapidly falling GDP growth, exports and the public sector contributed to autonomous growth while the private autonomous expenditure had a slightly negative contribution. Again, this is not in line with a shift from a DLPD towards a DDL regime according to the NIFA approach.

Finally, in Turkey, exports were the main autonomous component of high demand growth in both periods. In the first period, public and private autonomous expenditures contributed considerably, too, while in the second period the contributions of the public sector were maintained, but the private autonomous contributions declined significantly. This shift is only partly accounted for in the diagnosed shift from a DDL towards a WEL regime applying the NIFA approach.

The SSM decomposition analysis shows that there may be more than one autonomous demand component significantly contributing to growth. In Figure 2, we classify the countries in our sample based on the autonomous contributions of the external sector (exports), the public sector (government consumption and investment), and the private sector (private households' credit-financed consumption and residential investment). An autonomous component is considered dominant if its contribution exceeds 50% of the total contribution of autonomous demand. In addition, if the second-largest autonomous component accounts for 40% or more of the total contribution of autonomous demand, it is also classified as dominant, and we thus have two dominant components. Otherwise, the economy is led by a combination of autonomous components with a contribution of 25% or more of the total contribution of autonomous demand.

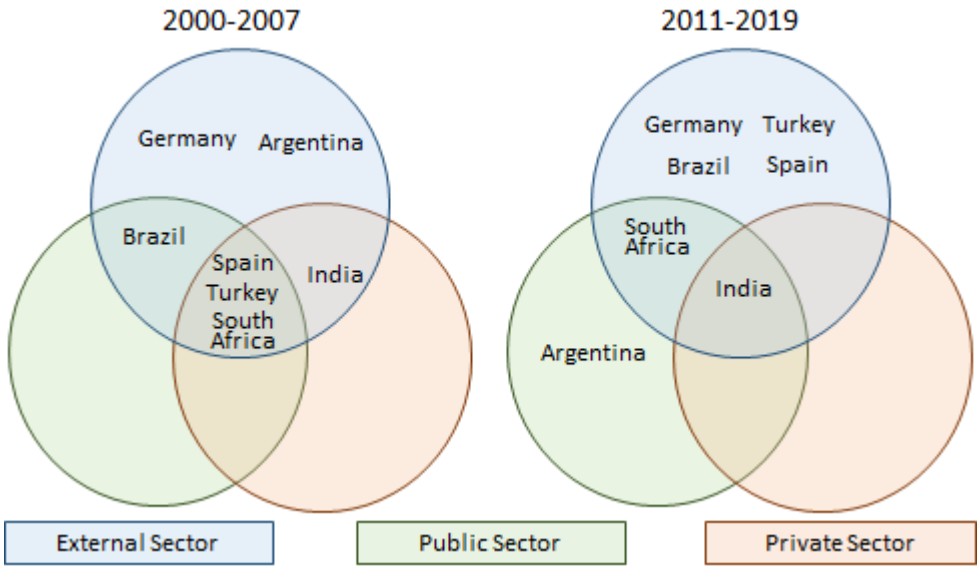
Table 6. SSM demand-led growth decomposition. Annual averages for the periods 2000-2007 and 2011-2019

		Germany		Spain		Argentina		Brazil		India		South Africa		Turkey	
		2000-2007	2011-2019	2000-2007	2011-2019	2000-2007	2011-2019	2000-2007	2011-2019	2000-2007	2011-2019	2000-2007	2011-2019	2000-2007	2011-2019
Real GDP growth, %		1.57	1.73	3.63	1.20	3.46	0.41	3.62	0.77	6.49	6.43	4.29	1.60	5.52	5.57
Total autonomous, pp.		2.78	3.12	5.23	1.50	5.01	0.57	4.80	0.32	9.55	4.65	5.92	1.44	7.77	5.86
Autonomous components	Exports	3.83	1.95	1.88	2.31	3.32	0.19	2.14	0.59	4.62	1.79	2.41	0.76	3.78	3.42
	Government consumption	0.29	0.55	1.16	0.03	0.55	0.49	1.27	0.25	0.78	1.03	1.27	0.68	1.30	1.44
	Government investment	-0.01	0.06	0.31	-0.41	0.33	-0.11	0.26	-0.34	0.39	0.49	0.37	0.02	0.63	0.32
	Household (residential) investment	-0.15	0.19	0.97	-0.43	0.52	0.06	0.13	0.02	1.00	1.31	0.61	0.06	1.28	0.87
	Credit-financed consumption	-1.17	0.37	0.91	0.00	0.29	-0.05	1.01	-0.21	2.76	0.04	1.25	-0.08	0.77	-0.19
Total induced, pp.		-1.16	-1.34	-1.74	-0.31	-0.23	0.22	-1.66	1.02	-3.54	1.57	-1.34	-0.04	-2.66	0.78
Induced components	Consumption out of disposable income	0.50	-0.60	-0.35	-0.72	-0.96	0.78	-1.41	1.42	-3.20	0.67	-0.09	0.67	-1.88	-0.41
	Corporate investment	-0.07	0.18	0.05	0.90	0.34	-0.48	0.24	-0.53	2.12	-0.11	0.53	-0.17	1.33	-0.01
	Imports	-1.59	-0.93	-1.44	-0.49	0.39	-0.08	-0.49	0.13	-2.46	1.00	-1.78	-0.55	-2.11	1.20
Inventories, pp.		-0.18	-0.05	-0.03	0.04	-0.14	-0.37	0.44	-0.30	0.72	-0.51	0.05	0.08	-	-

Notes: Contributions may not sum to the growth rate of real GDP due to rounding, approximation, price adjustments and statistical discrepancies not included in expenditure estimates of GDP.

Sources: World Bank (2025), MECON (2025), INDEC (2025), OECD (2025), European Commission (2024), BIS (2025), MoSPI (2025); authors' calculation and presentation.

Figure 2. SSM demand-led growth decomposition: dominant autonomous demand components



Source: authors' presentation.

For all the countries in our sample, exports were the dominant autonomous component of demand with the highest contribution in the first period. Only in Spain the contribution of private households' demand was equal to that of exports. However, also in India, Turkey and South Africa this component was significant and dominant. The contribution of government expenditures was also considerable in Spain, Brazil, Turkey, and South Africa in the first period. In the second period, exports were dominant in all countries but Argentina, where government expenditures took the lead. Furthermore, in India government expenditures became one of the main autonomous components together with private autonomous expenditures, while in South Africa private households' autonomous demand ceased to be dominant. Compared with the previous literature (Figure 1) our results are similar, with only a deviation for India in the second period, which may be due to different periodisations.

Our results highlight the dominant role of exports as autonomous demand component in all countries in the first period and in almost all countries in the second period. This key importance of exports for growth, which seems to have even increased over time, is somewhat hidden in the NIFA approach. In the next section, we thus take a closer look at the structure of exports and we try to define different export-led regimes.

4. Export structure and international trade

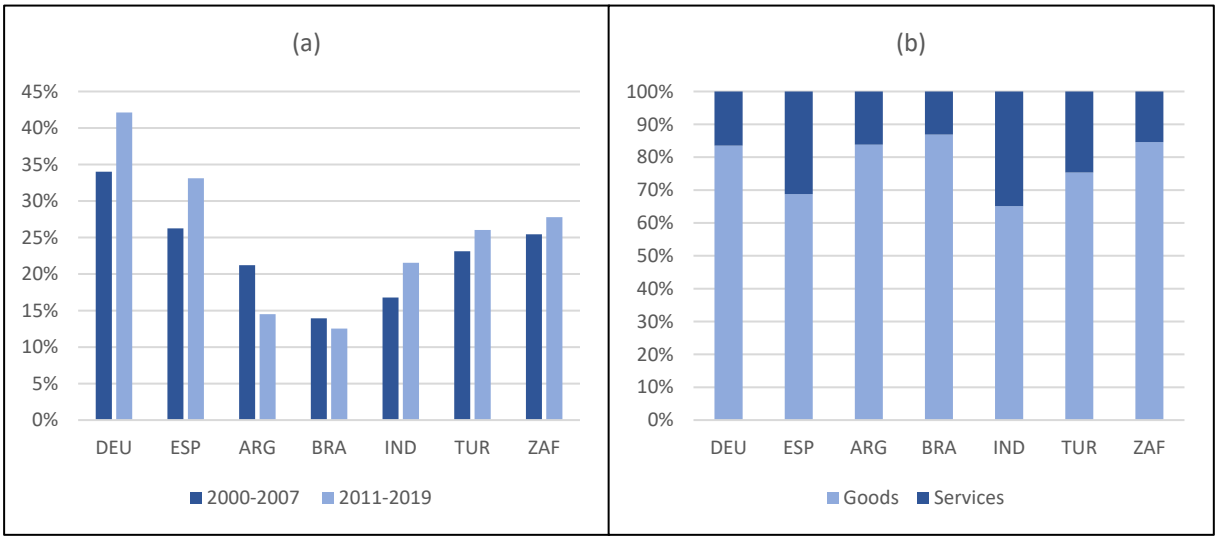
Given the importance of exports for the growth performance of the countries under analysis, we now examine their export structures to assess potential varieties of export-led regimes. We analyse the categories of exported services, the technological content and product groups of exported goods, geographic distribution of exports of goods, and trade-related economic complexity.

Panel (a) of Figure 3 shows the evolution of exports of goods and services as a percentage of GDP. We observe an increase in the export share in all countries except the Latin American ones, with a pronounced decline in Argentina. Germany and Spain exhibit the

largest increases. Panel (b) shows the shares of goods and of services in total exports. These shares remain rather stable across periods, but in all cases exports of goods substantially exceed exports of services. Nevertheless, two groups can be identified according to the importance of services. Spain and India, and Turkey to a lesser extent, show higher service shares, ranging between 25% and 35% of total exports, whereas the remaining countries exhibit service shares of around 15% or lower. Accordingly, despite the predominance of goods exports, next we analyse service exports by product category (Figure 4).

Different types of exported services embody varying levels of value added and reflect different degrees of sophistication. Travel services, which include tourism, represent more than half of total service exports in Spain, Turkey, and South Africa, and were also significant in Argentina. In all four countries, the share of travel services declined in the second period. Germany exhibits the highest share among the sample countries for finance, insurance and pension services. The data shows Brazil as a hub for other business services, which encompass research and development, consulting, and other technical and business-related services. India, Argentina and Germany also show strong and increasing exports of other business services. Additionally, India stands out in exports of telecommunications and information services.

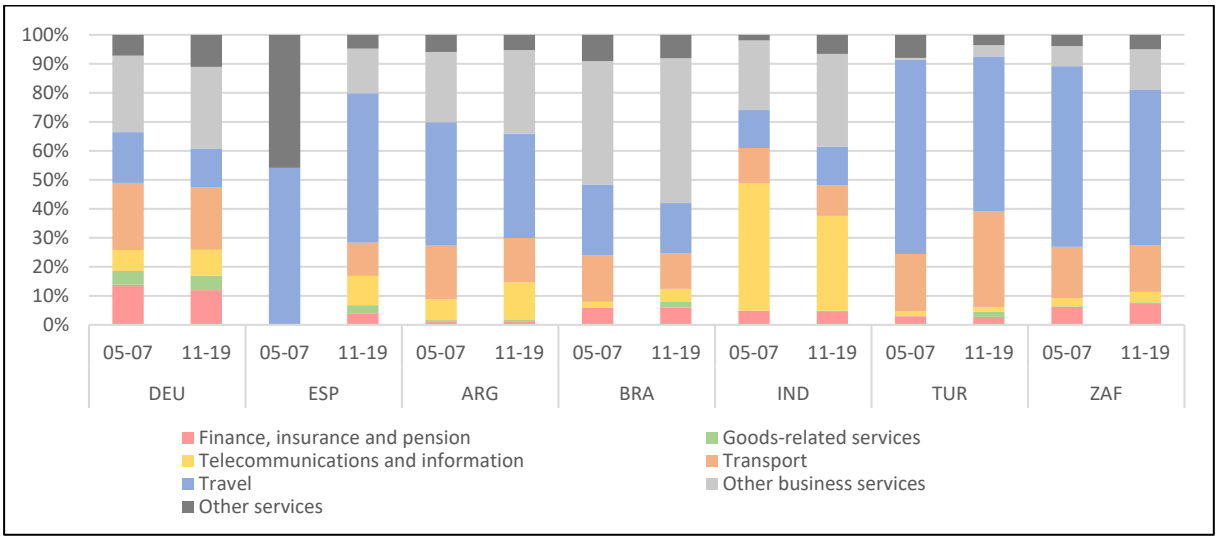
Figure 3. Exports of goods and services. Annual averages. (a) Periods 2000-2007 and 2011-2019. Percentage of GDP. (b) Period 2000-2019. Percentage of total exports



Notes: panel (b) is based on BoP data in current US$.

Sources: WITS (2025); authors' presentation.

Figure 4. Exports of services by category. Annual averages for the periods 2005-2007 and 2011-2019. Percentage of total

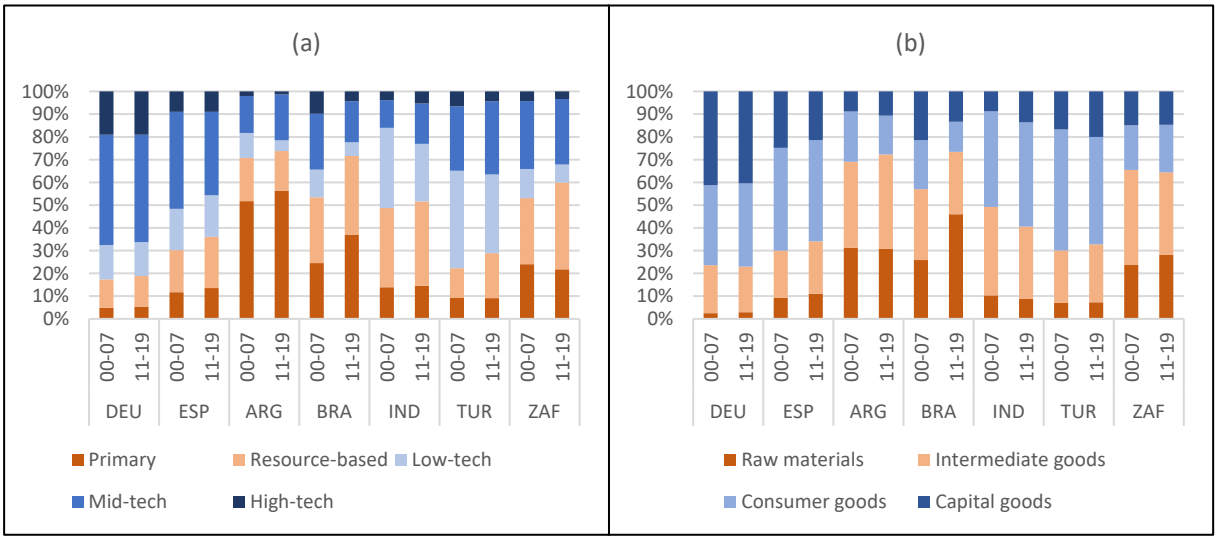


Notes: Spain only has data on travel services for the first period. Category names were modified for presentation purposes.

Sources: UNCTAD (2025); authors' presentation.

We now turn to the analysis of goods exports, which account for the major part of exports in the countries analysed (Figure 3 (b)). The degree of technology in exported goods is relevant, as high-technology products tend to grow faster in world trade and present higher income elasticities than products with lower technology (Lall, 2000). Although structural changes of this type often occur over long periods, certain trends are observed (Figure 5 (a)). Germany maintains a relatively stable technological classification of exports, heavily concentrated in high- and, in particular, mid-tech products. Spain has lost mid-tech production to primary and resource-based (i.e., products that are more processed than primary goods but still heavily reliant on natural resources). Brazil shows a strong tendency towards primary and resource-based exports of goods. Argentina experiences a similar process, though less pronounced and concentrated in primary exports, alongside a modest shift from low- to medium-technology products. India and Turkey increased their mid-tech share at the expense of low-tech production, with India also having increased its share of high-technology exports, and both increasing resource-based export goods. Finally, South Africa significantly increased the share of resource-based exports while all other technology groups of exports have seen a decline, particularly low-tech exports.

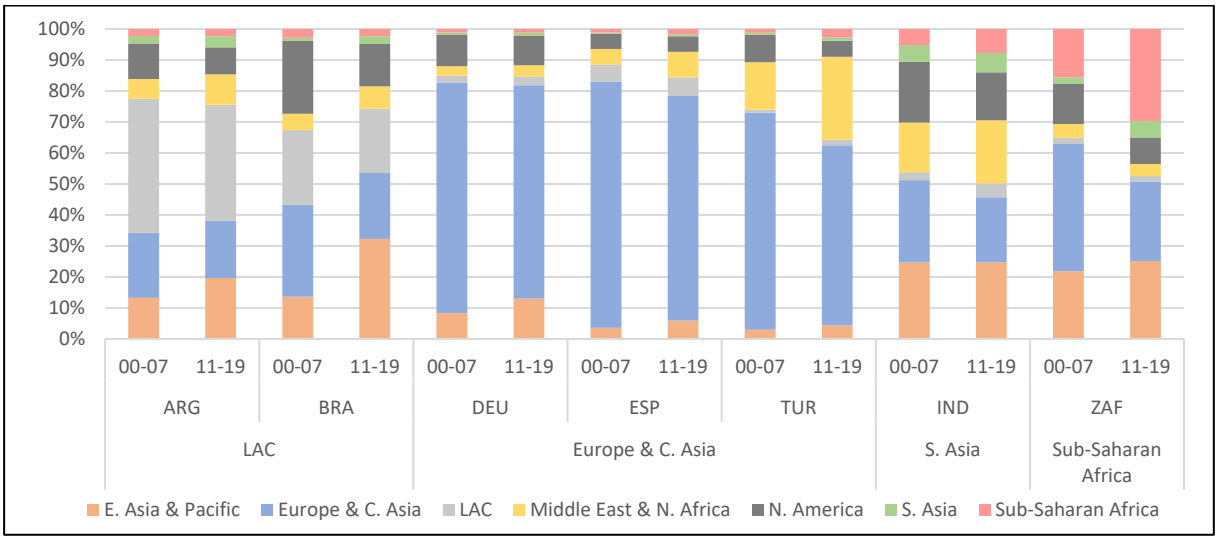
Figure 5. Exports of goods. Annual averages for the periods 2000-2007 and 2011-2019. Percentage of total. Classification by (a) technology and by (b) product group.



Sources: WITS (2025); authors' presentation.

The technological-content analysis is complemented by a classification of goods exports by product group (Figure 5 (b)), which captures differences in the processing stage and the use of exports as intermediate or final goods. We observe a clear greater relative importance of raw materials in Argentina, Brazil and South Africa. Although Brazil experienced the strongest increase in this product group, it also increased in South Africa. This is consistent with the characteristic tendency of these economies towards primary and resource-based production of export goods, already noted in the analysis of technological content. The export goods of Germany remained concentrated in final capital and consumption goods with remarkable stability. Spain shows a slight increase in exports of raw materials and intermediate goods at the expense of other categories, yet consumer goods remained the most important export group. In Turkey, consumer goods also account for the largest share of exports in both periods, although their share decreased as capital and intermediate goods exports increased. India also shows technological upgrading, with higher exports of both final consumer and capital goods in the second period. A greater disaggregation of exported products reveals no substantial changes among the top five export products in any of the countries in our sample (see Appendix C, Table C2).

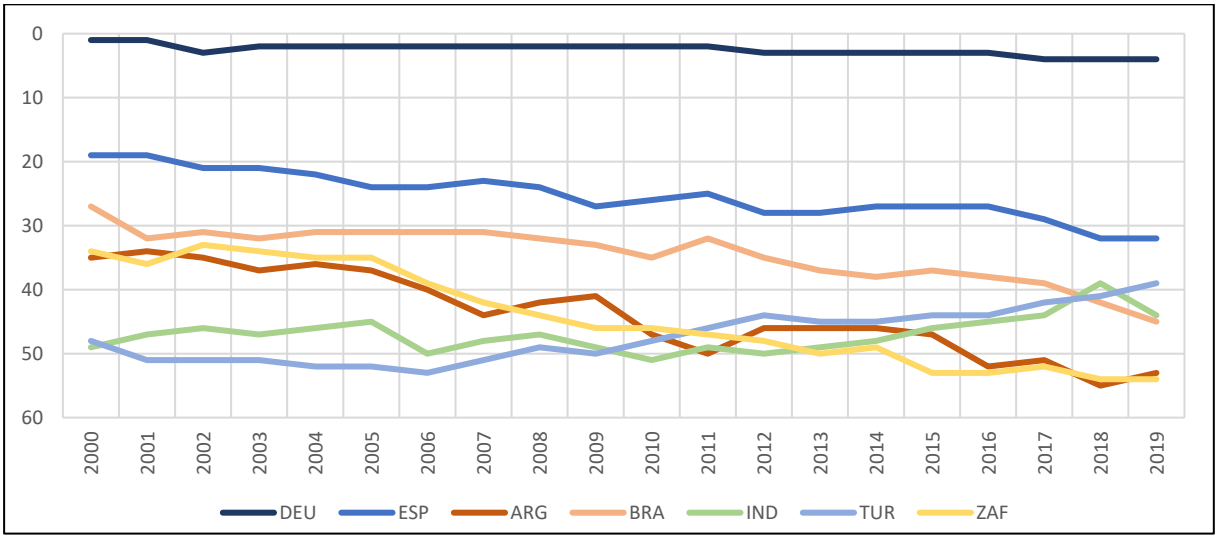
Figure 6. Exports of goods: share of main trading regions. Annual averages for the periods 2000-2007 and 2011-2019, current US dollars, in percent



Sources: UN COMTRADE (2025); authors' calculation and presentation.

When analysing the geographic distribution of goods exports, we first observe that countries tend to realise a large part of their trade within their respective region, with the exception of India (Figure 6). Over the time periods, there is a general increase of exports to the East Asia and Pacific region, particularly pronounced in Brazil, but also important in Argentina and Germany. These dynamics may be explained by the rise of China and other emerging economies of the region. Although the export shares to the East Asia and Pacific region increased less in India and South Africa, both countries already exhibited relatively high shares in the first period. On the contrary, Spain and Turkey show comparatively low shares. We also observe a notable decline of exports to Europe and Central Asia across all countries, which may reflect weaker domestic demand dynamics in advanced export-led economies. The export share to South Asia, particularly to India, increased in all countries, although it remained modest compared with other regions. The Middle East and North Africa region also gained a larger share as export destination in all countries except South Africa. Notably, Turkey exhibits the largest expansion of exports to this region, which now account for just over a quarter of its total exports. Trade with Latin America and the Caribbean remained modest in countries outside the region, and in Argentina and Brazil their shares even declined, consistent with poor regional economic performance. Lastly, South Africa significantly increased its intra-regional trade with Sub-Saharan Africa, with its share now exceeding one-quarter of total exports.

Figure 7. Ranking Economic Complexity Index (ECI) - Trade



Sources: OEC (2025); authors' presentation.

Finally, we examine the evolution of overall economic complexity of traded goods, which provides a condensed summary of the dimensions analysed above. The economic complexity index (ECI), based on trade data, is an indicator of the sophistication of a country's export basket, synthetising characteristics related to technological development and the productive structure of the economy (Herrero et al., 2025). It indicates the non-price competitiveness of traded goods and is positively related to the income elasticity of exports. By focusing on the index ranking, we account for both within-country changes in economic complexity and changes in countries' relative positions. Our analysis is restricted to the top sixty countries in the ranking, representing the upper-half of the average country coverage during the period. Germany exhibits a consistently high ECI, and its ranking remained fairly stable, although it declined from first to fourth position by the end of the second period. Spain ranks second highest within the sample, but its position consistently fell over time, moving from the high/upper-middle range to the lower-middle range. The declines of Brazil, Argentina and South Africa were considerably more pronounced, particularly for the latter two countries. While all three countries fell to the lower region of the ranking, Brazil declined from an upper-middle position, whereas Argentina and South Africa fell from lower-middle positions. Starting from the bottom of the ranking, Turkey and India are the only countries that improved their relative positions, rising from the lower to the lower-middle segment (although India fell to an upper-low position in 2019), ultimately overtaking Brazil, Argentina and South Africa by the end of the period.

5. A spectrum of export-led regimes

The structural analysis of exports reveals that, despite their overall importance as an autonomous source of economic growth, export-led growth was by no means uniform across the countries in our sample. Considerable heterogeneity dominated both with regard to initial structural conditions and the trajectories observed over the period analysed. While most countries transitioned towards growth regimes dominated by exports as the main autonomous source of growth, others exhibit more hybrid configurations, in which growth

patterns are characterised by a combination of exports and other autonomous demand components. Moreover, although exports of goods dominated over services in all cases, there were divergent patterns of productive specialisation, technological content, and positions within international production networks, which are also reflected in distinct trajectories of economic complexity of traded goods. We have thus found a spectrum of export-led regimes, in which the centrality of exports is a common denominator, yet with a wide array of structural differences. Drawing on this concept and country-specific characteristics, specifically the technological content of exports, the ECI ranking, and the dominance of different autonomous demand components, we can generate a typology of export-led growth regimes, as shown in Table 7.

Germany shows a stable export-led regime in an ACE, with a consistently high ECI ranking during both periods and a clear dominance of exports, which are concentrated in mid- and high-technology products, as well as final capital and consumer goods. Spain has moved towards an ACE export-led regime, with exports concentrated in medium-technology and resource-based goods, and a decline in the ECI ranking from an upper-middle position to a lower-middle one.

Three ECEs, Argentina, Brazil and South Africa, have experienced a strong relative fall of their ECI trade ranking and exhibit a high relevance of exports of raw materials. In Argentina, primary exports predominate, the ECI ranking has fallen from the lower-middle to the lower segment in the second period and government expenditures have become the dominant autonomous demand source at the expense of exports. Primary and resource-based products are Brazil's main exports, its ECI ranking has fallen from upper-middle to low, with these exports becoming the dominant autonomous demand source. In the case of South Africa, exports are concentrated in resource-based and medium-technology products, its ECI ranking has fallen from lower-middle to low, with exports and government expenditures becoming the dominant autonomous sources of growth.

In contrast, India and Turkey are the only countries that have experienced some technological upgrading, with a rising ECI ranking from the lower to the lower-middle segment. India has exported mainly resource-based and low-tech products, but it has increased its shares of mid- and high-tech. These exports have become only one dominant source of autonomous demand, together with private and public autonomous demand growth. Turkey has moved towards an export-dominated economy, with exports concentrated in low- and mid-tech products.

We do not find tourism-led regimes, as Bürgisser and Di Carlo (2023) claim for the European periphery, even for Spain, Turkey and India, with higher shares of services in total exports than the other four countries (Figure 3 (b)). While in India travel services did not play a role, the average shares of tourism related services in total services in Spain (53%) and Turkey (60%) over the two periods of analysis were considerable (Figure 4). However, scaling these shares by the share of services in total exports in these two countries, we only observe around 15% of tourism exports in total exports in both countries. This is well below the shares of exports of goods according to technological level in total exports, which we have taken as main technology classification criterion (Table 7).

Table 7. Typology of regimes

Country	Period	NIFA decomposition	SSM decomposition	Export technology (top 3 levels, %)	ECI ranking (1 – 60)	Type of regime
Germany	2000-2007	ELM	Exports	MT (48.3) + HT (19) + LT (15.1)	High	**Mid- & high-tech products, high ECI, export-led**
	2011-2019	ELM	Exports	MT (47.4) + HT (19.1) + LT (15)	High	**Mid- & high-tech products, high ECI, export-led**
Spain	2000-2007	DLPD	Exports, Private households, Government	MT (42.6) + RB (18.5) + LT (18.1)	High/Upper middle	**Mid-tech and resource-based products, upper-middle ECI, export-, private household- & government-led**
	2011-2019	ELM	Exports	MT (36.7) + RB (22.6) + LT (18.3)	Lower middle	**Mid-tech and resource-based products, lower-middle ECI, export-led**
Argentina	2000-2007	ELM	Exports	PP (51.8) + RB (19) + MT (16.3)	Lower middle	**Primary products, lower-middle ECI, export-led**
	2011-2019	DDL	Government	PP (56.4) + MT (20.2) + RB (17.4)	Low	**Primary products, low ECI, government-led**
Brazil	2000-2007	DDL	Exports, Government	RB (29) + PP (24.6) + MT (24.6)	Upper middle	**Primary & resource-based products, upper-middle ECI, export- & government-led**
	2011-2019	WEL	Exports	PP (37) + RB (34.4) + MT (18)	Low	**Primary & resource-based products, low ECI, export-led**
India	2000-2007	DDL	Exports, Private households	LT (35.3) + RB (34.9) + PP (13.9)	Low	**Resource based & low-tech products, low ECI, export- & private household-led**
	2011-2019	DDL	Exports, Government, Private households	RB (37) + LT (25.3) + MT (17.7)	Low/Lower middle	**Resource based & low-tech products, lower-middle ECI, export-, government- & private household-led**
South Africa	2000-2007	DLPD	Exports, Private households, Government	MT (29.9) + RB (29.1) + PP (24)	Lower middle	**Resource-based & mid-tech products, lower-middle ECI, export-, private household- & government-led**
	2011-2019	DDL	Exports, Government	RB (38.1) + MT (28.8) + PP (21.8)	Low	**Resource-based & mid-tech products, low ECI, export- & government-led**
Turkey	2000-2007	DDL	Exports, Private households, Government	LT (43) + MT (28.4) + RB (13.1)	Low	**Low- & mid-tech products, low ECI, export-, private household- & government-led**
	2011-2019	WEL	Exports	LT (34.7) + MT (32.2) + RB (19.8%)	Lower middle	**Low- & mid-tech products, lower-middle ECI, export-led**

Notes: PP=primary production; RB=resource-based; LT=low-technology; MT=medium-technology; HT=high-technology
Sources: WITS (2025); authors' presentation.

6. Conclusions

The current contribution focusses on the first two levels of DGR and GM analysis identified by Hein (2023), the NIFA and the SSM growth decomposition approaches, and amends them by the analysis of export structures and international trade. By providing a comparative theoretical and empirical analysis of different growth decomposition approaches, this article contributes both to the PKE literature on DGRs and to the CPE GM approach. We have compared the NIFA and the SSM demand-led growth decomposition approaches and systematically reviewed the previous literature in each tradition regarding regime changes for the periods before and after the GFC and the GR, 2007-2009. For a sample of seven countries, Germany and Spain as ACEs, and Argentina, Brazil, India, Turkey and South Africa as ECEs, we have applied both approaches and shown that exports have become an increasingly important autonomous source of growth in most countries, and that this tendency is somewhat hidden in the NIFA approach. However, while our results highlight the important and increasing role of exports as autonomous source of growth in most countries, structural differences among them should not be overlooked. Based on our analysis of traded goods and services, we have derived a spectrum of export-led regimes, distinguished in particular by technological intensity and economic complexity of traded goods. India and Turkey were the only countries to show technological upgrading in exports, reflected in improvements in both the technological classification of exports and their economic complexity rankings, starting from low rankings and keeping relatively important service exports. Germany displayed a relatively stable export-led regime, strongly specialized in medium- and high-technology capital goods exports alongside a stable and high position in the ECI ranking. The remaining countries analysed have moved in the opposite direction. Argentina, Brazil and South Africa exhibit strong signs of export primarisation, while Spain has experienced a decline in medium-tech exports. All four countries have suffered from reductions in their economic complexity rankings. In contrast to previous studies, we did not find tourism-led regimes. Taken together, these results highlight the limitations of treating export-led growth as a homogeneous model and underscore the importance of considering the country-specific structural characteristics that shape different export-led regimes.

Our findings also lay the grounds for the analysis of growth drivers and the political economy factors underpinning the observed regime changes, i.e. the third and fourth level of DGR or GM analysis in PKE and CPE according to Hein (2023). The results also offer a basis for IPE analyses that seek to explain the observed regime changes in the context of structural transformations of the global economy. Furthermore, our contribution presents a macroeconomic framework for industry- and firm-level analyses of the positions of firms, industries and countries within the international division of labour and hence in global value chains or production networks. The empirical approach we propose could be further extended through the use of input-output tables to analyse the relationships between DGRs and international trade structures. This could be further extended to apply to specific ecological impacts, for example. Such environmental linkages are intrinsically connected to the kind of structural analysis undertaken in this paper, and they are an extension that should be explored, yet remains largely absent in the DGR and GM literature.

Finally, our analysis suggests some economic policy implications to consider. While we observe a widespread importance of exports as autonomous source of growth across most of

the countries analysed, their underlying structural characteristics and trajectories are very different. This heterogeneity becomes particularly relevant when assessing the risks, vulnerabilities and potential instabilities of export-led models in an increasingly fragmented global economy characterised by multiple geopolitical and trade conflicts, but also when identifying potential new development opportunities that may arise in this context. Rising international competition, protectionism, tariffs and the renewed prominence of industrial policies imply that export-led models are now more exposed and conditioned by systemic forces at the regional and global levels. Even though the most recent years are not covered in our analysis, the results provide valuable insights for the current context of volatile interdependencies. Policymakers should not focus only on preserving existing sources of exports and growth, but should also foster structural transformations that raise the technological level and complexity of their economies. These transformations would enable their economies to produce goods with greater complexity and higher income elasticities, which are more dynamic and stable in global trade. Furthermore, in an era in which exports may become less dynamic, economic policy should also aim to strengthen domestic demand by acting on autonomous demand components and other economic variables, including income distribution and the imports profile.

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Appendix A – SSM growth decomposition formula

To derive Equation (7) in the main text, we closely follow Freitas and Dweck (2013, pp. 189–191) but with a different nomenclature, and we also use import propensity instead of a domestic content parameter to facilitate interpretation. We start from the national accounts identity (Equation (3)), but we include inventories (E), necessary for the sum of contributions to match GDP growth when working with empirical data. Furthermore, we separate autonomous government expenditures (G_a) into consumption (GC_a) and investment (GI_a):

(A1) $$Y = C + I + G + X - M = C_a + cY + I_a + \beta Y + GC_a + GI_a + X_a - mY + E$$

With $Z = C_a + I_a + GC_a + GI_a + X_a$, equation (A1) becomes:

(A2) $$Y = cY + \beta Y - mY + Z + E$$

GDP change could then be represented as:

(A3) $$\Delta Y = Y_t - Y_{t-1} = c_t Y_t + \beta_t Y_t - m_t Y_t + Z_t + E_t - c_{t-1} Y_{t-1} - \beta_{t-1} Y_{t-1} + m_{t-1} Y_{t-1} - Z_{t-1} - E_{t-1}$$

Adding and subtracting $c_t Y_{t-1}$, $\beta_t Y_{t-1}$ and $m_t Y_{t-1}$ from the right hand-side, and given $\Delta Y = \hat{Y} Y_{t-1}$, we obtain:

(A4) $$\hat{Y} Y_{t-1} = c_t \hat{Y} Y_{t-1} + \beta_t \hat{Y} Y_{t-1} - m_t \hat{Y} Y_{t-1} + \Delta c Y_{t-1} + \Delta \beta Y_{t-1} - \Delta m Y_{t-1} + \Delta Z + \Delta E$$

Dividing both sides by Y_{t-1}:

(A5) $$\hat{Y} = c_t \hat{Y} + \beta_t \hat{Y} - m_t \hat{Y} + \Delta c + \Delta \beta - \Delta m + \frac{\Delta Z}{Y_{t-1}} + \frac{\Delta E}{Y_{t-1}}$$

Solving the equation for $\hat{Y}$:

(A6) $$\hat{Y} = \frac{1}{1 - c_t - \beta_t + m_t} \left[\Delta c + \Delta \beta - \Delta m + \frac{\Delta Z}{Y_{t-1}} + \frac{\Delta E}{Y_{t-1}} \right]$$

The supermultiplier is equal to $\mu_t = \frac{1}{1 - c_t - \beta_t + m_t}$. Also, $\Delta c = \hat{c} c_{t-1}$ and $c_{t-1} = \frac{C_{i,t-1}}{Y_{t-1}}$, which also applies to β and m. Using these expressions and after breaking down Z into the different components of autonomous demand, we arrive at the final formula for the SSM growth decomposition:

(A7) $$\hat{Y}_t = \mu_t \left(\frac{C_{a,t-1}}{Y_{t-1}} \right) \hat{C}_{a,t} + \mu_t \left(\frac{I_{a,t-1}}{Y_{t-1}} \right) \hat{I}_{a,t} + \mu_t \left(\frac{GC_{a,t-1}}{Y_{t-1}} \right) \widehat{GC}_{a,t} + \mu_t \left(\frac{GI_{a,t-1}}{Y_{t-1}} \right) \widehat{GI}_{a,t} + \mu_t \left(\frac{X_{a,t-1}}{Y_{t-1}} \right) \hat{X}_{a,t} + \mu_t \left(\frac{C_{i,t-1}}{Y_{t-1}} \right) \hat{c}_t + \mu_t \left(\frac{I_{i,t-1}}{Y_{t-1}} \right) \hat{\beta}_t - \mu_t \left(\frac{M_{i,t-1}}{Y_{t-1}} \right) \widehat{m}_t + \mu_t \left(\frac{E_{t-1}}{Y_{t-1}} \right) \hat{E}_t$$

Appendix B – Variable definitions and calculations in the SSM decomposition exercise

Table B1. Variable names and corresponding nomenclature used in SSM decomposition

Variable name	Nomenclature
Autonomous demand	Z
Autonomous/Credit-financed consumption	C_a
Household (residential) investment	I_a
Government consumption	GC_a
Government investment	GI_a
Exports	X_a
Induced demand	
Consumption out of disposable income	$C_i = C - C_a$
Corporate investment	$I_i = I - I_a - GI_a$
Imports	M_i
Inventories	E
Supermultiplier	$\mu_t = \frac{1}{1 - c_t - \beta_t + m_t}$
Propensity to consume	$c = (C - C_a)/Y$
Inducement to invest	$\beta = (I - I_a - GI_a)/Y$
Propensity to import	$m = M/Y$

Sources: authors' presentation.

Credit-financed consumption: following Campana et al. (2024), we calculated real net flows of household credit using BIS data. We first-differenced the end of period stocks of each year and deflated them by the GDP implicit price deflator from the European Commission.

Household (residential) investment: calculated by applying household sectoral investment share coefficients to real gross fixed capital formation data. Germany, Spain, Brazil, Turkey and South Africa have available data on investment by sector from the OECD. For Argentina, we calculated sectoral investment shares using data from INDEC and the Argentine Ministry of Economy. For India, we calculated sectoral investment shares using data from MoSPI.

Government investment: calculated by applying public sectoral investment share coefficients to real gross fixed capital formation data. To obtain the coefficients, we followed the same method as for household investment.

Corporate investment: calculated by subtracting household (residential) investment and government investment from total investment (gross fixed capital formation) data.

Consumption out of disposable income: calculated by subtracting credit-financed consumption from total private consumption.

Appendix C – Further tables

Table C1. Autonomous demand and GDP. Annual averages for the period 2000-2019

	Germany	Spain	Argentina	Brazil	India	Turkey	South Africa
Correlation Autonomous demand and GDP	0.89	0.83	0.91	0.79	0.30	0.87	0.74
Autonomous demand components as % of GDP	0.65	0.59	0.43	0.42	0.50	0.51	0.56
Exports	0.37	0.29	0.22	0.11	0.20	0.24	0.28
Public consumption	0.19	0.19	0.12	0.20	0.10	0.15	0.19
Public investment	0.02	0.03	0.03	0.02	0.04	0.03	0.03
Household (residential) investment	0.06	0.06	0.05	0.06	0.12	0.07	0.03
Credit-financed consumption	0.01	0.03	0.01	0.03	0.04	0.02	0.03

Sources: World Bank (2025), MECON (2025), INDEC (2025), OECD (2025), European Commission (2024), BIS (2025), MoSPI (2025); authors' calculation and presentation.

Table C2. Share of top 5 products in exports of goods. Annual averages, in percent. Current US dollars. HS2 chapter classification.

Country	2000-2007	2011-2019
Germany	Mechanical and electrical machinery and equipment (29.5); Vehicles and parts (20.3); Pharmaceutical and chemical prods. (7); Plastics (4.4); Optical, photographic and medical instruments (4)	Mechanical and electrical machinery and equipment (27.4); Vehicles and parts (20.9); Pharmaceutical and chemical prods. (9.1); Optical, photographic and medical instruments (4.8); Plastics (4.1)
Spain	Vehicles and parts (25.5); Mechanical and electrical machinery and equipment (15.4); Pharmaceutical and chemical prods. (5.4); Mineral fuels and ores (4); Plastics (3.6)	Vehicles and parts (19.4); Mechanical and electrical machinery and equipment (13.2); Pharmaceutical and chemical prods. (6.8); Mineral fuels, oils and its distillation, ores (6.8); Plastics (3.8)
Argentina	Mineral fuels and ores (18); Cereals, oil seeds and oleaginous fruits (13.4); Food industries, residues and wastes (10.5); Animal/vegetable fats and oils (8.2); Vehicles and parts (7.8)	Cereals, oil seeds and oleaginous fruits (17); Food industries, residues and wastes (16.2); Vehicles and parts (11.8); Animal/vegetable fats and oils (7.5); Mineral fuels and ores (5.8)
Brazil	Mineral fuels and ores (13); Vehicles and parts (12.6); Mechanical and electrical machinery and equipment (12.2); Iron and steel (7.3); Oil seeds and oleaginous fruits, cereals (5.4)	Mineral fuels and ores (23.3); Oil seeds and oleaginous fruits, cereals (13.1); Vehicles and parts (7.6); Mechanical and electrical machinery and equipment (7.6); Meat and offal (6.4)
India	Precious stones, metals and jewellery (16.1); Mineral fuels and ores (11.3); Pharmaceutical and chemical prods. (7.6); Mechanical and electrical machinery and equipment (6.6); Apparel and clothing accessories (9.5)	Mineral fuels and ores (16.5); Precious stones, metals and jewellery (14); Pharmaceutical and chemical prods. (9.7); Mechanical and electrical machinery and equipment (8.4); Vehicles and parts (7.5)
Turkey	Apparel and clothing accessories (17.9); Mechanical and electrical machinery and equipment (13.9); Vehicles and parts (13.2); Iron and steel (10.3); Fruit and nuts, edible; peel of citrus fruit or melons (3.2)	Mechanical and electrical machinery and equipment (15); Vehicles and parts (14.1); Apparel and clothing accessories (9.6); Iron and steel (9.6); Precious stones, metals and jewellery (5.9)
South Africa	Precious stones, metals and jewellery (16.2); Mineral fuels and ores (15.3); Iron and steel (12.6); Mechanical and electrical machinery and equipment (10.5); Vehicles and parts (10)	Mineral fuels and ores (23.2); Precious stones, metals and jewellery (18); Vehicles and parts (11.4); Mechanical and electrical machinery and equipment (9); Iron and steel (8.5)

Notes: product names were modified and/or combined for presentation purposes.

Sources: UN COMTRADE (2025); authors' calculation and presentation.