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FOREIGN TRADE AND DEMAND-DRIVEN GROWTH: THE CASE OF THREE EASTERN EUROPEAN COUNTRIES[4]

The paper studies the relationship between foreign trade and economic growth in Bulgaria, Estonia and Lithuania for the period 2000-2023 in the framework of post-Keynesian theoretical models. Main tasks are to examine the impact of exports, imports and net exports on the dynamics of GDP, to highlight its peculiarities over time and across countries, and to characterise the main determinants of exports and imports for the three countries overall. The research methodology includes the use of descriptive analysis of the dynamics in GDP and in exports, imports, trade openness and net exports, the interdependencies between them and their links to changes in domestic demand, as well as the econometric analysis of the exports and imports functions using R Statistics panel data tools. The empirical results show that trade openness has been trending upwards, with the greatest growth impact coming from increased exports. The econometric estimation of the exports function with the first difference estimator reveals a positive impact of EU GDP and a negative impact of real effective exchange rate, while that of the imports function indicates a positive impact of own GDP and a negative impact of real effective exchange rate. The dynamics of economic activity are highly sensitive to the performance of major trading partners, but there is also a significant external crowding-out effect. However, the rise in imports was constrained by the non-typical impact of increasing relative prices, contributing to an upturn in net exports and higher economic growth.
Keywords: foreign trade; economic growth; post-Keynesian models; aggregate demand; real effective exchange rate
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1. Introduction

There is a complex and bidirectional relationship between foreign trade and the dynamics of economic activity. It has been examined in numerous theoretical and empirical studies, most of which focus on the impact of foreign trade on economic growth. The predominant studies examine endogenous growth models, which focus on the impact of trade openness on aggregate supply and are long-run oriented. In these studies, the influence of openness on aggregate output growth is seen as occurring through its impact on the most important factors of growth. More specifically, this is related to increasing imports of new technologies, growth in human capital, acquisition of more numerous and diverse goods and factors of production, increasing factor productivity, accumulation of knowledge, and expansion of markets (Amin, Haq, Hussain, 2023; Grossman, Helpman, 1990; Kircicek, Ozparlak, 2023; Rivera-Batiz, Romer, 1991). Other studies follow the logic of post-Keynesian models, in which changes in effective aggregate demand are of utmost importance for growth. In this second class of models, the role of foreign trade is manifested not only through changes in exports and changes in imports provoked by GDP dynamics, but also through their impact on household consumption and investment (Barbosa-Filho, 2004; Deprez, Harvey, 1999; Lavoie, 2014, 2022a; Stockhammer, Onaran, 2022). They are considered to embody to a significant extent the neo-Kaleckian principle of the distribution of income between labour and capital and the resulting distinction between wage-led growth and profit-led growth (Lavoie, Stockhammer, 2012; Bhaduri, Marglin, 1990).

Most empirical studies are in the context of endogenous models and reach ambiguous results on the impact of trade openness. These results vary depending on the selected range of countries, the research instruments applied and the method of measuring openness, as well as the level of technology, human capital and the quality of institutions (Fatima et al., 2020; Frankel, Romer, 1999; Kim, Lin, Suen, 2011). There are relatively few studies in the context of post-Keynesian theory, and they mainly concern the economies of developed countries or developing countries outside Europe. There are, however, some studies in a post-Keynesian or broader perspective for the region of Eastern Europe, which concern individual countries or groups of countries (Dünhaupt and Hein, 2019; Kühnast, 2023; Zeman, 2018; Yotzov, 2013; Zlatinov, 2018; Zlatinov et al.). They analyse the behaviour of most elements of aggregate demand or focus primarily on exports or income distribution.

The current paper aims to analyse the relationship between foreign trade and economic growth in three Eastern European countries – Bulgaria, Estonia and Lithuania, in the framework of the post-Keynesian theoretical models. The tasks are to study the impact of exports, imports and net exports on the dynamics of real gross domestic product, to highlight its peculiarities over time and across countries, and to characterise the main determinants of exports and imports for the three countries overall.

The selection of the set of countries was made based on several substantive considerations. Until the late 1980s and early 1990s, they were part of the former socialist bloc. Subsequently, they made a transition from a centrally planned to a market economy, which was associated with the implementation of deep structural reforms, including the liberalisation of foreign trade and the loss of traditional markets, as well as a deep initial recession. The transition period of the three countries ended in the first decade of the 21st

century, when they were recognised as functioning market economies and became members of the EU. The development of the integration process also corresponded with an increase in their trade flows with the other member states, which became their main trading partners. Another important consideration relates to the functioning of the three countries in a currency board regime, which for the Baltic countries ended with their entry into the Euro area. Another important consideration relates to the functioning of the three countries in a currency board regime, which ended earlier for the Baltic states and later for Bulgaria, upon their entry into the Euro area.

The study uses annual data covering the period from 2000 to 2023. The period chosen for analysis is consistent with the presence of comparable empirical information according to the European System of Accounts 2010 (ESA2010) and with the requirement that it is verified and not preliminary. Although such data have been available since 1995, the starting point has been moved to 2000 to avoid the initial five-year implementation period of ESA 2010, in which the data are still experiencing the impact of the methodological changes made.

The rest of the paper is structured as follows: The second part reviews the most important views on the relationship between foreign trade and economic growth in post-Keynesian theory. The third part presents the main indicators for the empirical analysis and describes the research methodology used, especially the econometric models applied. The fourth part contains the main results of the empirical analysis and the discussion on them, highlighting their specifics in comparison with other empirical studies. The conclusion systematises the main conclusions of the study, indicates its limitations and outlines possible directions for future research.

2. Literature Review

The post-Keynesian theory views economic growth as induced by aggregate demand, both in the short and long run, through its effect on capital and factor productivity. It is based on the underlying Keynesian postulates, according to which the level of aggregate production is lower than its level at full employment, changes in the money supply have real effects on the economy, and economic agents perform their activities in conditions of uncertainty. The assumptions that in reality forms of imperfect competition, and mainly oligopoly, prevail, and that the behaviour of macroeconomic variables is significantly influenced by the distribution of income between wages and profits are added. Regardless of how the respective models are constructed and the principles adopted for grouping and prioritising the aggregate demand components, theories pay considerable attention to the impact of foreign trade. In some models, this is done by describing the influence of net exports and, in others, by emphasising the impact of external demand and domestic demand-related changes in imports.

In a substantive sense, a distinction is made between two basic conceptions of long-run growth, according to which it is defined as being either "export-led" or "balance of payments-constrained". The first postulates a leading role of exports in the growth of aggregate demand and aggregate output under the assumption that this role is positively influenced by an increase in domestic demand (Dixon and Thirlwall, 1975; Cornwall, 1977; McCombie and Thirlwall, 1999; Blecker, 2011; Stockhammer, 2022; Jungmann, 2023). The specific

mechanisms of the impact of exports on economic growth are direct and indirect, and the latter is expressed through the multiplier principle. The export growth rate itself is a function of the increasing cost competitiveness of exported goods and services and the real depreciation of the national currency. In turn, they reflect the accelerated technological progress and increase in average labour productivity induced by higher economic growth with an exogenously determined wage growth rate. These causal relationships constitute a closed and expanding circle in which supply-side characteristics appear not as causes, but as effects of increased production. Other features of this concept are its abstraction from the import function and its consideration independent of the potential balance of payments constraints.

The second concept is centred around the increase in imports caused by higher economic growth, given a pre-specified condition for the current account balance (understood as determined entirely by the trade balance) (Moreno-Brid, 1998; McCombie, Thirlwall, 2004; Blecker, 2011; Thirlwall, 2019; Charles, Dallery, Marie, 2020). In earlier models, this condition is tighter and implies equilibrium, while in the latter, it is more flexible and allows for a certain current account deficit financed by a financial inflow. In the latter case, constraints may arise from the size of the net financial inflow or may involve a fixed amount of current account deficit or surplus in the long run. The concept under consideration defines an economic growth rate that is consistent with the balance of payment constraints in place. This growth rate can be determined by introducing two fundamental assumptions: for equal quantitative impact of changes in the real exchange rate on exports and imports in absolute terms, and for the presence of relative purchasing power parity. It is calculated specifically as a quotient of the growth rate of external demand and the elasticity of imports with respect to the country's own GDP. The external demand depends mainly on changes in the GDP levels of major trading partners and income elasticities and remains independent of changes in relative prices. It is perceived as a significant source of economic growth, whereas domestic demand dynamics are regarded as wholly or primarily offset by import changes.

Most contemporary models are of the hybrid type and incorporate key features of the concepts of export-led growth and the balance of payment-constrained growth (Blecker, 2013; Padhi, 2020; Demir, Razmi, 2021; Shingil, Ozdeser, Saliminezhad, 2022; Byrialsen et al., 2024). They are not restricted to tracking the behaviour of exports alone but also examine the parallel behaviour of imports and various components of domestic demand. In these hybrid models, a country's exports are presented as positively dependent on the real GDP of trading partners and the decrease in relative prices, and imports are presented as positively related to the country's own GDP and the increase in relative prices. This corresponds to the orientation of some of these models in the medium- and short-run horizon or to linking them to different structural characteristics of the economy. A similar hybrid approach is also pursued in the present study, which does not allow its positioning in the realm of either of the two alternative concepts.

A specific feature of post-Keynesian views, defined as neo-Kaleckian, is their focus on the dependence of growth on the functional distribution of income between wages and profits (Blecker, 2016; Hein, 2014; Lavoie, 2022b; Stockhammer, Rabinovich, Reddy, 2021). According to them, a possible wage increase that is not associated with an increase in labour productivity can have a positive impact on growth through its impact on aggregate demand.

This concept is in contrast with the neoclassical principle that says that an increase only causes a decrease in aggregate supply due to the loss of competitiveness in the international market. In fact, the specific effect on aggregate demand cannot be determined unambiguously due to the simultaneous decrease in profit and the unequal impact of the two main incomes on the different elements of demand. Its analysis is consistent with the assumptions of a higher marginal propensity to consume for wage earners than for profit earners, of the dependence of investment on profit and the degree of capacity utilisation, as well as of the availability of spare production capacity. Under the above conditions, the increase in the share of wages in income leads to an increase in personal consumption, a two-way impact on investment due to the increased capacity and the reduced share of profit, and a decrease in net exports. If the direct and investment-influencing positive impact on personal consumption is higher than the absolute negative impact on investment and the foreign trade balance, growth is defined as wage-led, while in the opposite case, it is defined as profit-led.

In numerous post-Keynesian works on income distribution, the existence of export-led growth is associated with its characterisation as profit-led. However, empirical studies show that export growth can be combined with both suppression and sustained consumption growth, which is associated with an increase in the wage share. The contradictory empirical results are likely due to various reasons. One of them is the stronger influence on the two elements of aggregate demand of factors that are not related to changes in the functional distribution of income, such as the financing of consumption through loans, inequality in the levels of income received from labour, etc. Another possible reason is the unequal sensitivity of exports to changes in the real exchange rate, if they are caused by a wage-induced increase in the prices of domestically produced goods and services. Additionally, according to most theoretical models, imports also depend positively on a higher wage share of income. This is a result of both its impact on relative prices and the real exchange rate, and the increase in GDP caused by higher consumption and possibly higher investment. The strength of the impact of the income distribution in favour of wages on imports depends on the sensitivity of imports to its two main determinants and is usually higher than the strength of its impact on exports, which also predetermines the negative effect on net exports (Baccaro, Pontusson, 2016; Oyvat, Öztunalı, Elgin, 2018).

3. Data and Methodology

The empirical analysis is based on the use of the following indicators for Bulgaria, Estonia and Lithuania:

- GDP growth rate (chain-linked volumes, % change on previous period)
- Exports and imports as a % of GDP at constant prices
- Trade openness (sum of exports and imports as a % of GDP at constant prices)
- Personal consumption (final consumption of households and non-profit institutions servicing households), government consumption and gross fixed capital formation as a % of GDP at constant prices

- Growth rates of exports and imports (chain-linked volumes, % change on previous period)
- Contribution of exports, imports and net exports to GDP growth (p.p. change on previous period)
- Exports and imports chain-linked volumes (in 2015-million euro)
- Real effective exchange rate (REER) (CPI deflated – 42 trade partners, index 2015=100)
- GDP chain-linked volumes (in 2015-million euro).

The information about all indicators is provided by Eurostat. Data for the first and the last indicators are for the three countries and the EU average. A starting year for the calculation of the ratios is 2000, and for the growth rates and the contributions to them – 2001.

The REER is calculated as the ratio between the nominal exchange rate and the consumer price index (CPI). It is presented in index form, with an increase in the indicator showing the currency's appreciation against that of the main trading partners.

The descriptive part of empirical analysis reveals the trends in GDP dynamics, trade openness, exports, imports and net exports, the existing interdependencies between them, and their links to changes in domestic demand. The behaviour of most indicators is analysed for the period as a whole and for three subperiods, which are differentiated according to the state of the economies (Table 2). The first subperiod lasts up to the global financial and economic crisis, the second covers the 2009-2010 crisis, and the third includes the post-crisis recovery and the COVID-19 pandemic.

In the second part of the empirical analysis, econometric estimations of the export and import functions are carried out using R Statistics Software's panel data analysis tools. These functions have the following forms:

$$XGDPc_{i,t}=a+\beta_1 GDPEU_{i,t}+\beta_2 REER_{i,t}+u_{i,t} \quad (1)$$

$$MGDPc_{i,t}=a+\beta_1 GDPc_{i,t}+\beta_2 REER_{i,t}+u_{i,t} \quad (2)$$

where:

$u_{i,t}$ is the error term;

index i represents the country;

index t indicates the year,

and all variables are given in Table 1.

The variable GDPEU in the first regression is used as a proxy for the income of all trading partners since exports to the EU in Bulgaria and Lithuania exceed 60%, and in Estonia – 70% of total exports.

Since an increase in REER implies a real appreciation of the national currency, the sign of this variable in the same equation is expected to be negative. Conversely, in the import function, a real appreciation of the domestic currency should induce the substitution of

domestic goods and services for imported goods, and the sign of the REER is expected to be positive.

Table 1. Variables used in the econometric analysis

Variable	Designation	Description
Exports of goods and services as a share of the country's GDP	$XGDP_C$	Ratio of exports to GDP, both measured in chain-linked volumes (2015) in million euro
Imports of goods and services as a share of the country's GDP	$MGDP_C$	Ratio of imports to GDP, both measured in chain-linked volumes (2015) in million euro
GDP of the country	GDP_C	GDP of the country in chain-linked volumes (2015) in million euros
GDP of the European Union (excluding the country)	GDP_{EU}	GDP of the EU27 reduced by the country's GDP, both measured in chain-linked volumes (2015) in million euros
Real effective exchange rate of the country	REER	Real effective exchange rate (42 trading partners), expressed as an index (2015=100)

Source: Author's selection.

All variables are tested for unit roots with multiple tests, and if required, the econometric equations are estimated using a first-difference estimator. Arellano's heteroscedasticity and autocorrelation consistent standard errors were applied to ensure the robustness of the results.

4. Results and Discussion

4.1. Descriptive analysis

The GDP dynamics of the three countries from 2001 to 2023 show general trends, while certain country-specific peculiarities exist within some of the sub-periods (Table 2). Until 2009, the average annual growth rate was relatively high, with Lithuania in the lead based on this criterion. In 2009-2010, there was a recession in all three countries, deep in the two Baltic countries and relatively moderate in Bulgaria. Subsequently, economic activity was growing, the highest rate being in Lithuania and the lowest rate – in Bulgaria. As a result of these developments, the average increase in real GDP over the period was moderate, with Lithuania again in the best relative position, Estonia and Bulgaria lagging behind, characterised by relatively similar average rates.

For all three countries, trade openness, measured as the sum of exports and imports as a % of GDP, clearly shows an upward trend. This is primarily due to the increase in exports, while the impact of the rise in imports is higher only for Estonia in the third sub-period. The economies of Lithuania and Estonia are more open than that of Bulgaria, which is consistent with the theoretical rule of the inverse relationship between openness and the size of the countries. This rule is also valid for the entire period when comparing the two Baltic countries, although Lithuania starts to overtake Estonia starting in the middle of the third sub-period.

Exports are the component of aggregate demand with the highest average growth rate in all three countries. Investment ranks second, and the difference between investment and export growth is the smallest in Estonia. The third highest growth rate is exhibited by personal

consumption, and the lowest – by government spending. The average growth of imports in Bulgaria and Estonia is higher than that of exports, while in Lithuania, the ratio is the opposite.

Table 2. Economic growth and aggregate demand

	2000-2008			2009-2010			2011-2023			2000-2023		
	BG	EE	LT	BG	EE	LT	BG	EE	LT	BG	EE	LT
Economic growth rate (%)	6.0	6.1	7.4	-0.9	-6.1	-7.2	2.2	2.7	3.6	3.3	3.2	4.0
Exports (% of GDP)	42.8	49.8	45.5	47.2	61.2	57.5	64.8	79.7	78.1	55.1	67.0	64.2
Imports (% of GDP)	48.1	51.9	51.0	51.1	55.6	58.4	66.1	78.4	74.5	58.1	66.6	64.4
Trade openness (% of GDP)	90.9	101.7	96.5	98.3	117	115.8	130.9	158.1	152.6	113.1	133.5	128.5
Net exports (% of GDP)	-5.3	-2.1	-5.5	-3.9	5.6	-0.9	-1.3	1.3	3.6	-3.0	0.4	-0.2
Exports growth rate (%)	10.0	9.9	13.5	-0.4	2.0	1.4	5.2	5.0	7.2	6.4	6.4	8.9
Imports growth rate (%)	14.8	12.5	15.4	-11	-4.7	-6.0	5.3	6.3	6.3	7.2	7.5	8.4
PC growth rate (%)*	7.5	7.6	8.7	-1.0	-7.6	-10.9	2.6	3.5	3.0	4.0	4.0	3.8
GC growth rate (%)**	2.7	3.8	2.4	-1.9	-2.0	-2.1	2.7	2.2	0.2	2.3	2.4	0.8
Investment growth rate (%)	15.9	11.7	15.1	-21.1	-17.6	-9.9	1.5	5.9	5.2	4.6	5,9	7.3
Exports contrib. to growth (p.p)	4.0	6.0	6.3	-0.7	0.6	0.3	3.1	3.6	5.2	3.1	4.2	5.1
Imports contrib. to growth (p.p)	-7.6	-8.5	-8.4	7.8	4.8	5.4	-3.1	-4.4	-4.3	-3.7	-5.0	-4.9
Net exports contrib. to growth (p.p)	-3.6	-2.5	-2.1	7.1	5.4	5.7	0.0	-0.8	0.9	-0.6	-0.8	0.2
PC contrib. to growth (p.p)*	5.1	4.2	5.6	-0.7	-4.1	-7.1	1.6	1.8	1.8	2.6	2.1	2.3
GC contrib. to growth (p.p)**	0.5	0.7	0.5	-0.3	-0.4	-0.4	0.5	0.4	0.0	0.4	0.4	0.1
Investments contrib. to growth (p.p)	4.0	3.7	3.5	-7.0	-5.9	-5.4	0.3	1.4	1.0	0.9	1.6	1.3

*PC – personal consumption, **GC – government consumption.
Source: Eurostat and own calculations.

External demand growth in all three countries is highest in the first sub-period and relatively moderate in the third. From 2001 to 2008, the growth rate of exports is 10% and just under 10% in Bulgaria and Estonia, respectively, and even higher in Lithuania. It is lagging behind that of investment but exceeding the growth rate of personal consumption. Owing to the higher relative share of individual consumption in GDP, its contribution to Bulgaria's economic growth rate is dominant, whereas the contribution of exports is equal to that of investment. In the Baltic countries, the average relative shares of exports and personal

consumption in GDP in the first sub-period are very close, which is a prerequisite for the most vital dependence of growth on the increase in exports.

In 2009, external demand collapsed in all three economies, and a sharp increase was recorded in 2010. In the case of Estonia and Lithuania, the crisis-invoked decline is fully offset by this increase. As a result, the exports have a stabilising effect on their economies, on average, for the sub-period amid a significant decline in personal consumption and investment. The pre-crisis level of real exports in Bulgaria did not recover within the sub-period, and, on average, a negative contribution to growth was observed. It is equal to the contribution of personal consumption, but is much lower in absolute value than the negative contribution of investment.

From 2011 to 2023, Bulgaria's and Lithuania's export growth was faster than all components of the domestic demand. The ratio between export growth and personal consumption growth in the two countries is 2 and 2.4, respectively, and between export growth and investment growth – 3.5 and 1.4. Exports account for approximately 141% of the real GDP growth in the former country and 144% in the latter. In Estonia, by analogy with the first sub-period, the growth rate of exports is lower than that of investment and exceeds the growth rate of personal consumption. Nevertheless, Estonia's exports emerge as the most critical demand-side determinant of growth, contributing 133%. On a comparative basis, Lithuania had the most significant increase in external demand, which subsequently contributed to growth in the last sub-period and the entire period.

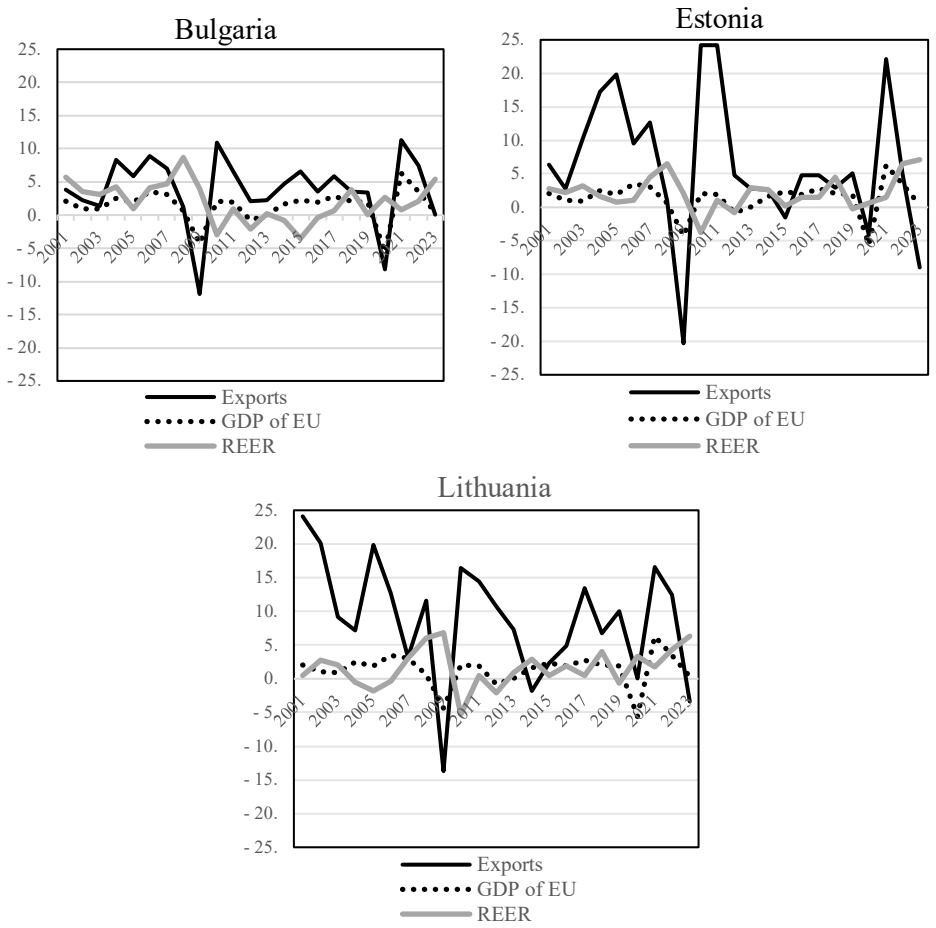
The dynamics of domestic demand usually correspond positively with the changes in imports and, through them, also affect the behaviour of net exports. In the first sub-period, net exports were negative in all three countries, with the depressing impact on economic growth being strongest in Bulgaria. Subsequently, the trade balance increased, which in the case of the latter country was associated with a reduction in the deficit, and in the case of Lithuania, after 2010 – with running a surplus. Estonia's net exports were positive and relatively high in the second sub-period, while in the third period, their value decreased. Estonia is the only country with a positive average trade balance for the period, and Bulgaria is the country with the highest negative balance in absolute terms. The net exports had a strong positive impact on growth in 2009-2010 in all three countries because of the faster decline in imports compared to exports in 2009. In the last sub-period, net exports had a growth-enhancing effect only in Lithuania, as it fell slightly behind the positive effect of investment.

The next part of the descriptive analysis shows to what extent the high contribution of exports to economic growth and the presence of an external crowding-out effect from imports are caused by the most important variables in post-Keynesian growth models. Although the results cannot be accepted unquestioningly due to probable lag effects, issues with endogeneity and simultaneous dependence on other factors, they give certain indications about the type of dependencies and their features over time.

When tracking changes in exports, EU real GDP and the real effective exchange rate, some similarities between countries are also observed, as well as certain peculiarities (Figure 1). The high growth of exports in all of them during the first sub-period corresponds to a positive economic growth rate on average for the EU, without this being associated with unidirectional changes in these rates. However, years with faster growth in the Union's

economic activity are usually also characterised by an accelerated increase in exports in the same or the following year, and vice versa – years with slower growth in the EU are also characterised by slower export growth. In Bulgaria and Estonia, this is true for all years with larger changes, while in Lithuania, there are some exceptions.

Figure 1. Growth rates of exports, GDP of the EU and REER (%)



Source: Eurostat and own calculations.

The sharp decrease and subsequent rapid increase in exports typical for the sub-period 2009-2010 in all three countries project the recession and the restoration of positive economic growth rates among the main trading partners, respectively. The range of deviations in this interval is the highest in Estonia, which may indicate a higher sensitivity of its economy to external demand compared to Bulgaria and Lithuania, as well as a stronger impact of other factors. Exports growth in the three countries remains high in 2011, which is also related to the relative stability of the economic growth rate in the EU. In the following two years,

characterised by a decrease and subsequent stagnation of real GDP in the Union, the rate of export growth slows down, with the exception of Bulgaria in 2013. The positive economic growth rates in the 2014-2019 period in the EU lag slightly behind those in the first sub-period, but are combined with much lower export growth than observed for the same sub-period, although without close correspondence between the rates by year. A more pronounced positive correlation between the export dynamics of the three countries and economic activity in the EU was observed after the COVID-19 crisis, and for Bulgaria and Estonia during the crisis itself, while Lithuania was the only country in which exports did not decrease in 2020. In 2023, economic growth in the EU slowed down significantly, which corresponds to a decrease in exports in the Baltic countries and a retention of their level in Bulgaria.

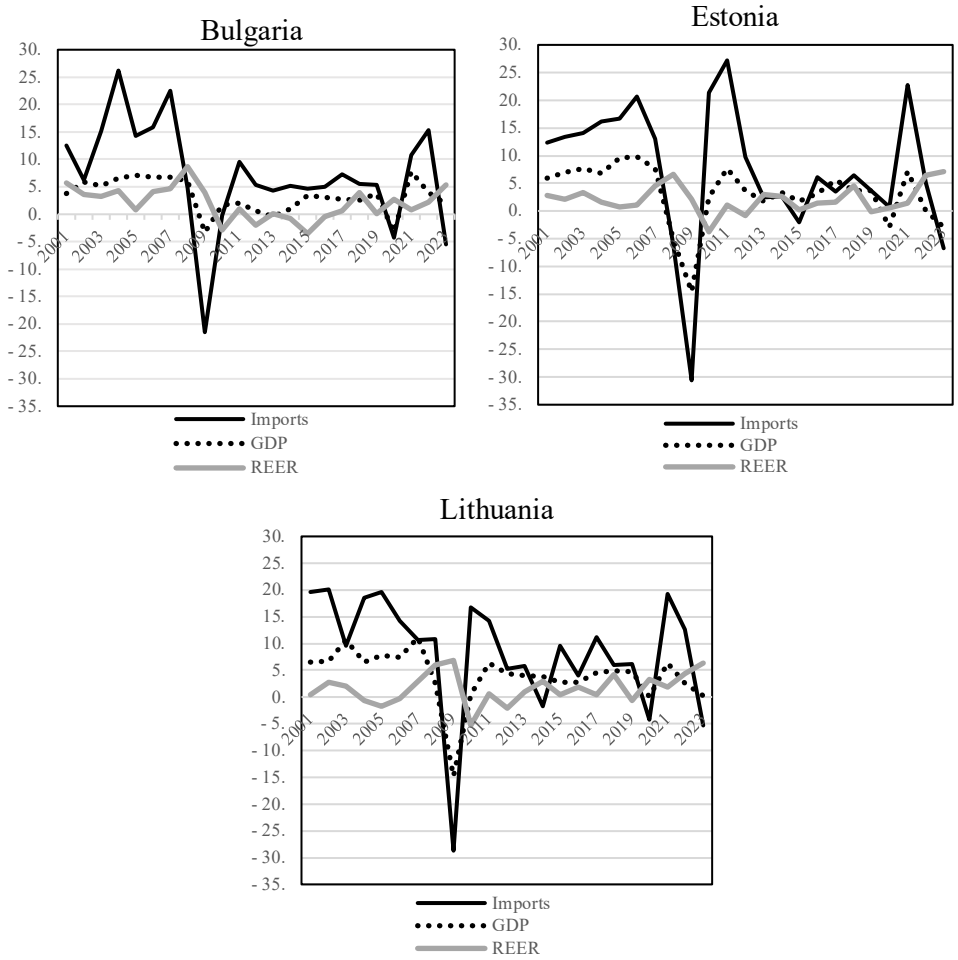
The first sub-period is generally characterised by an increase in the real effective exchange rate of the three countries, which is most pronounced in Bulgaria and is not typical only in Lithuania from 2004 to 2006. The fact that the real appreciation of currencies was then combined with high export growth, which for Bulgaria and Lithuania reached its maximum for the entire period, is indicative of the strong dependence of exports on other factors, such as the significant flow of FDI, the acceleration of domestic credit, etc. Nevertheless, the export growth rates during half of the years changed oppositely to the rates of change in the relative prices of domestic goods, which was more pronounced in the Baltic countries. Thus, the largest and second largest real appreciation of the national currencies in Bulgaria and Estonia in 2008 can be perceived as one of the reasons for the significant slowdown in their exports. In Lithuania, the increase in the real effective exchange rate in the same year is also the second highest for the period, as is the case for Estonia, but unlike it, it is combined with an acceleration of exports. Conversely, the general real depreciation of currencies in 2010 is among the reasons for the significant increase in exports, which is highest in Estonia. Within the third sub-period, two intervals can be distinguished, separated by 2016. Up to and including this year, between changes in exports and the real effective exchange rate, no sustainable correspondence is evident, while after it, the theoretically justified negative dependence prevails. In Estonia and Lithuania, it is most pronounced in the last two years, and in Bulgaria – only in the last year. In the two Baltic countries, the accelerated increase in the relative prices of domestic goods in 2022 and 2023 contributes, respectively, to the slowdown in export growth and the decline in the level of exports.

Figure 2 presents the relationships between the dynamics of imports, GDP and the real effective exchange rate in each of the three countries. It shows that up to 2007 incl., imports everywhere increased at mostly double-digit rates, which corresponds to relatively high rates of economic growth. In Estonia, the two rates changed almost in parallel, while in Bulgaria and Lithuania, import growth varied in a much wider range than that of economic activity.

In the first country, the economic crisis began as early as 2008 and was associated with a decline in imports. In the same year, real GDP growth in Lithuania slowed significantly while import growth remained stable, whereas in Bulgaria, import growth sharply declined while aggregate output growth slowed relatively moderately. The recession of 2009 led to a significant reduction in imports, which was stronger in the Baltic countries. The recovery of their growth since 2010 reflects the revival of economic activity and occurs with varying intensity. In 2010-2011, the highest import growth, which even exceeds pre-crisis values, was observed in Estonia, where the highest economic growth was also achieved. After that,

the import growth rates in the three countries are mostly positive, with their changes in Lithuania and Estonia in most years being unidirectional with the changes in the real GDP growth rates. In Bulgaria, the changes in both rates in half of the years of the third sub-interval take place in different directions. The decline in aggregate output in Estonia and Bulgaria and its retention in Lithuania, provoked by the COVID-19 pandemic, negatively affects imports, which decrease in Lithuania and Bulgaria and slow down their growth in Estonia. The economic recovery in 2021 has a stimulating effect on imports in all three countries, while the subsequent stagnation of the GDP level in Estonia in 2022 and its decrease in 2023 appear, respectively, as a growth-suppressing factor. The slowdown in economic growth in Bulgaria and Lithuania also has a similar pattern in these two years, which is one of the reasons for the decline in imports reported in 2023.

Figure 2. Growth rates of imports, GDP and REER (%)



Source: Eurostat and own calculations.

The comparison between changes in imports and in the real effective exchange rate is not characterised by a certain regularity for the overall period. During the first sub-period, the increase in the relative prices of domestic goods and services in Bulgaria and Estonia occurs at rates that for the first country usually change in the same direction, and for the second country in the opposite direction to the rates of increase in imports. Then, the typical Lithuanian formation of intervals with an increase and decrease in the real effective exchange rate does not affect the dynamics of imports. The continuing real appreciation of the currencies of all three countries in 2009, which in Lithuania was even accelerated compared to 2008, does not lead to an increase in imports due to the strongly negative impact on them from the economic crisis. The real depreciation of currencies in 2010 also had no significant influence on imports, which decreased only in Bulgaria as a result mainly of the lagged impact of the decline in economic activity. A similar absence of a positive relationship between changes in imports and the relative prices of national goods and services is also observed during the COVID-19 pandemic and its subsequent recovery. In most of the remaining years of the third sub-period, the growth rates of imports in Lithuania change in the opposite direction to the growth rates of the real effective exchange rate. For Estonia and Bulgaria, the results are mixed. The existence of a positive relationship is rare and manifests only in a slowed growth of imports in response to a real depreciation of the exchange rate, or as an accelerated growth of imports following a substantial real appreciation.

4.2. Econometric estimation

The sample dimensions for the econometric analysis are as follows: T=22, N=3, which leads to a total sample size of n=66 observations. The results from the application of standard unit root tests show that some time series used to estimate the regressions are not stationary at levels. A possible explanation for this issue is that the panel is much more significant in length than width (T>N). The next step of the study is to check for stationarity (assuming both common and individual unit root processes) at the first difference of the variables. The outcomes are presented in Table 3, showing that all series are stationary at first differences.

This leads to the use of the following first-difference estimator. Taking first differences from both sides of the regression equations yields:

$$\Delta XGDPc_{i,t}=a+\beta_1\Delta GDPEU_{i,t}+\beta_2\Delta REER_{i,t}+u_{i,t} \quad (3)$$

$$\Delta MGDPc_{i,t}=a+\beta_1\Delta GDPc_{i,t}+\beta_2\Delta REER_{i,t}+u_{i,t} \quad (4)$$

where:

Δx_{it} represent the first difference operator.

Table 3. Results from panel unit root tests (at first differences)

	ΔGDP_c		ΔGDP_{EU}		$\Delta REER$		$\Delta XGDP_c$		$\Delta MGDP_c$	
Null: Unit root (assumes common unit root process)										
Method	*Stat.*	*Pr.*	*Stat.*	*Pr.*	*Stat.*	*Pr.*	*Stat.*	*Pr.*	*Stat.*	*Pr.*
Levin, Lin & Chu	*6.14*	*0.00*	*8.30*	*0.00*	*2.05*	*0.02*	*6.01*	*0.00*	*6.99*	*0.00*
Null: Unit root (assumes individual unit root process)										
Method	Stat.	Pr.	Stat.	*Pr.*	*Stat.*	*Pr.*	*Stat.*	*Pr.*	*Stat.*	*Pr.*
IPS W-stat.	4.60	0.00	6.94	*0.00*	*2.86*	*0.00*	*5.58*	*0.00*	*5.89*	*0.00*
ADF – Fisher χ^2	30.01	0.00	46.74	*0.00*	*18.49*	*0.01*	*36.91*	*0.00*	*39.68*	*0.00*
PP – Fisher χ^2	29.16	0.00	56.48	*0.00*	*18.78*	*0.01*	*38.69*	*0.00*	*47.14*	*0.00*

Source: Own calculations.

The intercepts in the first difference regressions are added ad-hoc and don't represent the intercepts of the standard pooled panel regressions. The estimation uses Arellano's heteroscedasticity and autocorrelation robust covariance matrix.

The results from Pedroni's panel cointegration tests (at levels), presented in Table 4, show that there is no statistically significant evidence of cointegration in the two groups of variables, under both the within-dimension and between-dimension specifications at a level of significance of $\alpha = 0.05$.

The econometric estimation of the export and import functions with the first difference estimator is presented in Table 5. All exogenous variables in both models are statistically significant at $\alpha = 0.01$.

In the first function, the GDP growth of trading partners in the EU has a positive impact, and real currency appreciation negatively influences countries' exports, and the type of both effects is consistent with the theoretical principles. In the second function, the increase in countries' GDP has an expected positive sign, while the real appreciation of the currency leads to a decrease in imports instead of their expected increase. The negative sign in front of REER in the imports model can be explained in three ways: i) REER is deflated by total CPI, whose values are highly dependent on changes in prices of non-tradables; ii) The income effect of the appreciation of some goods with inelastic demand can exceed the substitution effect; iii) The price level in these countries is still lower than in most of their trading partners, which means that not every increase in prices of domestic goods leads to a substitution with foreign ones.

Due to working with the first differences, the interpretations of the regression coefficients are the following: i) An increase in change of EU real GDP (reduced by the country's real GDP) of one million euros produces on average 0.00001 p.p. increase in the change of the ratio between exports and the GDP in a given country; ii) One index point rise in the change of the REER leads to an average of 0.438 p.p. decrease in the change of the ratio between exports and GDP; iii) One million euro increase in the change of the domestic real GDP induces an average increase in the ratio between imports and domestic GDP by 0.002 p.p.; iv) One index point rise in the change of the REER triggers an average of 0.404 p. p. decline in the change of the ratio between imports and domestic GDP.

Table 4. Results from Pedroni's panel cointegration tests (by groups of variables)

	$XGDP_c$, GDP_{EU}, $REER$		$MGDP_c$, GDP_c, $REER$	
Null Hypothesis: No cointegration				
Alternative hypothesis: common AR coefficients (within-dimension)				
	Statistic	*Probability*	*Statistic*	*Probability*
Panel ν-stat.	*0.229*	*0.410*	*1.075*	*0.141*
Panel ρ-stat.	*0.625*	*0.734*	*-0.509*	*0.305*
Panel PP-stat.	*0.782*	*0.783*	*-0.909*	*0.182*
Panel ADF-stat.	*0.037*	*0.515*	*-1.361*	*0.087*
Alternative hypothesis: individual AR coefficients (between-dimension)				
	Statistic	*Probability*	*Statistic*	*Probability*
Group ρ-stat.	*1.435*	*0.924*	*-0.173*	*0.431*
Group PP-stat.	*1.509*	*0.934*	*-1.196*	*0.116*
Group ADF-stat.	*0.801*	*0.788*	*-1.436*	*0.076*

Source: Own calculations.

Table 5. Econometric estimation of the export and import functions

Independent variables	*Dependent variable:*	
	$\Delta XGDP_c$	$\Delta MGDP_c$
	(1)	*(2)*
ΔGDP_{EU}	*0.00001****	
	(0.00000)	
ΔGDP_c		*0.002****
		(0.0002)
$\Delta REER$	*-0.438****	*-0.404****
	(0.082)	*(0.041)*
Constant	*1.880****	*0.979****
	(0.442)	*(0.357)*
Observations	*69*	*69*
Adjusted R^2	*0.277*	*0.355*
F-statistic	*14.034****	*19.712****

*Notes: Values in the brackets are Arellano's HAC standard errors. The regressions are estimated by using the first difference estimator, which reduces the observations to 66. The statistical significance is marked as follows: `*' – p < 0.1; ` **' – p < 0.05; `***' – p < 0.01.*
Source: Own calculations.

4.3. Discussion and policy applications

The present analysis shows some similarities with previous studies, such as Baccaro and Pontusson (2016), who compare the contributions of exports and domestic demand to both GDP and economic growth rates for a set of highly developed economies. It fills a gap in the literature on Eastern European countries, particularly three of them, which, for the period under consideration, have a fixed exchange rate of the national currency against the euro or are members of the euro area. A characteristic feature of the article is the highlighting not only of the trends in the dynamics of foreign trade and economic growth and the existing dependencies between them for the whole period, but also the disclosure of their features within the framework of the separate sub-periods before the Great Recession, during and after it, incl. during the COVID-19 crisis. Another one of its features is the comparative descriptive analysis of the relationship between foreign trade and changes in economic

activity in the three selected countries, as well as the revealed similarities and differences between them over time.

The econometric modelling of exports and imports follows the logic of hybrid post-Keynesian models of the type of Oyvat, Öztunalı and Elgin (2018). However, unlike them, it does not include a variable showing the income distribution between profits and wages, which does not allow for empirical verification of the main conclusions of post-Keynesian models of the neo-Kaleckian type. Another feature of the current study is the replacement of export and import values by their ratios to GDP, which is one of the ways to solve the endogeneity problem.

The obtained empirical results, particularly the strong dependence of economic growth on exports, require the implementation of certain economic policies for its stimulation. These should include the acceleration of technological progress, the increasing innovation activity and the acceleration of the accumulation of human capital, which will contribute to increasing the competitiveness of countries. This can be done by implementing targeted structural policies, by attracting more FDI (Bayar, Diaconu (Maxim), 2022) and increasing the efficiency of the use of EU funds, and more broadly – by improving the conditions for doing business and increasing the quality of institutions. Another important factor for growth is the improvement of the structural characteristics of foreign trade, leading to an increase in the relative shares of high-value-added exported goods and services and of imported goods for productive purposes (Nguyen, 2020).

5. Conclusions

The conducted analysis of the link between exports and imports on the one hand, and economic growth on the other hand, for Bulgaria, Estonia and Lithuania, leads to a few important conclusions:

First: The trade openness of the three countries is on an upward trend, which is mainly driven by the increase in exports. For the period as a whole, its increase made a higher contribution to economic growth than the domestic demand components. For the two Baltic countries, this is true for the intervals before and after the global crisis, while for Bulgaria, it applies only after the crisis.

Second: Changes in net exports reflect both external demand dynamics and domestic demand-related changes in imports. The growth contribution of the net exports over the entire period was positive only in Lithuania and was most strongly negative in Bulgaria, while over the period, their positive impact in all three countries was highest during the crisis.

Third: There is a positive relationship between the growth rates of exports and the GDP of the EU as a major trading partner, which is most pronounced in years with greater changes in economic activity. There is also a positive relationship between the growth rates of imports and the countries' own GDP, which changes in one direction for most of the period.

Fourth: The increase in real GDP of the EU is a statistically significant factor for the increase in the ratio of exports to GDP of the three countries on average. There is also some external

crowding-out effect in these countries, which is expressed in a home-growth-induced increase in the ratio of imports to GDP.

Fifth: The relationship between changes in the relative prices of domestically produced goods and services and changes in exports is generally negative but shows significant specificities by sub-period and individual year. Simultaneously, the descriptive analysis does not show a definite correspondence between changes in these relative prices and import growth rates.

Sixth: The rise in REER negatively impacts the exports and imports to GDP ratios for the three countries on average. This atypical impact on the imports to GDP ratio can be explained by the non-tradable share in the total CPI and the income and price levels relative to their trading partners, while it contributes to an improvement in the external trade balance.

The findings on the vital contribution of external demand to the achieved rates of economic growth, as well as its positive dependence on the income of the main trading partners and negative dependence on the REER, align with the fundamental postulates of the post-Keynesian theory. Such consistency is also observed for the positive dependence of imports on GDP, indicating that the empirical results confirm the validity of hybrid-type theoretical models. A specific feature of the current study is the evidence of the negative impact of REER on imports, which reflects the peculiar conditions in the considered countries.

A few more critical limitations characterise the analysis in this study: i) it considers the other components of aggregate demand only in terms of their relative importance compared to exports and net exports, but without looking at the dependencies with them and with imports; ii) the impact of exports on economic growth is assessed only through its direct contribution to the respective rates, and without characterising the magnitude of the multiplier effect; iii) exports and imports are represented as functions of only two main variables, which are subject to interpretation in almost all hybrid models; iv) the analysis does not examine the structural characteristics of economic growth by economic sectors and activities and of foreign trade by group of goods according to the Standard International Trade Classification (SITC, Rev. 4), which affect the aggregate relationship; v) the dependence of economic growth on the functional distribution of income between wages and earnings, and the degree of inequality between wage earners is not the focus of attention. These unexplored aspects of the analysed relationship in a post-Keynesian context may be the subject of future research, which may concern the selected set of countries, all countries in Eastern Europe, or individual countries in the region.

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Contribution of individual authors

Stela Raleva has carried out the descriptive analysis.
Ilia Atanasov has made the econometric analysis.
Lidia Kabatliyska-Andonova had elaborated the theoretical part of the research.

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There is no conflicts of interests.

Declaration of Generative AI and AI-assisted technologies in the writing process

The authors declare that no generative AI or AI-assisted technologies were used in the writing process of this manuscript. At the final stage, the authors used DeepL to translate some texts and to improve the accuracy of the language. After using this tool, the authors reviewed and edited the content as needed and takes full responsibility for the content of the publication.

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