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Abstract
This paper provides a comprehensive analysis of the German demand and growth regimes from 1999 to 2024 within the framework of Eurozone macroeconomic governance for three sub-periods: 1999-2009, 2010-2020, and 2021-2024. Applying a national income and financial accounting decomposition approach, we find an extreme export-led mercantilist (ELM) regime during the first period, a moderated ELM regime in the second period, and a weakly export-led (WEL) regime in the third period. Also, the application of the Sraffian supermultiplier growth accounting approach indicates that exports were the primary autonomous growth driver, though with a declining trend over time. The examination of the structural underpinnings of Germany's export-led regime reveals that exports are mainly in capital goods and medium to high-technology products with a high income elasticity of demand, and thus rely on growth dynamics in the respective destination countries. The analysis of the German macroeconomic policy regime shaped by the Eurozone governance system finds for the first period a restrictive macroeconomic policy stance that suppressed domestic demand, making exports the primary growth driver. The second period saw a more expansionary stance, leading to a less extreme ELM regime. This trend continued into the third period, leading to a WEL regime with balanced domestic and external growth drivers. The paper concludes by advocating for a coordinated Eurozone macroeconomic policy mix that generates sufficient domestic demand and imports to balance the structurally shaped German export dynamics and to prevent regional and global current account imbalances.

Keywords: Eurozone governance, Germany, growth decomposition, macroeconomic policy regime
JEL Codes: E11, E12, E61, O52

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1. Introduction

The economic policy contained in the Maastricht Treaty and the introduction of the euro in 1999 were highly influenced by the dominance of New Consensus Macroeconomics (NCM) (Clarida et al., 1999; Goodfriend and King, 1997) in that period. The core of this theoretical approach is a long-run equilibrium of economic activity at the non-accelerating-inflation-rate-of-unemployment (NAIRU), which is determined by the supply side, particularly by labour market institutions and the social benefit system, which determine workers' nominal wage-setting power, and by the degree of competition in the goods market, which determines firms' price-setting power (Carlin and Soskice, 2015). Improving employment and economic activity thus requires supply-side policies in terms of labour market and product market deregulation, reducing wage-setting powers of workers and trade unions, as well as price-setting powers of firms. Monetary policies by the central bank are supposed to adjust actual unemployment to the NAIRU in the short run by means of inflation targeting interest rate policies. However, these policies have no impact on the NAIRU equilibrium and only affect inflation in the long run. Fiscal policies are downgraded and are required to support inflation stabilization of the central bank by means of balancing the budgets over the cycle. There is hence no role for active government demand management, and public policies should thus focus on supply-side measures to reduce the NAIRU.

The Eurozone economic governance system put into place in 1999 broadly followed this macroeconomic policy assignment (Arestis and Sawyer, 2013; Bibow, 2007). The highly independent European Central Bank (ECB) has been required to pursue a hierarchy of goals with price stability at the top. Fiscal policies have remained in the hands of the member state governments and have been coordinated by the Stability and Growth Pact (SGP), which reinforced the Maastricht Treaty maximum government deficit-GDP ratio of 3 per cent and a government debt-GDP ratio of 60 per cent, and furthermore required close to zero structural government budget balances. There has been no explicit role for wage and income policies, neither at the Eurozone level nor at the member state level, and the policy approach has been dominated by supply-side policies to improve long-term employment and growth.

The Global Financial Crisis and the Great Recession 2007-09, then the Eurozone Crisis starting in 2010, and the stagnation in the period before the Covid-19 Crisis in 2020 revealed the severe problems of the Eurozone economic policy model based on the NCM (Arestis and Sawyer, 2011; Hein, 2013/2014). First, in 'normal' times, there was no mechanism that prevented rising current account imbalances and divergences among member states. Second, during the Great Recession and the Eurozone crisis, it became clear that the nominal interest rate policies of the ECB were insufficient to stabilise aggregate demand and economic activity. Third, and the main reason for the Eurozone crisis, the role of the ECB as a 'lender of last resort' –not only for the banking sector, but also for member state governments– was unclear at the beginning of the crisis.

In the course of the crisis, the third problem was partly solved by the ECB taking responsibility as lender of last resort for member states, but not unconditionally so. While also new financial rescue institutions like the European Stability Mechanism (ESM) have been introduced, member countries' fiscal policies, which initially responded quite expansionary towards the 2007-09 crises, were further constrained when the Eurozone crisis hit by tightening the SGP and by imposing austerity measures on those countries needing financial

assistance, including the ECB as lender of last resort. This combination of financial stabilisation and fiscal constraints has led to particularly slow growth in the Eurozone in the period between the Great Recession and the Covid-19 Crisis compared to other developed capitalist economies and regions. The internal current account imbalances from the pre-Great Recession period were externalised thereafter, turning the Eurozone from a balanced current account region against the rest of the world into a large surplus region (Hein, 2018; Hein and Martschin, 2020). Only when the Covid-19 crisis hit in 2020, the tightened SGP was temporarily suspended, which allowed member countries' fiscal policies to respond in an expansionary way. For the first time, the European Commission temporarily issued debt in order to support member countries through the Recovery and Resilience Facility, as part of the Next Generation EU programme (Hein, 2024). However, in light of the results of the recent revision of the SGP, this does not seem to imply a fundamental change in the role of fiscal policies in the Eurozone macroeconomic policy mix.

Within this briefly sketched European governance system, Germany, as the biggest Eurozone economy, has played a specific and changing role over time. During the period from the introduction of the euro until the Great Recession, Germany was faced with low growth, high unemployment, low inflation, and rising current account surpluses, and was thus seen as the main contributor to the internal Eurozone current account imbalances (Hein, 2013/14; Simonazzi et al., 2013). However, with the recovery period from the Great Recession and the emergence of the Eurozone Crisis, Germany experienced higher growth and more stable development than the rest of the Eurozone, becoming a role model for other Eurozone countries (Detzer and Hein, 2016a, 2016b). However, after the recovery from the Covid-19 Crisis and the rise in inflation, accelerated by the Russian war on Ukraine, Germany has again fallen behind the rest of the Eurozone (European Commission, 2024).

In this paper, we therefore examine more closely the German demand and growth regimes during the period 1999-2024 against the background of the Eurozone macroeconomic governance system. Our aim is to clearly distinguish long-run structural features rooted in the German production system from institutional and macroeconomic features. For our analysis, we will distinguish three subperiods: 1999-2009, 2010-2020, and 2021-2024. Following the distinction proposed in Hein (2023a), we will apply different levels of the growth regime analysis. In Section 2, we will begin with the national income and financial accounting decomposition approach, examining the sources of demand and growth, as well as how demand growth is financed, as initially proposed by Hein (2011, 2012). This will be complemented by the application of the Sraffian supermultiplier model-based growth decomposition approach, which distinguishes different components of non-capacity-creating autonomous demand (credit-financed consumption, residential investment, exports, government expenditures) and the income-induced components (private consumption, private investment, imports), as initially put forward by Freitas and Dweck (2013). In Section 3, we will then take a closer look at the structure of German exports in order to shed some light on the nature of the German export-led demand and growth regime. Section 4 will explicitly turn to the analysis of the German macroeconomic policy regime, that is, monetary, fiscal, and wage policies, and their interaction against the open economy background, as applied by Hein and Martschin (2021). This will allow us to highlight the role of the Eurozone

macroeconomic governance system for the distinct German demand and growth regimes. Section 5 will summarize and draw some economic policy conclusions.

2. Demand and growth regimes in Germany, 1999-2024

We analyze the evolution of Germany's economic growth over the 25 years following the introduction of the euro in 1999, distinguishing three subperiods: 1999-2009, 2010-2020, and 2021-2024. Multiple economic crises, including the Global Financial Crisis and Great Recession, the Eurozone Crisis, and the Covid-19 Crisis make the choice of subperiods of analysis difficult and somewhat arbitrary. We base our decision both on the literature, which generally compares the periods before and after the Global Financial Crisis and the Great Recession (e.g., Hein and Martschin, 2020, 2021), and on our analytical goal, considering that global episodes potentially contributed more to changes in the demand and growth regime in an open economy like Germany.[1] Two different complementary decomposition exercises are conducted to identify sources of demand and growth and to analyze their changes in the proposed periods. We apply the national income and financial accounting decomposition method initially proposed by Hein (2011, 2012) and the autonomous demand-led growth decomposition pioneered by Freitas and Dweck (2013) based on the Sraffian supermultiplier (SSM) framework.

2.1. The national income and financial accounting decomposition

The national income and financial accounting decomposition seeks to analyze the sources of demand and growth, as well as how that demand is financed, identifying the German regime in each period. One of the advantages of this method is that it is based on accounting conventions and is thus not limited to any particular theory (Hein, 2023a). Following this approach, we begin the empirical exercise by looking at the growth contributions of the main demand aggregates and the financial balances of the macroeconomic sectors:

$$g_t = \frac{\Delta Y_t}{Y_{t-1}} = \frac{\Delta C_t}{Y_{t-1}} + \frac{\Delta G_t}{Y_{t-1}} + \frac{\Delta I_t}{Y_{t-1}} + \frac{\Delta X_t}{Y_{t-1}} - \frac{\Delta M_t}{Y_{t-1}} = \frac{\Delta C_t}{Y_{t-1}} + \frac{\Delta G_t}{Y_{t-1}} + \frac{\Delta I_t}{Y_{t-1}} + \frac{\Delta NX_t}{Y_{t-1}} \quad (1)$$

$$FB_P + FB_G + FB_E = (S - I) + (T - G) + (M - X + FI^{net}) = 0 \quad (2)$$

The growth contributions to GDP growth (g) of the main demand aggregates in Equation 1 consist of private consumption (C), public consumption (G), total investment (I), exports (X) and imports (M), the last two components making up net exports (NX). The sectoral financial

[1] Sensitivity analyses were conducted for the final year of the first subperiod of analysis i) 1999-2007/2008/2009/2010, for the year of beginning and end of the second subperiod ii.a) 2008-2019/2020/2021, ii.b) 2009-2019/2020/2021, ii.c) 2010-2019/2020/2021 and ii.d) 2011-2019/2020/2021, and for the initial year of the last subperiod iii) 2020/2021/2022-2024. In the national income and financial accounting decomposition, the regime classification for the first and last subperiods do not change with alternative periodization, while the classification for the second subperiod may vary from export-led mercantilist to weakly export-led in ii.a) and ii.b) due to the inclusion of the significant drop in exports that occurred in 2009 during the Global Financial Crisis. However, the trends in regime development remain the same across periods, and, in this sense, the analysis shows robustness to period choice. With respect to the autonomous demand-led growth decomposition, trends are also stable, and exports and domestic demand contributions to growth as shares of total growth do not change significantly, except in the last subperiod, where the small number of years considered increases the sensitivity to period changes.

balances in Equation 2 consist of the private sector financial balance (FB_P), the government sector financial balance (FB_G), and the external sector financial balance (FB_E). The private sector balance is given by the difference between private saving and private investment ($S - I$). The government sector balance is given by the difference between the income from tax revenues and social contributions and government expenditures ($T - G$). The external sector balance is comprised of the difference between imports and exports, and it also considers net revenues from the cross-border payments for factors of production ($M - X + FI^{net}$).

Applying these two indicators, the literature on demand and growth regimes in finance-dominated capitalism has so far identified four regimes: two poles comprised of the 'debt-led private demand boom' (DLPD) and the 'export-led mercantilist' (ELM) regimes, and two intermediate regimes comprised of the 'domestic demand-led' (DDL) and the 'weakly export-led' (WEL) regimes, as can be seen in Table 1.

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

Export-led mercantilist (ELM)	• positive financial balances of the private sector, and the private household 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 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 financial balances of the private sector as a whole, • balanced or positive financial balances of the external sector, • growth is almost exclusively driven by domestic demand, • 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.

Source: Based on Dünhaupt and Hein (2019, p. 458).

For Germany, during the three subperiods of our analysis, we obtain the results shown in Table 2. For both 1999-2009 and 2010-2020, Germany shows negative external sector financial balances and hence current account surpluses, positive private sector financial balances, a positive balance of goods and services as a percentage of nominal GDP, and a positive contribution to growth from net exports. This places Germany in an ELM demand and growth

regime during both periods. However, in 2021-2024, the regime shifts to WEL, as the growth contribution from net exports becomes slightly negative. Despite this development of net exports, exports remained the most dynamic component of GDP throughout the entire 1999-2024 period, growing at a faster pace than other components of aggregate demand and thus constituting a key contributor to German economic growth. These results are in line with other studies on demand and growth regimes in finance-dominated capitalism that included Germany, even if sometimes they use with a slightly different periodization.[2]

Table 2. Demand and growth regimes in Germany. Annual averages for the periods 1999-2009, 2010-2020 and 2021-2024.

	1999-2009	2010-2020	2021-2024
Real GDP growth, percent	0.87	1.44	1.20
Growth contributions by main demand aggregates, percentage points (1)			
Domestic demand, including changes in inventories	0.46	1.31	1.20
Private consumption	0.37	0.41	0.68
Public consumption	0.25	0.41	0.25
Investment	-0.01	0.45	-0.09
Inventories	-0.15	0.03	0.36
Net exports of goods and services	0.37	0.12	-0.03
Exports	1.50	1.47	1.14
Imports	-1.12	-1.34	-1.17
Balance of goods and services as share of nominal GDP, percent	4.00	6.23	3.92
Sectoral financial balances as share of nominal GDP, percent			
Private sector	5.25	7.50	8.40
Private households	5.15	5.57	6.39
Corporations	0.10	1.94	2.01
Public sector	-2.29	-0.19	-2.53
External sector	-2.96	-7.32	-5.87
Demand and growth regime (2)	ELM	ELM	WEL

Notes: (1) 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. (2) Demand and growth regimes: Export-led mercantilist (ELM), Weakly export-led (WEL).
Source: European Commission (2024), authors' calculations and presentation.

2.2. The autonomous demand-led growth decomposition

The national income and financial accounting decomposition exercise is complemented by a second level of analysis to better understand the drivers behind the evolution of the regimes: the autonomous demand-led growth decomposition. It should be noted that, unlike the previous exercise, this decomposition does have a clear theoretical basis. It is based on the SSM framework (Serrano, 1995), which postulates that, in the long run, economic growth is driven by non-capacity-creating autonomous demand –that is, demand that is not financed or induced by current income and does not add to the productive capacity of the economy. This decomposition will provide us with additional information on the dynamics of growth sources. Moreover, the differentiation among changes in autonomous components of demand and in components of the supermultiplier will allow us to include the influence of institutions in the

[2] See, for example, the summary tables on the results of several recent studies in Akcay et al. (2022: 83) and Hein (2023b: 250).

analysis, which will be carried out at a third analytical level, jointly with the analysis of the macroeconomic policy regime and the Eurozone governance system in Section 3.

Our decomposition methodology builds upon the work of Freitas and Dweck (2013) and it closely follows the operationalization by Campana et al. (2024), who applied it to an analysis of the BRICs countries. Aggregate demand is separated into autonomous (Z) and induced components, with the latter generating the supermultiplier (α):

$$Y = \frac{CC + G + I_G + I_H + X}{1 - c - h + m} = \frac{Z}{1 - c - h + m} = \alpha Z \tag{3}$$

The autonomous components of aggregate demand are credit financed consumption (CC), public consumption (G), public investment (I_G), household (residential) investment (I_H), and exports (X). The induced components are household consumption out of disposable income (C_H), corporate investment (I_C), and imports (M), depending respectively on the propensity to consume out of income (c), the inducement to invest by private firms given by current output/income (h), and the propensity to import (m). The growth rate of output (g) is thus determined by the growth rate of the autonomous components and the growth rate of the supermultiplier:

$$g_t = \frac{\Delta Y_t}{Y_{t-1}} = \frac{\Delta \alpha_t}{\alpha_{t-1}} + \frac{\Delta Z_t}{Z_{t-1}} = \frac{\Delta \alpha_t Z_{t-1}}{Y_{t-1}} + \frac{\alpha_{t-1} \Delta Z_t}{Y_{t-1}} \tag{4}$$

As in Campana et al. (2024), we assume that credit to households is a good approximation for credit-financed consumption demand and that household investment approximates household residential investment, given that a considerable part of the former is in dwellings, although it may also include investment in the capital stock of non-corporate businesses.[3] The propensity to consume is proxied as $c = (C - CC)/GDP$, the corporate inducement to invest as $h = (I - I_G - I_H)/GDP$, and the propensity to import as $m = M/GDP$. Therefore, we apply the autonomous demand-led growth decomposition formula as follows:

$$\begin{aligned} g_t = {} & \alpha_t \left[\frac{CC_{t-1}}{Y_{t-1}}\right] g_{CC,t} + \alpha_t \left[\frac{G_{t-1}}{Y_{t-1}}\right] g_{G,t} + \alpha_t \left[\frac{I_{G,t-1}}{Y_{t-1}}\right] g_{I_{G,t}} + \alpha_t \left[\frac{I_{H,t-1}}{Y_{t-1}}\right] g_{I_{H,t}} + \alpha_t \left[\frac{X_{t-1}}{Y_{t-1}}\right] g_{X,t} \\ & + \alpha_t \left[\frac{C_{H,t-1}}{Y_{t-1}}\right] g_{c,t} + \alpha_t \left[\frac{I_{C,t-1}}{Y_{t-1}}\right] g_{h,t} - \alpha_t \left[\frac{M_{t-1}}{Y_{t-1}}\right] g_{m,t} + \alpha_t \left[\frac{E_{t-1}}{Y_{t-1}}\right] g_{E,t} \end{aligned} \tag{5}$$

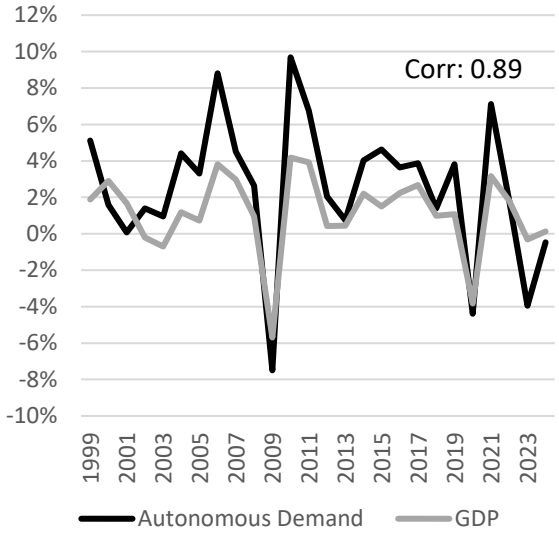
The last term of Equation 5 represents the contribution to growth from changes in inventories, necessary for the sum of contributions to match GDP growth. The previous three terms represent the contributions of the induced components of demand, which depend on the growth rates of their inducing parameters (*c, h, m*) and not on the growth rates of the components themselves, as is the case with the rest of the terms that are related to the autonomous components of demand. The decomposition in Equation 5 accounts for the proportional induced demand contributions via the supermultiplier (α) that are generated by changes in autonomous demand components, therefore including not only direct effects (as

[3] Appendix A explains the methodology for the calculation of consumer credit and investment by sectors.

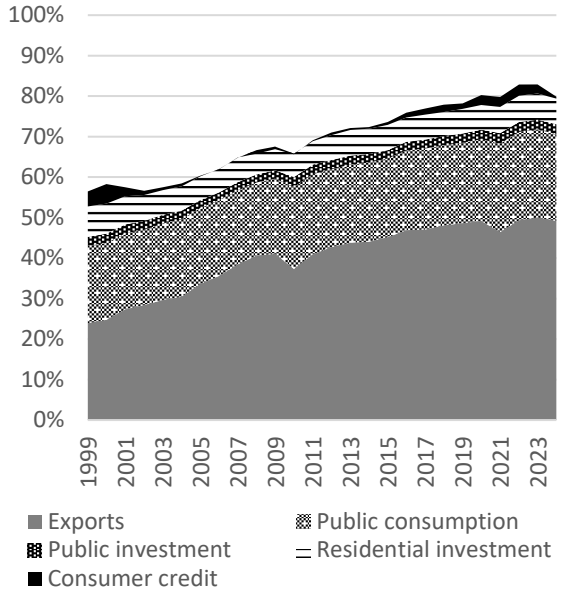
in the national income and financial accounting decomposition) but also indirect effects of these changes.

Figure 1. Autonomous demand and GDP in Germany, 1999-2024.

A. Growth rates of autonomous demand and GDP, percentage



B. Components of autonomous demand as percentage of real GDP

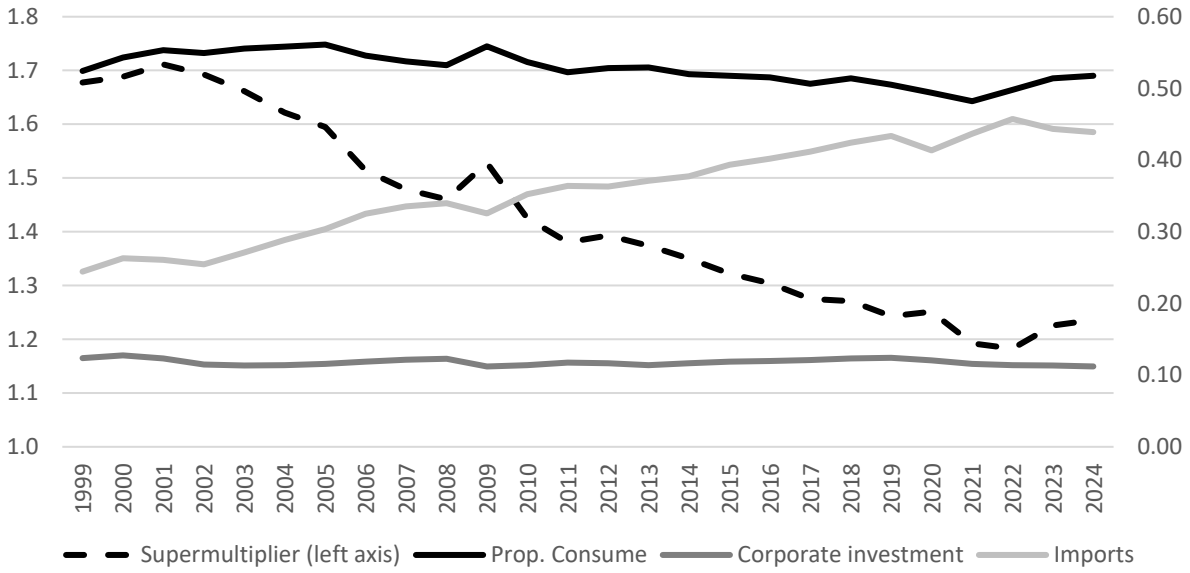


Source: European Commission (2024), OECD (2024), BIS (2024), authors' calculations and presentation.

Figure 1.A. shows the high correlation between the growth rates of autonomous demand and GDP, with a correlation coefficient of 0.89 during the 1999-2024 period. The composition of autonomous demand is depicted in Figure 1.B. The share of autonomous demand in GDP grew consistently during the period from 56% to 80%. Exports show an increasingly dominant role, which may indicate an increasing degree of openness of the German economy. In 1999, exports accounted for 42% of autonomous demand, while public consumption, the second largest component, represented 33%. By 2024, even after a relative stagnation in exports, its share reached 61% and the share of public consumption decreased to 27%. Residential investment and public investment display relatively constant shares in autonomous demand during the period, although the share of public investment is notably lower in comparison. Consumer credit also has a very low share, but shows high volatility.

The supermultiplier has steadily declined from 2003 to 2022, with the exception of the crisis years of 2009 and 2020, when it experienced temporary increases, as shown in Figure 2. The fall is mainly explained by the evolution of the propensity to import, which grew during most of the period. This also reflects the increasing openness of the German economy, as we have already observed for exports as part of autonomous demand. The propensity to consume out of income grew only slightly during 1999-2009, fell during 2010-2020, and then grew again in the last period, though without recovering to its previous values. Lastly, the corporate propensity to invest remained roughly the same, although a very modest decline is observed in the last period.

Figure 2. Evolution of the supermultiplier and its components in Germany, 1999-2024.



Source: European Commission (2024), OECD (2024), BIS (2024), authors' calculations and presentation.

The results of the decomposition of autonomous demand and the induced components are presented in Table 3 (see also Figure B.1 in Appendix B for a graphical representation). First, we note that the crucial role of exports as a source of growth is once again clear. The average contribution of exports to GDP growth is the highest in all three periods, although there is also a declining dynamic as contributions become smaller. Furthermore, the contribution of the external sector as a whole is consistently higher than that of the domestic sector, but the gap narrows over time due to both a reduction in external sector contributions and an increase in domestic sector contributions. This supports our clustering on the basis of the national income and financial accounting decomposition, which categorized Germany as extreme ELM in the first period, a less extreme but still ELM in the second period, and WEL in the short third period.

As mentioned in Section 2.1, the demand and growth regime in Germany did not change after the Global Financial Crisis. Nonetheless, there were changes among the different components of aggregate demand. Although the supermultiplier was lower in the period 2010-2020, average growth accelerated from 0.87% to 1.44%. This occurred despite a reduction in the growth contribution of external demand due to the Eurozone crisis and the consequences of the Global Financial Crisis and the Great Recession, which negatively impacted export growth, particularly in the first half of this second period. The increase in the average growth rate is thus explained by the positive evolution of autonomous demand components other than exports. Indeed, both the growth contributions of residential investment and credit-financed consumption reversed their sign from the first period and turned positive after the 2007-09 crisis. Furthermore, Germany continued to increase public expenditures, with both public consumption and public investment contributions rising during the second period. Despite this, the government was able to reduce its deficit and even achieve a surplus from 2012 onwards that would last up until the beginning of the Covid-19 pandemic (see Figure B.2 in Appendix B). Regarding the induced components of demand, the

average propensity to consume out of income fell during the period 2010-2020, turning its contribution to growth negative. This could be partly related to the increase in inequality in the distribution of disposable income in Germany (measured by the Gini index), despite a slight upward trend in the average wage share in market income (see Figure B.3 in Appendix B). Lastly, the increase in the propensity to import slowed down, and its negative contribution to growth was reduced compared to the first period of analysis.

Table 3. Autonomous demand-led growth decomposition in Germany: average annual growth of real GDP, autonomous and induced components of demand, in percent, 1999-2009, 2010-2020 and 2021-2024.

A. Contributions to growth of autonomous and induced components of demand

		1999-2009	2010-2020	2021-2024
	GDP	0.87	1.44	1.20
	Total Z	2.14	3.16	1.02
Autonomous components	G	0.40	0.54	0.30
	I_G	0.05	0.07	-0.04
	X	2.42	2.03	1.35
	I_H	-0.17	0.20	0.03
	CC	-0.56	0.32	-0.62
	Total induced	-1.09	-1.78	-0.27
Induced components	C_H	0.43	-0.79	0.73
	M	-1.41	-1.09	-0.74
	I_c	-0.10	0.11	-0.26
	Inventories	-0.24	0.05	0.42

B. Sectoral contributions to growth

	1999-2009	2010-2020	2021-2024
GDP	0.87	1.44	1.20
Domestic sector	-0.20	0.49	0.57
Private sector	-0.65	-0.12	0.31
C_H	0.43	-0.79	0.73
I_c	-0.10	0.11	-0.26
CC	-0.56	0.32	-0.62
I_H	-0.17	0.20	0.03
Inventories	-0.24	0.05	0.42
Public sector	0.45	0.61	0.26
G	0.40	0.54	0.30
I_G	0.05	0.07	-0.04
External sector	1.01	0.94	0.61
X	2.42	2.03	1.35
M	-1.41	-1.09	-0.74

Note: 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. Data for 2024 is a forecast.

Source: European Commission (2024), OECD (2024), BIS (2024), authors' calculations and presentation.

The last period of analysis, 2021-2024, comprises only four years, part of which were affected by the Covid-19 crisis, and the last year is still a forecast. For these reasons, the 'trends' in this period must be interpreted with caution. During this period, Germany became WEL due to a slightly negative average growth contribution of net exports as shown in Table 2. The growth rate of exports continued to fall but remained positive, with the reduction being faster than that of imports, reducing the average growth contribution of the external sector as a whole (Table 3). The contribution of exports was negative in 2023 and 2024 for the first time besides the crisis years. The public sector slowed down consumption growth and even reduced investment, turning the growth contribution of the latter negative. Residential investment decelerated and its contribution turned close to zero, while consumer credit contracted. Corporate investment showed a negative contribution to growth, also with considerable inventories building up due to Covid-19. The average propensity to consume out of income grew and showed a positive contribution, possibly due to the fall in income during the crisis year.

Overall, the autonomous demand-led growth decomposition also displays the dominance of export growth as the main source of growth in Germany over the period 1999-2024. However, the growth contributions of exports show a declining trend, while domestic demand has increased its contribution through different autonomous and induced components in the respective sub-periods. This finding is broadly in line with, to our knowledge, the only other autonomous demand-led growth decomposition study that includes Germany by Morlin et al. (2022), which compares the periods 2000-2008 and 2010-2018. Therefore, in the following section, we will shed some more light on the nature of the German export-led demand and growth regime.

3. Exports, international trade and the productive structure: on the nature of the German export-led demand and growth regime

The debate on the determinants of German export performance has focused on the role of price and non-price competitiveness. On the one hand, a number of studies have argued that, since the late 1990s, German exports have been highly price sensitive, and therefore export growth has heavily depended on the suppression of domestic unit labour costs in order to avoid an appreciation of the real effective exchange rate (REER) and a loss of price competitiveness (e.g., Baccaro and Pontusson, 2016; Baccaro and Benassi, 2017, Flassbeck and Lapavitsas, 2013; Sinn, 2014). According to this view, the strategy of internal wage devaluation was especially effective in the fixed exchange rate regime of the Eurozone and was made possible by a still-functioning coordinated wage bargaining system, combined with the weakening of labour unions (Nölke, 2016). On the other hand, there are studies that highlight the role of non-price competitiveness and postulate that the export success of Germany is mostly based on high-value-added, high-technology, innovative, and high-quality products, which then allow German exports to benefit from high foreign GDP growth (e.g., Detzer and Hein, 2016a; Horn et al., 2017; Kollmann et al., 2014; Neumann, 2020; Simonazzi et al., 2013; Storm and Naastepad, 2015). This argument is in line with the balance of payments constrained growth literature. It stresses that it is the income elasticities of demand for exports and imports which determine the balance of payments constrained growth rate – Thirlwall's (1979) law– and that price elasticities do not matter much in the long run.

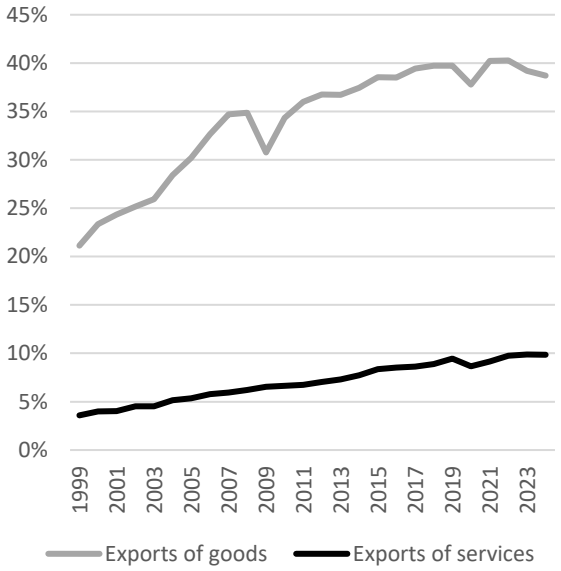
Since exports play a key role in Germany's economic growth, as shown in both decomposition exercises, the relevance of price and non-price competitiveness is of course important. Econometric studies provide some mixed results, as the overviews in Herrero and Rial (2023: 187) and Neumann (2020: 132-133), for example, make clear. Adding further estimations of German export functions to this strand of research is beyond our scope. Rather, we assume that both price and non-price competitiveness may matter and may vary for different types of German export goods. Therefore, in what follows, we shed some light on the nature of the German export-led regime by looking into the structure and destinations of German exports.

Examining the evolution of German exports, we find that exports of goods and services increased their share in GDP from 25% to 49% during the 1999-2024 period, driven by the growth of exports of both goods and services (Figure 3.A). Although the latter grew faster, given that the share of services is significantly smaller than the share of goods in exports, 80% of the average growth of total exports in the period was explained by the growth of exports

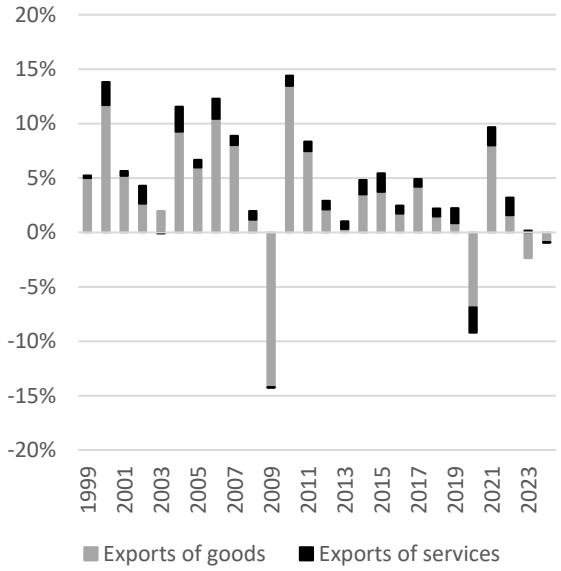
of goods (Figure 3.B). In the remainder of the analysis, we will focus on exports of goods to identify the main trade partners, the dominant sectors/products, the level of technological content of exports, and changes in these indicators over time.

Figure 3. Exports of goods and services, Germany, constant prices, 1999-2024.

A. Export of goods and services, percentage of real GDP.



B. Contributions to real export growth by goods and services, percentage points.



Source: European Commission (2024), authors' calculations and presentation.

For the destinations, Table 4 presents the shares of German exports to its main trading partners. The current EU 27 has been the main destination of exports from Germany throughout the entire period. After the introduction of the euro in 1999 and until the Global Financial Crisis, exports to the current EU 27 averaged 56% of total goods exports. During the 2010-2020 period, with the Eurozone crisis and slow growth in several member states due to contractionary financial and fiscal policies, the share of German exports to the EU 27 fell by almost 5 percentage points. From 2021, it resumed in the midst of the recovery from Covid-19 and geopolitical tensions, which have caused the EU to turn more inward. While there was a decline in the share of exports to Western EU economies and the Eurozone (e.g., France, Italy, Belgium, and Spain), there was a consistent increase in the share of exports to Eastern EU countries, most of which have not yet adopted the euro as their currency. Poland stands out with an increase in the share of German exports of 2.8 percentage points over the three periods' averages, while increases in the export shares to Czechia and Romania are also notable, at 1 and 0.7 percentage points, respectively.

Regarding extra-EU trading partners, China and India were among the fastest growing export destinations. However, only for China this also meant a huge increase in its share in German exports, which went up from 2.4% in the first period to 7.4% in the last period, making it one of Germany's main trading partners. Despite high growth, India's share in German exports remained modest, casting doubt on the importance given to it by part of the literature (e.g., Simonazzi et al., 2013: 659). Other high-growth emerging markets such as Russia, Turkey,

and South Korea, along with the previously mentioned Eastern European markets, have been as or more significant than India when considering their share in total German exports.

Table 4. Share of main trading partners in German exports of goods. Annual averages for the periods 1999-2009, 2010-2020 and 2021-2023, current US dollars, in percent.

	1999-2009	2010-2020	2021-2023
World	100.0	100.0	100.0
EU 27	56.1	51.3	53.0
Eurozone	44.6	37.7	37.0
France	10.4	8.8	7.4
Netherlands	6.3	6.3	6.7
Italy	7.1	5.3	5.3
Belgium	4.7	3.9	3.7
Spain	4.6	3.3	3.1
Slovakia	0.7	1.0	1.1
Non-Eurozone EU	11.5	13.6	16.0
Poland	2.8	4.3	5.6
Czechia	2.4	3.0	3.3
Hungary	1.7	1.7	2.0
Romania	0.6	1.0	1.3
Extra-EU 27	43.9	48.7	47.0
USA	9.1	8.2	9.1
China	2.4	6.2	7.4
UK	7.9	6.5	5.0
Switzerland	4.1	4.3	4.6
Turkey	1.4	1.7	1.7
Rep. of Korea	0.8	1.3	1.4
Japan	1.8	1.5	1.4
Russia	2.0	2.6	1.6
Mexico	0.8	0.9	1.0
India	0.5	0.9	0.9

Source: UN Comtrade (2024), authors' calculations and presentation.

Table 5. Share of main products in German exports of goods. Annual averages for the periods 1999-2009, 2010-2020 and 2021-2023, current US dollars, HS2 (as reported) classification, in percent.

	1999-2009	2010-2020	2021-2023
Machinery and mechanical appliances	18.5	17.2	16.0
Vehicles	16.9	17.0	16.0
Electrical machinery and equipment	10.9	10.3	11.0
Pharmaceutical products	3.5	5.6	7.3
Optical, photographic and medical instruments	4.0	4.8	4.9
Plastics	4.3	4.2	4.3
Iron and steel, and articles thereof	4.3	4.1	4.1
Aircraft and spacecraft	2.4	2.8	1.8
Other commodities not specified	5.0	2.9	2.2
Mineral fuels and oils and their distillation	1.9	2.2	2.8

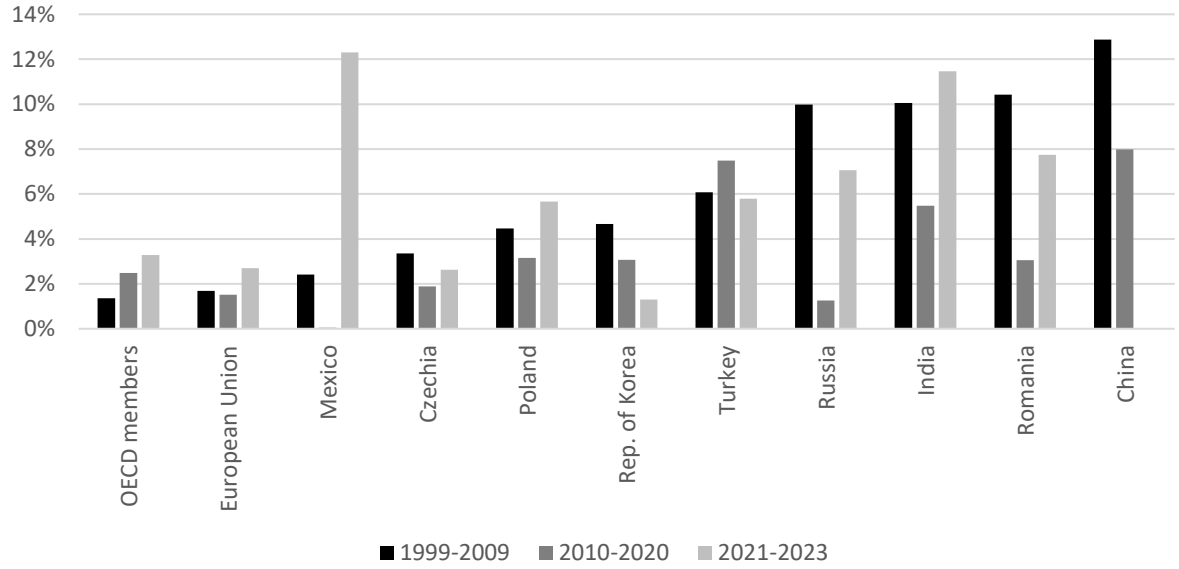
Note: the product names have been slightly modified for presentation purposes.
Source: UN Comtrade (2024), authors' calculations and presentation.

The composition of German exports of goods is dominated by capital goods. Machinery and mechanical appliances, electrical machinery and equipment, optical, photographic and medical instruments, aircraft and spacecraft, iron and steel, and articles thereof made up 40%

of the total in 1999-2009 (Table 5). Two other dominant products were vehicles and pharmaceuticals, together accounting for more than 20% of German exports. The product structure did not change significantly over the periods considered. However, for 2010-2020, we observe a 1.3 percentage points reduction in the share of machinery and mechanical appliances and a 2.1 percentage points increase in the share of pharmaceutical products, a trend that continued in 2021-2023.

The importance of external demand and growth dynamics in export markets for German exports (Neumann, 2020; Bramucci, 2024) is also related to the types of products exported. With an export basket consisting predominantly of capital goods, the role of investment in trading partners becomes particularly important (Simonazzi et al., 2013; Detzer and Hein, 2016a). Extending the analysis of Detzer and Hein (2016a), Figure 4 compares the average growth rates of real gross fixed capital formation in the OECD, the European Union, and some emerging countries that we have identified as important destinations of German exports with rising shares therein (Table 4). As expected, we observe that the latter countries showed considerably higher investment growth rates than the former during the first period, which also saw a rapidly rising share of exports in German GDP (Figure 3.A). A general slowdown in the growth rate of investment in these countries during the second period has then contributed to the deceleration in the increase of Germany's export share in GDP (Figure 3.A).

Figure 4. Growth rates of real gross fixed capital formation for OECD members, the European Union, and emerging countries that are Germany's main trading partners. Annual averages for the periods 1999-2009, 2010-2020 and 2021-2023, in percentage.



Note: available data for China includes only the period 1999-2019.
Source: World Bank (2024), FRED (2024), authors' calculations and presentation.

Technological content is also related to export performance, since high-technology products tend to grow faster in world trade and present higher income elasticities (Lall, 2000). In the case of Germany, exports show a high degree of technological content, with an average of 66% of medium and high-technology exports in 1999-2023 (Table 6). Neither the structure of

export products changed much during our entire period of analysis, nor did the technological content. In comparison with other countries, Germany presents a similar share of high-technology exports as France, higher than that of Italy and lower than those of China and the US –at least during the first period with respect to the latter country (see Table B.1 in Appendix B). However, Germany's considerable advantage in medium-technology exports places it first in that group of countries in terms of medium and high technology exports.

Table 6. Technological classification of German exports. Annual averages for the periods 1999-2009, 2010-2020 and 2021-2023. Percentage of total.

	1999-2009	2010-2020	2021-2023
High-Tech	18.8	19.2	19.7
Medium-Tech	47.8	47.2	45.7
Low-Tech	15.5	15.0	14.7
Primary Products	5.1	5.5	6.3
Resource-based products	12.6	13.5	13.3

Source: WITS (2024), authors' calculations and presentation.

At the same time, despite Germany's export growth, the share of German exports of goods in world exports declined from an average of 9.3% in 1999-2009 to 7% in 2021-2024 (European Commission, 2024), mainly due to faster export growth from developing and emerging economies such as China, India, Brazil, and Russia.

In summary, Germany's export-led regime is based on long-run persistent structural conditions. Its export productive structure, dominated by capital goods and medium and high-technology products with a high income elasticity of demand, has benefited from accelerated growth of emerging and catching-up countries, both outside and within the EU, particularly in Eastern Europe.

4. The German macroeconomic policy regime and the Eurozone governance system

In the final step of our analysis, we focus on the role of the German macroeconomic policy regime, against the background of the Eurozone governance system, for the emergence of and the slight changes in the German ELM/WEL demand and growth regimes across our three periods. The analysis follows and extends the approach by Hein and Martschin (2021), which has been inspired by the post-Keynesian notion of macroeconomic policy regimes developed and applied in the early 2000s (Hein and Truger, 2005, 2009; Herr and Kazandziska, 2011).

The concept of a 'macroeconomic policy regime' has been employed to evaluate international and intertemporal variations in the macroeconomic performance of countries or regions. This concept encompasses the set of monetary, fiscal, and wage or income policies, along with their coordination and interaction, within the institutional framework of a specific economy, including factors such as the degree of openness and the exchange rate regime. It posits that macroeconomic policies and aggregate demand not only influence short-term economic outcomes, as suggested by the NCM, but also exert a long-term impact on output, income, employment, inflation, distribution, and growth through various channels, as explained in post-Keynesian macroeconomics (Hein 2023b, Chapters 2-5). The post-Keynesian macroeconomic policy mix, as proposed by Arestis (2013), Hein (2023b, Chapter 6), and Hein and Stockhammer (2010) serves as a benchmark for sustaining a stable DDL regime. Deviations

from this benchmark are argued to contribute to a transition towards long-term unstable DLPD or ELM regimes, with adverse long-term consequences for macroeconomic performance.

To evaluate the impact of central bank monetary policies, emphasis is placed on examining the relationship between long-term interest rates and GDP growth. A monetary policy that supports employment, economic growth, and a stable DDL regime should aim to maintain the nominal long-term interest rate (i) slightly above the inflation rate ($\hat{p}$), but below the nominal GDP growth rate ($\hat{Y}^n$). Alternatively, the policy should target a slightly positive real interest rate ($i_r = i - \hat{p}$) that remains below the real GDP growth rate ($\hat{Y} = \hat{Y}^n - \hat{p}$):

$$\hat{p} \leq i \leq \hat{Y}^n \Leftrightarrow \ 0 \leq i_r \leq \hat{Y} \tag{6}$$

It is acknowledged that central banks cannot directly control long-term real interest rates in credit or financial markets at any point in time, but can only control short-term nominal money market rates, in the case of the ECB for the Eurozone as a whole. Nevertheless, the use of this and other tools, such as open market operations in financial markets in the context of quantitative easing, will affect long-term nominal rates and, considering some persistence in inflation trends, also long-term real rates beyond the short run. This impact might be asymmetric, since raising short-term rates will always drive up long-term rates, whereas lowering short-term rates might not be able to bring long-term rates down in a deep and persistent recession characterized by rising risk assessments and liquidity preference of financial and non-financial actors. That is why both short- and long-term real interest rates are considered, assuming that they have an impact in particular on residential investment. For Germany within the Eurozone, it also must be considered that differences in inflation rates between countries lead to variations in both short- and long-term real interest rates, even with homogenous nominal rates across the currency area. These differences are further influenced by country-specific risk assessments of financial market actors, leading to differentials in long-term nominal rates, particularly since the onset of the Eurozone crisis in 2010 (De Grauwe, 2012; Hein, 2013/14, 2018).

For wage policy, it is examined whether unit labour costs have grown at the target rate of inflation, which for Germany is the target rate for the Eurozone as a whole. Nominal wages (w) should thus rise according to the sum of long-run average or trend growth of German labour productivity ($\hat{y}$) plus the target rate of inflation for the Eurozone as a whole ($\hat{p}^T$), such that nominal unit labour costs grow at the target inflation rate and contribute to reaching this target:

$$\hat{w} = \hat{y} + \hat{p}^T \Leftrightarrow \hat{w} - \hat{y} = \hat{p}^T \tag{7}$$

Furthermore, it is taken into account that rising or falling nominal unit labour cost growth will not proportionally affect the rate of inflation because of incomplete pass-through. Therefore, changes in functional income distribution, i.e. in the labour income share, are also considered. For the assessment of the effects of wage policies via functional income distribution, it is taken into account that aggregate demand in Germany has been estimated to be wage-led in several studies (Hein and Vogel, 2008, 2009; Onaran and Galanis, 2014; Onaran and Obst, 2016; Naastepad and Storm, 2007; Stockhammer et al., 2011).

For fiscal policy, the financial balances of both the government and the other sectors could be considered, as indicated by equation (2). However, this equation is an accounting identity and thus does not allow to draw clear conclusions regarding deliberate and discretionary fiscal policy interventions, as included in the post-Keynesian macroeconomic policy mix for real government expenditures (G_r):

$$G_r = G_{r0} + G_{r1}(e^T - e), \qquad G_{r0} \geq 0, G_{r1} > 0 \tag{8}$$

with G_{r0} as the expenditure level to reach a target employment rate e^T associated with non-inflationary full employment, and G_{r1} as the counter-cyclical reaction coefficient towards deviations of the employment rate from the target rate. Hein and Martschin (2021) have assessed the short-term discretionary responsiveness of fiscal policies by examining the changes in the cyclically adjusted budget balance-potential GDP ratio (CBR) and relating these changes to changes in the output gap. Their approach thus did neither directly engage with equation (8) nor equate potential output with the target level of full employment output, acknowledging the well-documented empirical measurement challenges and the endogeneity issues associated with potential output (Heimberger and Kapeller, 2017). Consequently, the focus is solely on the annual changes in CBRs and output gaps, rather than on their levels. When output gaps and CBRs move in the same direction, fiscal policies are deemed counter-cyclical, as governments reduce (increase) structural deficits or increase (reduce) structural surpluses during an economic upswing (downswing). Conversely, when output gaps and CBRs move in opposite directions, fiscal policies are identified as pro-cyclical, with governments decreasing (increasing) structural deficits or increasing (reducing) structural surpluses during an economic downswing (upswing). Additionally, the share of public investment in GDP is considered as an indicator of the growth orientation of fiscal policies.

Finally, open economy conditions are taken into account, recognizing their influence on both the effectiveness of domestic macroeconomic policies and the overall demand and growth regime. Following Hein and Martschin (2021), we look at the degree of openness indicated by export and import shares of GDP, as well as the evolution of price competitiveness, which is measured using real effective exchange rates (REER). An increase in the REER signifies a currency appreciation and, consequently, a loss of international price competitiveness. To address non-price competitiveness, we have also incorporated the Economic Complexity Index (ECI) (OEC, 2024), also following the approach of Kohler and Stockhammer (2022).

Table 7. Macroeconomic policy regime indicators in Germany. Annual averages for the periods 1999-2009, 2010-2020 and 2021-2024.

	1999-2009	2010-2020	2021-2024
Monetary policy (*)			
Short-term real interest rate, %	2.21	-1.45	-3.71
Long-term real interest rate, %	3.22	-0.68	-3.72
Long-term real interest rate minus real GDP growth, pp.	2.35	-2.11	-5.27
Wage policy			
Nominal unit labor costs (ULC), annual growth, %	0.99	1.93	3.89
Inflation rate (HCPI), % (*)	1.56	1.32	5.99
Adjusted wage share, current prices, %	57.07	57.62	57.52
Change in adjusted wage share from previous decade	-2.06	0.55	-0.10
Fiscal policy			
Cyclically adjusted budget balance (CBR) (as % of potential GDP), annual change, pp.	0.18	-0.19	0.44
Output gap (as % of potential GDP), annual change, pp.	-0.45	0.16	0.51
Number of years with pro-cyclical fiscal policy (c: contractionary, e: expansionary)	5 (3 c, 2 e)	8 (4 c, 4 e)	3 (2 c, 1 e)
Public investment, % of GDP	2.12	2.27	2.42
Open economy			
Change in real effective exchange rate (REER), vis-à-vis 37 industrial countries, ULC-based, %	-0.63	0.25	-0.32
OEC Economic Complexity Index (ECI) Trade (**)	1.87	1.90	1.80
Ranking ECI Trade (**)	2.00	3.36	5.00
Real exports of goods and services, % of GDP	33.40	45.73	49.31
Real imports of goods and services, % of GDP	29.20	39.15	44.41

Notes: 'pp.' indicates percentage points; (*) no data available for 2024; (**) no data available for 2023 and 2024.
Source: European Commission (2024), Eurostat (2024), OEC (2024), OECD (2024), authors' calculations and presentation.

Table 8. Macroeconomic policy regime in Germany for the periods 1999-2009, 2010-2020 and 2021-2024.

	1999-2009	2010-2020	2021-2024
Monetary policy	-	+	+
Wage policy	-	+	0/-
Fiscal policy	-	+/-	0/-
Open economy conditions	+	0/+	0/+

Notes: expansionary stance (+), contractionary stance (-), neutral stance (0).
Source: authors' presentation.

In Table 7 we present the indicators for the different macroeconomic policies in Germany on average for each of our three time periods, while Table 8 summarises the stance of each policy area for each period.[4]

Germany's macroeconomic policy regime significantly contributed to its ELM demand and growth regime during the first period from 1999 – 2009 (Table 2) and to growth being dominantly driven by exports in that period (Table 3). ECB monetary policies imposed a restrictive monetary policy stance on the German economy, with a considerably positive differential between the real long-term interest rate and real GDP growth. The restriction of

[4] We broadly confirm the findings of Hein and Martschin (2021) regarding the stance of the macroeconomic policy mix for the first two time periods, with a few minor differences because of different periodization. Hein and Martschin (2021) consider the periods 2001-2009 and 2010-2019.

private domestic demand was further exacerbated by deflationary wage policies, which contributed to inflation rates below the ECB target rate and higher real interest rates compared to other Eurozone countries, and thus to the restrictive impact of ECB policies on the German economy on the one hand. On the other hand, suppressed wage growth led to a declining labour income share in a wage-led demand economy. Fiscal policies, under pressure to meet the goals of the Stability and Growth Pact, were pro-cyclical over five years, of which three years were pro-cyclically contractive and two years pro-cyclically expansionary (see Figure B.4 in Appendix B). On average, this provided a pro-cyclically restrictive stance, because a negative change in the output gap was associated with a positive change in the CBR. Furthermore, public investment was restrained since the share of public investment in GDP was quite low in international comparison (Hein and Martschin, 2021). However, taken together, public consumption and public investment still had a small positive autonomous contribution to growth (Table 3). The suppression of domestic demand enforced by the Maastricht regime was accompanied by improving international price competitiveness, indicated by the fall in the REER – Germany benefitted from the nominal devaluation of the euro during the first years and from very low domestic inflation in this first period as a whole – and by particularly high non-price competitiveness, indicated by the ECI, based on the structural composition of German export goods. Overall, this resulted in growth driven exclusively by net exports, with domestic demand, both autonomous and induced, having a negative contribution (Table 3). This reliance on external demand generated current account surpluses and external sector deficits as main characteristics of the ELM regime, leading to only mediocre growth when compared internationally, and contributing to the current account imbalances before the Global Financial Crisis and the Great Recession, both at the global scale and within the Eurozone (Detzer and Hein, 2016b; Hein, 2013/14, 2018; Hein and Martschin, 2020).

In the subsequent period, 2010-2019, we observe a gradual shift in Germany's macroeconomic policy regime, without changing the ELM nature of the demand and growth regime (Table 2) and the dominance of autonomous exports as a growth driver (Table 3). Falling and then zero nominal short-term interest rate policies of the ECB since March 2016 (ECB 2024) as a response towards the Eurozone crisis and the following stagnation, together with low country-specific risk with regard to nominal long-term nominal interest rates, turned the respective real rates in Germany negative. This had a positive impact on the autonomous growth contributions of credit-financed consumption and residential investment (Table 3). The real long-term interest-real GDP growth differential turned negative, indicating a positive effect of ECB monetary policies on German growth in this period. Wage policies contributed to this expansionary stance, with nominal unit labour cost growth close to the ECB target inflation rate. Since actual inflation in Germany remained below that rate, the labour income share slightly increased. However, this was insufficient to generate an increase in the average propensity to consume and hence a positive growth contribution of induced consumption, which rather turned negative (Table 3). Fiscal policies failed to act counter-cyclically in most years of this second period of analysis, and were instead pro-cyclically contractionary and expansionary for four years each. On average over this period, however, a slight pro-cyclically expansionary impact was imposed, with the output gap rising and the CBR falling. Relatively dynamic private domestic and foreign demand allowed for fiscal consolidation, as reflected by

decreasing public sector deficits. This was reinforced by the introduction of the 'debt brake', which limited federal budget expenses (Detzer and Hein, 2016b). However, the public investment-GDP ratio slightly increased, but remained low in international comparison (Hein and Martschin, 2020). Overall, the autonomous growth contribution of the sum of public investment and public consumption increased compared to the first period (Table 3). The open economy condition for exports as the main autonomous growth driver remained favourable. International price competitiveness of German producers in international markets, measured by the REER, only slightly decreased, while non-price competitiveness, indicated by the ECI, remained high.

Our last short period, 2021-2024, which includes the recovery from the Covid-19 crisis in 2020 and the subsequent stagflation period with the Russian invasion of Ukraine in 2022, is difficult to assess, also because of the lack of data for the last two years for several indicators. In these four years, the ECB monetary policy stance for Germany remained expansionary with negative short- and long-term interest rates and a negative real interest rate-real GDP growth differential, although the ECB began to raise short-term money market rates in July 2022 (ECB, 2024). On average over this period, wage policies generated nominal unit labour cost growth well above the ECB target rate of inflation of 2 per cent, but did not manage to keep up with high inflation rates generated by the energy price shock and supply-side bottlenecks, which meant falling labour income shares. Fiscal policies reacted pro-cyclically in three out of four years, being pro-cyclically expansionary in 2021 and pro-cyclically contractionary in 2023 and 2024. On average, however, fiscal policy was counter-cyclical, and the public investment-GDP ratio slightly increased but remained at a low level in international comparison. The open economy conditions remained favourable with a slight real devaluation (i.e., a fall in the REER) and a slightly falling but still very high ECI. Autonomous exports hence continued to be a main growth driver, although with lower growth contributions compared to the previous period. Autonomous public consumption and induced private consumption also contributed to growth, such that the domestic and the external sector had similar contributions (Table 3). In terms of the national income and financial accounting decomposition approach, Germany shows negative growth contributions of net exports and has thus turned towards a WEL regime (Table 2).

Taken together, our macroeconomic policy regime analysis shows that the Eurozone governance system and its application to Germany has supported the dominance of the ELM demand and growth regime and the dominance of exports as the growth driver in the first period. The change in the policy stance in the second period, particularly the low interest rate policies of the ECB and German wage policies generating unit labour cost growth in line with the ECB inflation target, allowed for positive growth contributions of domestic demand without changing the dominance of exports as a growth driver and the ELM demand and growth regime. We saw, with several caveats, that this tendency continued in the last short period, leading to equal contributions to growth from both domestic and external sectors and a change in the demand and growth regime towards WEL.

5. Conclusions

In this paper, we have examined the German demand and growth regimes from 1999 to 2024 against the background of the Eurozone macroeconomic governance system to clearly

distinguish long-run structural features rooted in the German production system from institutional and macroeconomic features related to the Eurozone governance system. For our analysis, we have distinguished three sub-periods: 1999-2009, 2010-2020, and 2021-2024.

Applying the national income and financial accounting decomposition approach to examine the sources of demand and growth, as well as how demand growth is financed, we found an extreme ELM regime for the first period, a somewhat softened ELM regime for the second period, and a WEL regime for the third. Also, the Sraffian supermultiplier model-based growth decomposition revealed exports as the main autonomous growth driver, however, with a declining trend over the three periods. Government expenditures and autonomous credit-financed consumption gained importance in the second period and induced consumption in the short third period.

Shedding some light on the German export-led regime, we have then examined the composition and destination of German exports of goods and found that this regime is based on long-run persistent structural conditions. The export structure has been dominated by capital goods and medium and high-technology products with a high income elasticity of demand. Germany has thus benefited from accelerated growth of emerging and catching-up countries, particularly in the first period, both outside and within the EU, especially in Eastern Europe. Slower growth in the main destination countries was then associated with lower export contributions to growth in the following periods.

Finally, we have analyzed the German macroeconomic policy regime dominated by the Eurozone macroeconomic governance system. For the first period, this imposed a highly restrictive macroeconomic policy stance on the German economy, with a highly positive long-term interest rate-real GDP growth differential, pro-cyclically restrictive fiscal policies, a low public investment-GDP ratio, deflationary wage policies, and falling wage shares. This policy mix depressed domestic demand and left exports – based on a high demand elasticity, higher growth in destination countries, and supported by increasing price competitiveness – as the sole growth driver, and net exports as the only demand source for meagre growth in an ELM regime. In the second period, the macroeconomic policy stance became more expansionary, in particular because of low interest rate policies of the ECB and stabilizing wage policies. These changes allowed government expenditures and autonomous credit-financed consumption to gain relevance as autonomous growth drivers besides exports, turning the ELM regime less extreme. It seems that this macroeconomic policy stance continued in the last short period, leading to equal contributions to growth from both domestic and external sectors, and a change in the demand and growth regime towards WEL, with initially high growth in 2021 and 2022, but stagnation in 2023 and 2024.

Summing up and drawing some economic policy conclusions, we would argue that the German economy is structurally export-led, based on the export of capital goods and medium and high-technology products with high income elasticities of demand. Net exports as dominant source of demand growth, and thus high current account surpluses contributing to regional and global current account imbalances, can only be avoided by an adequate macroeconomic policy mix providing high domestic demand and generating sufficient imports to roughly balance high exports (Hein and Truger, 2017). This policy mix includes interest rate policies that contribute to low long-term real interest rates, wage policies that stabilize functional income distribution and inflation at the Eurozone target rate, and fiscal policies that

stabilize domestic demand at non-inflationary full employment levels in a functional finance manner. Of course, such a macroeconomic policy mix needs to be coordinated in the Eurozone context, as explained by Hein and Martschin (2020), for example. This requires respective changes in the Eurozone governance system. The ECB would have to become an unconditional lender of last resort for member state governments. A coordination mechanism for fiscal policies that provides sufficient leeway for member state fiscal policies would have to be introduced. Finally, institutions and power resources for the coordination of wage bargaining, both within member states and at the Eurozone level, would have to be developed.

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Appendix A – Autonomous demand-led growth decomposition – Variable construction

Consumer credit was calculated following the methodology of Girardi and Pariboni (2016) as applied by Campana et al. (2024). From the BIS (2024) database on Credit to the non-financial sector, we used the time-series of 'Credit to Households and NPISHs from all sectors at market value, in domestic currency, adjusted for breaks'. We calculated real net flows of consumption credit by first-differencing end of period stocks of credit to households in each year and deflating them by the GDP implicit price deflator obtained from the European Commission (2024).

Household (residential) investment was calculated applying a household investment share coefficient to the time-series data of 'Gross fixed capital formation at 2015 prices: total economy' from the European Commission (2024). The household investment share coefficient was calculated from the series 'Annual investment by asset and institutional sector' from the OECD (2024), by dividing the investment of households and non-profit institutions serving households by total investment.

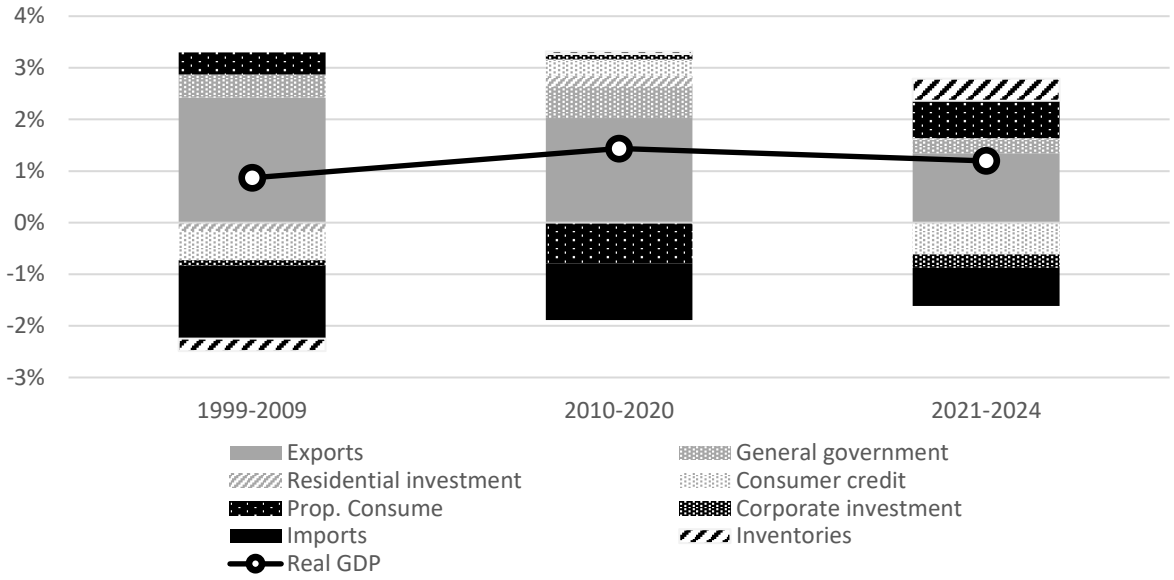
Public investment was calculated following the same methodology as for Household (residential) investment, but we applied a general government investment share coefficient which we obtained through an equivalent procedure.

Corporate investment was calculated subtracting Public investment and Household (residential) investment from Total investment.

Household consumption out of disposable income was calculated subtracting Consumer Credit from Total consumption.

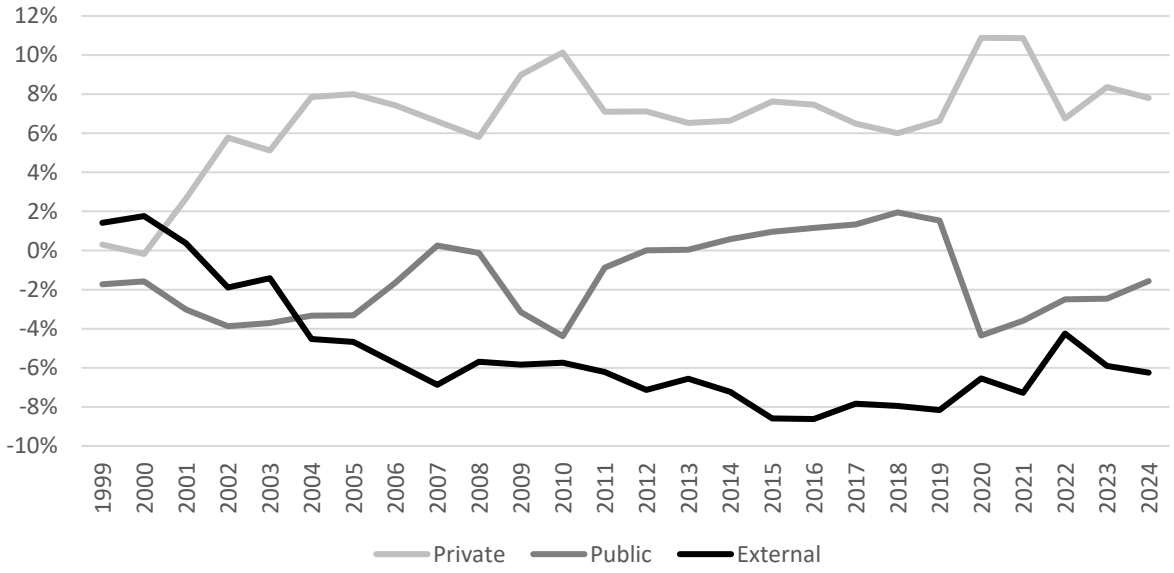
Appendix B – Further figures and tables

Figure B.1. Autonomous demand-led growth decomposition in Germany, 1999-2024. Growth contributions, percentage points.



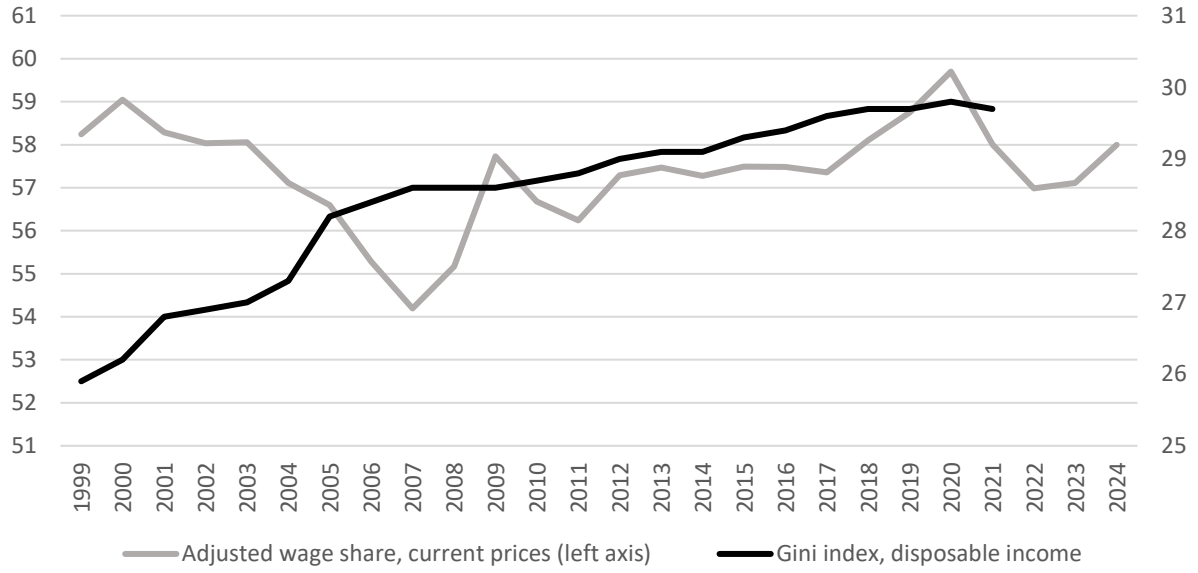
Source: European Commission (2024), authors' calculations and presentation.

Figure B.2. Evolution of sectoral financial balances, 1999-2024. Percentage of GDP.



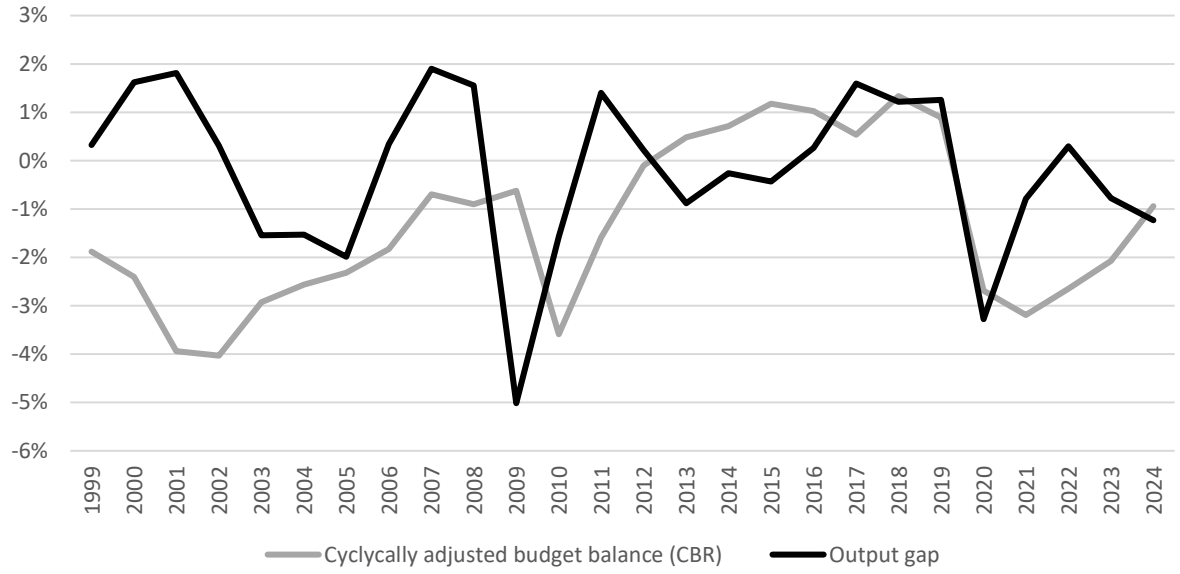
Source: European Commission (2024), authors' presentation.

Figure B.3. Adjusted wage share (current prices, percentage of GDP) and Gini coefficient (disposable income), 1999-2024.



Note: due to data availability, the Gini index is presented for the period 1999-2021.
Source: European Commission (2024) and Solt (2020), authors' presentation.

Figure B.4. Cyclically adjusted budget balance (CBR) and output gap, 1999-2024. Percentage of potential GDP.



Source: European Commission (2024), authors' presentation.

Table B.1. Technological classification of exports for France, Italy, China and the United States. Annual averages for the periods 1999-2009, 2010-2020 and 2021-2023. Percentage of total.

		1999-2009	2010-2020	2021-2023
France	High Tech	19.9%	21.9%	17.3%
	Medium Tech	37.5%	34.4%	35.0%
	Low Tech	16.5%	16.7%	18.0%
	Primary Products	8.3%	8.7%	10.0%
	Resource-based products	17.6%	18.4%	20.0%
Italy	High Tech	9.2%	8.5%	9.0%
	Medium Tech	39.3%	38.8%	37.7%
	Low Tech	32.6%	29.4%	28.7%
	Primary Products	4.4%	5.5%	6.7%
	Resource-based products	14.8%	17.8%	18.3%
China	High Tech	31.2%	34.9%	33.3%
	Medium Tech	19.5%	21.9%	25.3%
	Low Tech	36.1%	31.9%	29.7%
	Primary Products	4.8%	3.0%	3.0%
	Resource-based products	8.3%	8.3%	9.0%
United States	High Tech	30.3%	20.9%	20.0%
	Medium Tech	33.6%	32.9%	30.0%
	Low Tech	12.0%	11.4%	10.0%
	Primary Products	8.7%	12.0%	17.0%
	Resource-based products	15.5%	23.3%	22.7%

Source: WITS (2024), authors' calculations and presentation.

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