INTERNATIONAL TRADE, LABOUR MARKET AND ECONOMIC GROWTH IN LONG TERM

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Abstract. General global trend in advanced economies indicates decreasing working hours and increasing labour productivity. The aim of the research is to examine the existing relationships between hours worked, labour productivity and international trade in the long-term. In the study, OECD and more in detail, some EU countries (Latvia, Estonia, Lithuania, Poland, Germany) are selected. The research period is 1995–2021. The results indicate that employees are working fewer hours, receiving more and generating larger economic output per person employed. This relation is detected in many EU countries. In the long term, advanced and stable economies (such as Germany) differ from emerging and previously so-called transition economies (Poland, Latvia etc.) in the EU. More efficient use of labour resources is linked with both application of modern technologies and the growing importance of high-tech industries that lead to higher economic output. High energy costs impact the selection of technologies, replacement to more efficient ones and innovations in the production process, transportation and storage. The results argue that high-tech exports are strongly linked with high-tech imports due to high import dependency. Faster well-balanced recovery and stable performance are expected in the majority of countries and market segments domestically in the post-COVID era.

Keywords: international trade, labour productivity, real GDP growth, long-term trends, recovery.

JEL Classification: C13, E24, F16, F43, O40, P45

INTRODUCTION

Recent economic turbulence caused by an expected shock of COVID-19 and continued with rising and unstable energy costs resulted into high inflation in many counties has increased an interest in recovery process in the post-crisis period. However, short-time shifts and changes within the economy have relatively more minor impacts on longer perspectives. In past years, an exensive research, academic and professional attention is paid to short-term effects and fast and quick recovery plans and programs, slightly ignoring possible long-term trade-offs and effects on significant market agents, their decision-making patterns and expectations.

The long-term analysis is valuable and practically applicable to identify general trends over time that are not affected by shocks such as COVID-19 or alike. These shocks have proven to be capable to initialize or cause both temporary and permanent changes in the economy. The long-term analysis gives a broader perspective and ground for forecasting. To elaborate effective and targeted recovery programs and activities

related to the domestic market (focused on technologies, unemployment, inflation) and international (foreign trade, investments), grounded and precise forecasting is an essential element.

The general global trend in advanced economies indicates decreasing working hours and increasing labour productivity in the long term. The aim of the research is to examine the existing relationships between hours worked, labour productivity and international trade in the long-term. The research hypothesis is domestic labour productivity level expressively determines the international competitiveness in the global market.

1. LITERATURE REVIEW

Numerous scholars have investigated and stressed the importance of productivity and international trade for balanced and stable economic growth. It is generally agreed that external shocks as international trade shocks, have different effects on the labour market than overall domestic shocks (Partridge et al., 2017). In the literature on technologies and technological changes, there seems to be general agreement that modern technologies, such as automation technologies, including artificial intelligence, have the potential to significantly disrupt labour markets in the long run (Bowen & Morosan, 2018; Frank et al., 2019).

Recent research on the post-COVID or post-crisis development tends to stress the importance of impact on the labour market and employment (Birinci et al., 2021; Lim et al., 2021); the importance of digital transformation (António & Rita, 2021; van Ark et al., 2021), digitalisation (Berlak et al., 2021) and digital skills (Döhring et al., 2021), as well as general post-pandemic recovery strategies (Dias et al., 2022). Export diversification and its long-term impact on the economy have been extensively examined and highlighted in various product markets (Canh & Thanh, 2022; Fatima et al., 2022).

It is worth highlighting that the more productive companies are more active in export markets, and result exporters are found to be more effective than non-exporters (Wagner, 2007, 2012), foreign demand and export status significantly increases the probability of introducing product innovations and adoption of process innovations (Bratti & Felice, 2012; Fassio, 2018) and higher productivity and efficient products result in success in export (Andersson et al., 2008), however, exporting as such does not improve productivity.

The studies on innovations as drivers of productivity and economic growth argue about a stable and long-run relationship between innovation and economic growth (Maradana et al., 2017; Pradhan et al., 2017). But more intensive use of labour resources and longer hours worked results in less productive employees, longer time is needed to perform the same task (Collewet & Sauermann, 2017) and average hours worked per adult are substantially higher in low-income countries than in high-income countries (Bick et al., 2018). The recent studies in the post-COVID era have re-opened the discussion on working time reduction and positive impacts on the economy and environment (Antal, 2018; Lukács & Antal, 2023).

International trade and market integration disproportionately benefit companies producing high-quality products (Furusawa et al., 2020), at the same time relation between employment polarization and technology and international trade impact industries and regions differently (Terzidis & Ortega-Argilés, 2021). The existing

literature emphasizes the linkages between national labour market, exports and economic growth, that are with up-most importance in many countries, including the European Union (EU) countries during recovery in the post-crisis period.

2. METHODOLOGY

In the study, OECD and more in detail some EU countries (Latvia, Estonia, Lithuania, Poland, Germany) are selected. Research period is 1995-2021; shorter period used if the whole period is not covered in the data source. Data bases of international institutions as Eurostat, OECD, World Bank, as well as national statistics office of Latvia. Annual and quarterly data used. National totals as well aggregates on NACE classification basis (due to data unavailability) are applied instead of sectoral indicators.

The following key indicators are selected:

- hours worked per employed person;
- GDP per employed person;
- GDP per hour worked;
- High-technology exports.

Selection of the above-listed indicators are affected by various external factors, including the data comparability, data availability in long-run, breaks in time-series etc. Schematically the applied research design is given in Figure 1.
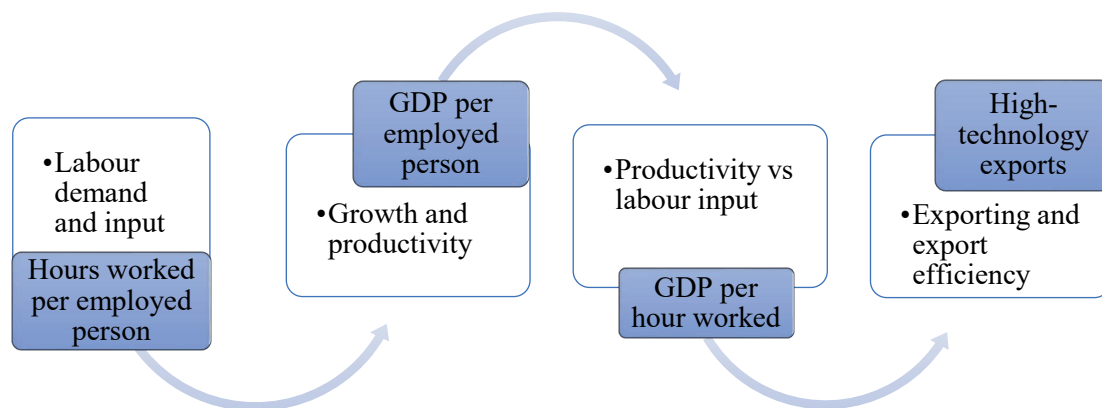
**Fig. 1.** Examined process and indicators reflecting key aspects.

The studies on relationships between productivity, foreign trade and economic growth commonly include correlation and econometrics approaches (Behun et al., 2018; Fatula, 2018) and these are classic and well-recognised instruments.

Hence, the research methodology includes correlation analysis in order to identify long-term tendencies in the research period, afterwards econometric analysis (linear regression; ordinary least squares (OLS)) and forecasting are applied.

3. RESULTS AND DISCUSION

The results of dynamics of the EU data indicate that employees are working less hours, however receiving more and generating larger economic output per person

employed. This relation is detected in many EU countries. Correlation analysis of long-term tendencies detection in one of the EU countries - in Latvia reveal that there is a strong linear relationship between hours worked per person and GDP per employed person (r= −0.862) (see Fig.2).
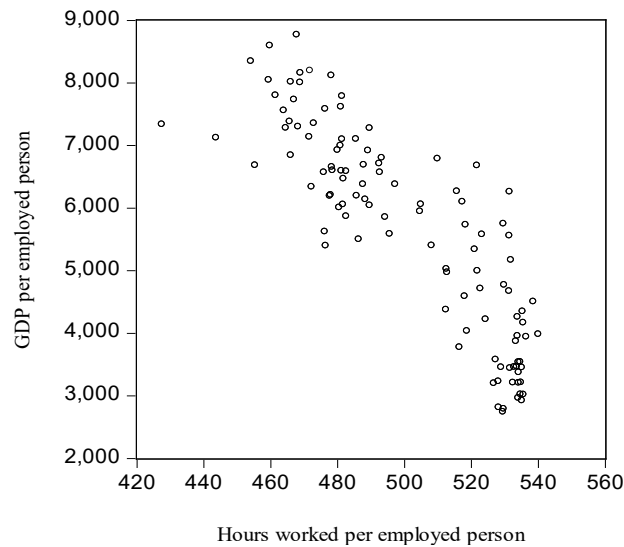
Data Source: CSB Latvia

Fig. 2. Hours worked per employed person and GDP per employed person in Latvia in 1995Q1–2022Q2.

Definitely, hours worked per employed person is not the only factor that explains GDP per employed person (as measure of labour productivity). There are many factors that influence directly and indirectly labour productivity, within these factors technologies applied, technological improvement together with education and training involving more efficient human resource management and motivation are the key determinants of this process. These factors individually are hard to be measured due to subjective side.

Estimated equation (1) of Latvia's economy (1995Q1–2022Q2) claims that hours worked per employed person and COVID-19 impact explains 76% of the variance in GDP per employed person. Heteroskedasticity tested with Breusch-Pagan-Godfrey test and factors do not form a statistically significant relationship with squared residuals of the equation (1).

$$GDP\_EMP = 32691.3 − 53.9*HOURS\_EMP − 1992.2*DUMMY\_COVID, \quad (1)$$

(t-stat= 22.4) (−18.6) (−3.3)

R^2=0.76; F-stat=176.4; DW=1,45;

where

GDP_EMP − GDP per employed person (thsd. euro) in a quarter;

HOURS_EMP – hours worked per employed person (number of hours) in a quarter;

DUMMY_COVID – dummy for COVID-19 severe lockdown impact (=1 in 2020Q2;2021Q1; otherwise=0).

The performed correlation analysis amid sectors provides convincing evidence that labour productivity has increased faster and declining working hours very strongly

negatively correlates with labour productivity (for example, in trade and transport (NACE classification G+H+I activities) (r=−0,90) (see Fig.3a); however, sectors as construction (NACE F activity) has very weak linear correlation (r=−0.17) (see Fig.3b).
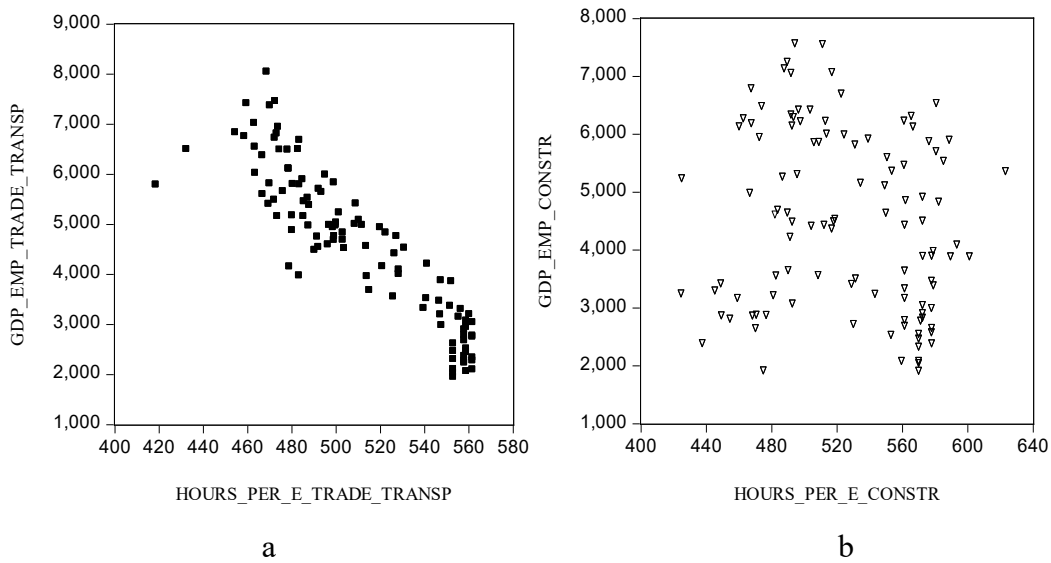
a   b
Data Source: CSB Latvia

Fig. 3. Hours worked per employed person and GDP per employed person in Trade and Transport (G-I industries; *a*) and in Construction (F industry; *b*) in Latvia in 1995Q1–2022Q2.

General cross-section data analysis of OECD countries in 2021 reveals that it is not possible to identify one universal general trend amid all OECD countries (see Fig.4). These findings of the study warrant further discussion; the result should not be over-interpreted.
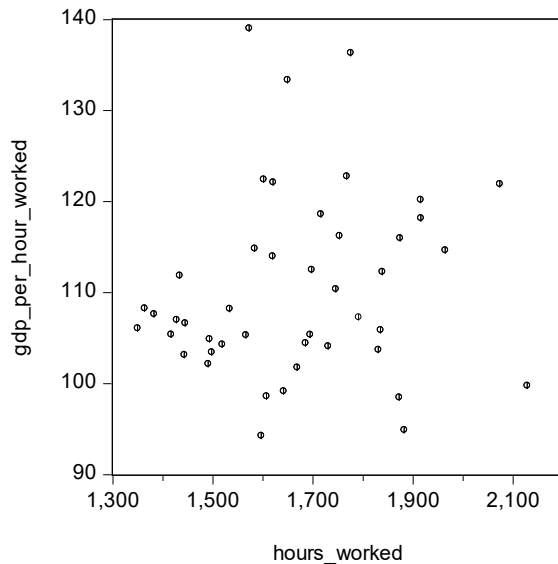
Data Source: OECD data base

Fig. 4. Hours worked per employee in a year (*hours_worked*) and GDP per hour worked (2015=100) (*gdp_per_hour_worked*) in OECD countries in 2021.

In long-term, advanced and stable economies (as Germany) differ from emerging and previously so-called transition economies (Poland, Latvia etc.) in the EU (see Fig. 5). More efficient use of labour resources is linked with both application of modern technologies and growing importance of high-tech industries that lead to higher economic output. According to Eurostat used aggregation of manufacturing industry (Eurostat, 2022) according to technological intensity and based on NACE classification, high-technology industries are manufacture of pharmaceutical products and preparations (C21) and manufacture of computer, electronic and optical products (C26).
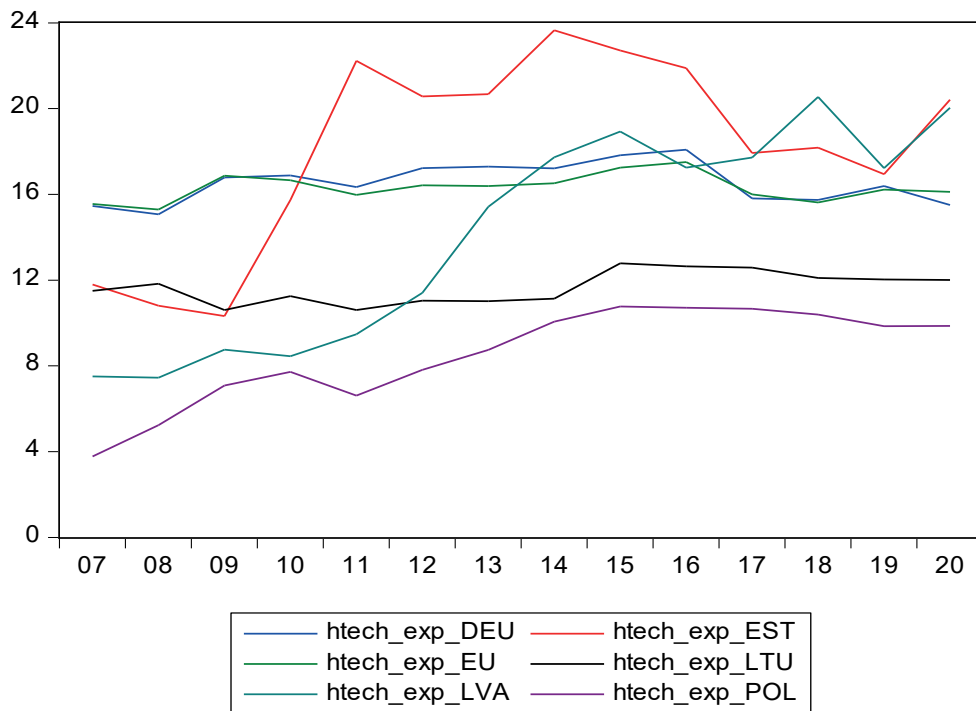
Data Source: World Bank data base

Fig. 5. High-technology exports (% of manufactured exports) in selected European Union countries in 2007–2020.

High energy costs have an impact on selection of technologies, replacement to more efficient ones and innovations in the production process, transportation and storage. Analysis of relationship between high-tech exports and GDP per capita in the selected EU countries argue that in Latvia and Poland there is a strong correlation; at the same time even in alike countries as Estonia and Lithuania is week or no correlation (see Fig. 6).

a   b
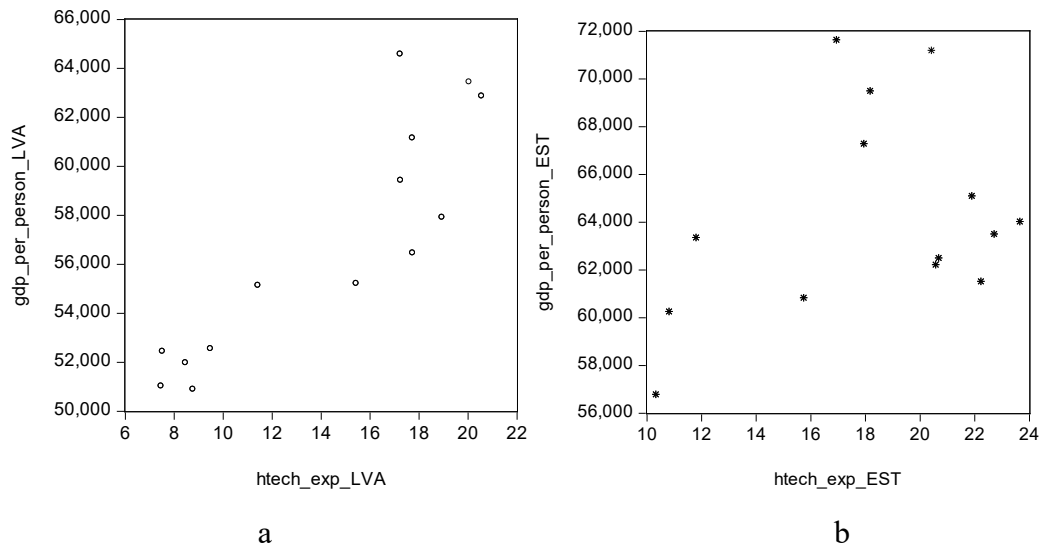
Data Source: World Bank data base

Fig. 6. High-technology exports (*htech_exp*) and GDP per person employed
(*gdp_per_person*) in 2007-2020 in Latvia *(a)* and Estonia (*b*).

The results argue that high-tech exports are strongly linked with high-tech imports due to high import dependency. Faster well-balanced recovery and stable performance are expected in majority of countries and market segments domestically in the post-COVID era.

CONCLUSION

Shorter actual (paid) working hours on average lead to higher GDP per person employed. This relationship is detected in many EU countries. In long-term, advanced and stable economies differ from emerging and previously so-called transition economies in the EU. On average, in OECD economies are not detected relationship between high-tech industry exports (as share from total exports) and GDP per person employed. On other hand, in emerging economies in the EU (as Latvia, Poland) high-tech industry exports strongly corelates with GDP per person employed. The research findings argue that exceptions prove the rule – as results on Estonia and Lithuania do not indicate this relation. High-tech industries (as pharmacy productions and electronic productions) demands large share of imported inputs hence increase in exports gradually is linked with increase of imports as well.

More efficient use of labour resources is linked with both application of modern technologies and growing importance of high-tech industries that lead to higher economic output. Faster recovery and stable performance in long-term leading to stability and certainty for society.

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