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Financialization and its impact on process of deindustrialization in the EU*

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Abstract

The aim of this research is to examine whether and to what extent the process of financialization has an impact on the process of deindustrialization in the European Union, employing a fixed-effect panel regression model. In this paper exogenous explanatory variable that indicates the level of financialization is presented by the value added of the finance sector as a percentage of total value added, and by the employment in the finance sector as a percentage of total employment. In a process of deindustrialization, the industrial activity is usually replaced by service activities. However, situations where the service sector has not been able to absorb the additional supply of labour and to produce additional values that would compensate the reduction in the industrial sector, could have led to higher unemployment and lower economic growth. In this paper, deindustrialization is measured by the value added of industry sector as a percentage of total value added, and by the employment in industry as a percentage of total employment. Using latest panel data from EUROSTAT and ILO for the period from 1995 to 2015 author detects the significant and negative impacts of the process of financialization on value added of industry sector, as well as on the employment in the industry sector. This supports the conclusion that the process of deindustrialization of the EU countries can be characterized as a financialization-led process.

Key words: *deindustrialization, financialization, value added, unemployment, fixed-effect panel regression model*

JEL classification: *G01, O14*

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1. Introduction

The issue of financialization and its impact on the overall economy, as well as on its specific parts, come back into focus with the latest financial crisis. The bubbles that draw prices of assets away from its fundamental value raise the questions how to predict them, should we try to burst the bubble before it blows by itself, and should we suppress some financial innovations that are considered as contributors of financial instability? There is no doubt that some financial complex products like mortgage-backed securities (MBS), collateralized debt obligations (CDO) and the process of securitisation had their part in the recent financial crises.

Namely, availability of credit in the US and debt-financed consumer spending led to a housing construction boom and real estate bubble which peaked in 2006. Aforementioned financial innovations which derived their value from mortgage payments and housing prices, significantly increased. As the housing prices rose too far out of fundamentals the price bubble ultimately burst. Because of the decline of housing prices, major global financial institutions that had borrowed and invested heavily in subprime MBS reported significant losses. Defaults and losses on other loan types also increased significantly as the crisis expanded from the housing market to other parts of the economy. Lehman Brothers was liquidated, Bear Stearns and Merrill Lynch were sold, Goldman Sachs and Morgan Stanley became commercial banks, and Fannie Mae and Freddie Mac were placed under the control of the U.S. government. These seven institutions were highly leveraged and had 9 trillion USD in debt or guarantee obligations. The crisis rapidly developed and spread into a global economic shock, resulting in a number of European bank failures, declines in various stock indexes, and large reductions in the market value of equities and commodities (Siddiqui, 2010).

In order to struggle with the financial crisis, many central banks, including Fed, expanded money supplies to avoid the risk of a deflationary spiral. Governments have passed large fiscal stimulus packages, by borrowing and spending to offset the reduction in private sector demand caused by the crisis. They have also bailed out many private firms and banks. The total cost of recent global financial crises only for the U.S. economy is estimated to be from $6 trillion to $14 trillion (Luttrell, et al., 2013).

Therefore, it is reasonable to raise a question what are the consequences of financialization, which is manifested in increased size and importance of financial products and financial sector relative to the industrial sector and overall economy as well. Financialization has occurred in many countries by shifting away from industrial capitalism. This impacts both the macroeconomy and the microeconomy by changing how financial markets are structured and operated and by influencing corporate behaviour and economic policy (Palley, 2007). Financialization influences on income and political power distribution within and between countries as well. It

has the impact on sustainable economic growth. When making the decisions about the kind of monetary policy to conduct, the monetary authorities take into account the ongoing process of financialization.

An exhaustive analysis of financialization obviously includes a large set of issues and research approaches. This paper deals with only one aspect: the impact of the process of financialization on the process of deindustrialization in EU member states.

Deindustrialization is a process of social and economic changes caused by the reduction or disappearance of entire industrial capacity and activities in the country. Industrial activity is usually replaced by service activities. However, situations where the service sector has not been able to absorb the additional supply of labour and produce additional values that would compensate the reduction in the industrial sector could have led to higher unemployment and lower economic growth.

The aim of this research is to examine whether and to what extent the process of financialization has an impact on the process of deindustrialization in the EU, employing a fixed-effect panel regression model. The main hypothesis of the paper is that the financialization process encourages the process of deindustrialization. According to this goal and hypothesis the paper is organised as follows. After the introduction part that contains the short description of the research objectives, the second section gives the literature review that deals with the issue of the process of financialization and deindustrialization. The third section contains the description of methodological framework. The comparative and descriptive analysis of financialization and deindustrialization within EU countries as well as econometric analysis of their relationship can be found in section four. Section five contains the research results and the discussion. Finally, the last section comprises concluding remarks.

2. Literature review

Financial economic theory teaches us that the role of finance is to direct production resources into the most productive activities, and to spread the risks among large numbers of people. That is why it is expected that finance and financial development should have a positive contribution to the economic growth. There are a vast number of papers that investigate the relationship between financial development and economic growth. Financial development is usually defined as a process that marks improvement in quantity, quality, and efficiency of financial intermediary services. Very often the government regulations and restrictions such as interest rates limits on loans and deposits, prohibitions of some financial innovations (for example short selling) are viewed as unnecessary obstacles that restrain financial development and thereby economic growth. That is why some authors advocate

financial liberalisation and deregulation (Obsfeld, 1992; De Gregorio and Guidotti, 1995; Levine, 2001; Bekaert, et al., 2005; Khadraoui and Smida, 2012).

Financialization is associated with the growth of the scale of the financial system under the condition of deregulation. It means the increasing role of financial motives, financial markets, financial actors and financial institutions in the operation of domestic and international economies (Epstein, 2005). According to this Gerald A. Epstein's definition of financialization, it is obvious that financial development is just one of the features of financialization.

Although financial development is usually perceived as a positive process with positive effects on economic growth, in scientific literature financialization has usually been proved to have negative effects on economic growth and the development (Yeldan, 2000; Epstein, 2001; Stockhammer, 2004; Palley, 2007; Freeman, 2010). Financial deregulation, which is actually a part of financialization process, can negatively influence on income distribution and overall disassociation of financial institutions from the productive sphere. Financial capital gradually gains supremacy over industry and that severely hampers the linkages between growth and productivity gains and intermediation of savings funds for productive capital accumulation. This has adverse consequences for the income of wage labour (Yeldan, 2000).

In order to investigate the relationship between financialization, central bank "inflation targeting" and rentier interests in the world economy Epstein (2001) constructed the simple econometric models on sample that includes 70 countries and uses annual data from 1960 to 1997. He found the increased role of financialization as an important reason why inflation targeting has been adopted and so widely promoted. Central banks' focus on inflation targeting cannot be explained by a "rational" social cost/benefit calculation, because according to his research results, there are few macroeconomic costs of inflation under moderate rates of inflation (under 20%). He states that financialization has altered the structure and motives of many firms and magnified their rentier motivations, including their increasing dependence on share price appreciations. This has increased the desire of the Fed to set the interest rates low. Epstein thinks that this rentier-led growth is not sustainable because it depends on the increase of United States trade deficits.

Financialization can lead to a slowdown in accumulation of capital goods (real assets). In order to prove this, Stockhammer (2004) performed empirical tests with annual data for the business sector of Germany, France, UK, and the USA. He managed to fully prove his hypothesis for the USA and France, but only partially so for the UK, and none for Germany. The explanation of the results for the UK is that the UK already had very low accumulation rates in the Golden Age. The insignificant findings for Germany can be explained by the fact that shareholder value orientation is a very new phenomenon in Germany. For France

financialization explains the entire slowdown in accumulation, and for the USA about one-third of the slowdown.

Financialization increases income disproportion and wage stagnation, and it can put the economy at risk of debt deflation and prolonged recession. Because of its adverse effects, Palley (2007) suggests a fundamental change of policy model. His stance is that the financial markets are at the heart of the financialization process, and that is why effective control over these markets should be restored. He argues that the only effective policy tool that monetary authorities have is the short-term interest rate and that this tool should be complemented with a new financial sector regulatory framework based on asset-based reserve requirements (ABRR).

Deregulated capital markets do not always reduce risk and allocate capital into most productive uses. According to Freeman (2010) in 2000s markets did the opposite. Because of the failure of governments, international agencies and financial experts to control it, financial sector actually increased the risk through leveraging, speculation, and rent-seeking. The costs mostly bear on the real economy in terms of lost employment and reductions in public goods and economic growth as countries re-stabilize their fiscal budgets through costly bailouts and stimulus packages. Freeman advocates thorough reform of the financial system.

Regarding the process of deindustrialization, there is no such rich literature span that investigates the causes, patterns and the consequences of this phenomenon. However, the works of Rowthorn and Ramaswamy (1997), Boulhol and Fontagne (2006), Tregenna (2011), Felipe et al. (2014) and Rodrik (2015) should be mentioned.

The process of deindustrialization can be explained by faster growth of productivity in manufacturing than in services while manufacturing is technologically more progressive than services (Rowthorn and Ramaswamy, 1997). Because of this, as deindustrialization continues, the overall growth of productivity will depend more and more on growth of productivity in services. Rowthorn and Ramaswamy (1997) conclude that the trade between the advanced economies and the developing world has not played an important role in deindustrialization, while trade among industrial countries accounts for some of the differences in employment structure between differently advanced economies. They expect that future growth within the developed world is likely to depend increasingly on productivity growth in services, and conclude that deindustrialization is not a negative phenomenon, but a natural consequence of further growth in advanced economies.

Researching strategy of the process of deindustrialization of Boulhol and Fontagne (2006) is based on a dynamic panel methodology. The authors conclude that net trade with low-wage countries is associated with an average decrease of around 2 points in the manufacturing employment share between 1970 and 2002, but this contribution represents only a fifth of deindustrialization over the period. They did

not find any increased impact of imports from developing countries in the second half of the period (1986-2002), other than impact due to increased trade.

Deindustrialization is also manifested in changes in the level and share of manufacturing employment. Tregenna (2011) results indicate that in most countries the decline in manufacturing employment is associated mainly with rising of productivity in manufacturing. The author remarks that reindustrialization, although important for long-term growth, is difficult and is not common. Felipe, Mehta and Rhee (2014) raise the question whether today's developing economies can achieve high-income status without first building large manufacturing sectors, and how difficult it is to sustain high levels of manufacturing activity. They found out that practically every economy that enjoys a high-income today experienced a manufacturing employment share in excess of 18%–20%, and that the maximum expected employment share for a typical developing economy has fallen to around 13%–15%. That is why the authors conclude that the path to prosperity through industrialization may have become more difficult.

Rodrik (2015) documents a significant deindustrialization trend in recent decades. He notices that countries are running out of industrialization opportunities sooner and at much lower levels of income compared to the experience of early industrializers. The author emphasizes the differences between countries and underlines that Asian countries and manufactures exporters have been largely insulated from those trends, while Latin American countries have been especially hard hit. The author finds out that advanced economies have lost considerable employment but they have done very well in terms of manufacturing output shares at constant prices. The evidence suggests both globalization and labour-saving technological progress in manufacturing have been behind these developments. The author expects that premature deindustrialization can have potentially significant economic and political consequences, including lower economic growth and democratic failure.

In mentioned papers there are various approaches of measuring of the financialization and industrialization. The indicators are associated with the variety of definitions. Palley (2007) measures financialization with the increase in the volume of debt. Furthermore, he also calculates the Finance, Insurance, and Real Estate (FIRE) output as a percentage of GDP and FIRE employment as a share of the total non-agricultural private sector. Stockhammer (2004) uses rentiers' share of the non-financial businesses, interest and rentiers' payments (dividend earnings) of non-financial businesses in order to measure the level of financialization. Freeman (2010) uses the data of the share of financial intermediation, real estate, renting, and business activities in GDP as a proxy for financialization. He also takes into the consideration the ratio of financial sector profits to the wages and salaries of all private sector workers, and the ratio of financial assets divided by GDP.

In work of Rowthorn and Ramaswamy, (1997), Boulhol and Fontagne, (2006), Tregenna, (2011) and Felipe et al., (2014) deindustrialization is measured by the share or by the level of manufacturing employment. The share of manufacturing value added in GDP and manufacturing output share at constant prices are used in Rowthorn and Ramaswamy (1997) and Rodrik (2015).

Following the work of Assa (2012) in this paper the level of financialization is measured by the value added of the finance sector as a percentage of total value added, and by the employment in the finance sector as a percentage of total employment. These proxies for financialization are appropriate because they are understandable and data for their assessment are available. In order to keep consistency with the measurement of financialization, deindustrialization is measured by the value added in industry sector as a percentage of total value added, and by the employment in industry as a percentage of total employment.

3. Methodological framework

In this study the relationship between financialization and deindustrialization is going to be examined by employing a fixed-effect panel regression model. Hsiao (2003) and Klevmarken (1989) list several benefits from using panel models (e.g.: controlling of individual heterogeneity, more variability, less collinearity among the variables, more degrees of freedom and more efficiency of the data, etc.). Also, some effects that are simply not detectable in pure cross-section or pure time-series data can be better detected and measured using panel models.

The basic class of models that can be estimated using panel techniques may be written as (1)

$$y_{i,t} = \alpha + X'_{i,t}\beta + u_{i,t} \quad i = 1, ..., N; t = 1, ..., T \tag{1}$$

with i denoting cross-section dimension (in our case countries), t denoting the time-series dimension (in our case years), α is a scalar (constant term), β is K×1 vector of coefficients, $X_{i,t}$ is the i,t^{th} observation on K explanatory variables, $u_{i,t}$ is error component. This error component ($u_{i,t}$) consists of time-invariant unobservable individual-specific effect that is not included in the regression (μ_i), and the reminder of the disturbance that varies within cross-section and time-series dimension ($v_{i,t}$):

$$u_{i,t} = \mu_i + v_{i,t} \tag{2}$$

In fixed effects model μ_i are assumed to be fixed parameters to be estimated, and $v_{i,t}$ are independent and identically distributed with mean 0, and variance σ^2_v. The $X_{i,t}$ are assumed to be independent of the $v_{i,t}$ for all i and t. We treat $X_{i,t}$ as non-stochastic variables.

Because we are focusing on the specific set of countries (all EU countries) and our inference is restricted to this set, according to Baltagi (2008) the fixed effects model is an appropriate specification. This can be tested employing Cross-section F and Cross-section Chi-square tests with the null hypothesis that the cross-section effects are redundant:

$$F(n-1, nT-K) = \frac{(R^2_{LSDV} - R^2_{Pooled}) / (n-1)}{(1 - R^2_{LSDV}) / (nT-n-K)} \quad (3)$$

where LSDV indicates the dummy variable model and *Pooled* indicates the pooled or restricted model with only a single overall constant term.

The fixed effects model, by the substitution of (2) into (1), can be written as (4):

$$y_{i,t} = \alpha + X'_{i,t}\beta + \mu_i + v_{i,t} \quad (4)$$

Now, ordinary least squares (OLS) can be performed on (4) to get estimates of α, β and μ. Parameter β are common to each subject and are called population parameter, while parameter α vary by subject and are known as individual parameter.

Basic fixed effects model assumes that $y_{i,t}$ are independent term so there is no correlation over time, and there is no correlation across subjects

4. Empirical data and analysis

4.1. Financialization in the EU economy

Economic activity is divided into three broad groups: agriculture, industry and services and these sectors are defined by the International Standard Industrial Classification (ISIC). Detailed classification into a narrow group allows identification of individual industries and services. According to the Revision 4 of ISIC from 2008, the financial sector is a part of services and it is classified into a group (K) named "Financial and insurance activities". The data for total employment are acquired from International Labour Organization (ILO), and data for employment in financial and insurance activities, as well as data for value added in the finance sector and total value added (GDP) are downloaded from EUROSTAT.

Based on the level of GDP per capita in 2014 all EU countries are classified into three groups: Low-income countries (Bulgaria, Croatia, Czech Republic, Hungary, Latvia, Lithuania, Poland, Romania and Slovakia) Middle-income countries (Cyprus, Estonia, Greece, Italy, Malta, Portugal, Slovenia, Spain and France), and High-income countries (Austria, Belgium, Denmark, Finland, Germany, Ireland, Luxembourg, Netherlands, Sweden and United Kingdom). The mentioned percentages that will be

used as indicators of the level of financialization for a period from 1995 to 2015 are presented on charts in Appendix.

The analysis of the data shows that, among low EU income countries, Bulgaria and Croatia have the highest value added of finance sector as a percentage of total value added in last five years, but that percentage does not exceed 8.4% (highest value is for Bulgaria 2011 – 8.3%). The average (for the whole period 1995-2015) for low-income countries is 4.05%, for the middle-income countries it is 5.08%, and for high-income countries it is 7.30%. In a group of middle-income countries Cyprus (9.6% – 2012) and Malta (8.3% – 2006) stands out. The largest share of value added of the financial sector has Luxembourg in a whole analysed period. It reached the highest value in 2006 (29.9%), and it does not go below 23.9%. This is a very large share comparing it even with the data of other high-income countries. According to this indicator, it seems that higher income countries have reached a higher level of financialization.

One can expect that the share of employment in finance sector out of total employment should be higher in countries that have a higher share of value added of finance sector out of total value added, but this is not always the case. For instance, Bulgaria has high value added generated in the finance sector, but not so high share of employment in this sector. The opposite case is for the Hungary. This indicates the different level of productivity of labour force employed in the finance sector in different countries. The average percentage of employment in the finance sector in low-income countries is 1.66%, in middle-income countries it is 2.80%, and in high-income countries, it is 3.74%. Among the middle-income countries Malta (5.6% – 2012) and Cyprus (5.2% – 2012) have a relatively higher percentage of employment in the finance sector, and Luxembourg is incomparable to any other country (around 11% in whole analysed period). This data also indicates that generally the productivity in the finance sector is higher than in other sectors.

4.2. Deindustrialization in the EU economy

According to ISIC, industry includes: (B) Mining and quarrying (C) manufacturing, (D) Electricity, gas, steam and air conditioning supply, (E) Water supply; sewerage, waste management and remediation activities and (F) Construction. The data for value added and for employment in the industry is found in EUROSTAT database. The graphs of these indicators of deindustrialization are also presented in Appendix.

The analysis is conducted separately, based on afore defined classification of EU countries in three groups (low-income, middle-income and high-income countries). All three groups have relatively similar average of value added in industry as a percentage of total value added (low-income countries 31.71%, middle-income countries 24.99%, and high-income countries 27.02%).

Among the low-income countries, Romania reached the highest value for this indicator in 2011 (41.51%), and Bulgaria had the lowest value in 1996 (21.35%). In a group of middle-income countries, Slovenia has a significantly higher percentage of value added in industry than any other country in a whole analysed period (it ranges from 31% in 2010 to 36% in 1999). The lowest level of this indicator with the obvious process of deindustrialization can be seen for Cyprus (it goes from 22% in 1995 to 10% in 2015). According to the data, the most deindustrialised country in EU in 2015 is Luxemburg (11%), and the most industrialised country is Germany (30%). Furthermore, the most obvious process of deindustrialization can be noticed for Ireland in the period from 2002 (40%) to 2015 (26%).

The process of deindustrialization is much more clearly shown in data of employment in the industrial sector, especially for middle-income and high-income countries. The average numbers are much lower for high-income countries. Based on the EUROSTAT data, the low-income countries have 30.15% of total employment, employed in some kind of industry, in average. For the middle-income countries this is 25.75%, and for the high-income countries it is 22.39%. If we compare these averages with the averages of value added of industry, it can be concluded that the efficiency of the workforce in high-income countries is much higher than in low-income countries, and that this efficiency increases for high-income countries.

The country that has the highest percentage of employment in industry in a whole analysed period is Czech Republic (41.3% in 1996 and 36.8% in 2014 with a clear process of deindustrialization). According to this indicator, the most deindustrialised country in a group of low-income countries is Latvia (23.5% in 2015). In a group of middle-income countries, Slovenia and Estonia have the highest percentage of employment in industrial sector (Slovenia 29.2% in 2015 with the highest percentage in 1995 – 39.0%; Estonia 29.4% in 2015 with the highest percentage of 34.4% in 2007), and the Greece has the lowest (13.8% in 2015). Almost all countries in the group of high-income countries experienced the evident process of reduction of the number of employees in industry, and it is the most significantly expressed in Ireland where the employment in industry as a percentage of total employment decreased from 27,3% in 2006 to 18.3% in 2014 (this is the decrease of 33%). The highest value of this indicator in a group of high-income countries in 2015 has Germany (24.4%), and the lowest value has Netherlands (14.6%). Both of these countries had much higher values of this indicator in 1995 (Germany 32%, and Netherlands 20.6%).

4.3. Deindustrialization and financialization relationship

In order to examine the influence of the process of financialization on the level of deindustrialization, the explanatory variable (financialization) is measured by the

percentage of value added of finance in total value added (VA_FIN_PRC), and by the percentage of employment in finance in total employment (EMP_FIN_PRC). The dependent variable (deindustrialization) is measured by the percentage of value added of the industry in total value added (VA_IND_PRC), and by the percentage of employment in industry in total employment (EMP_IND_PRC). Table 1 contains the correlation coefficients between these variables including all EU countries and for three groups of countries (high-income, middle-income and low-income countries) separately.

Table 1: Correlation coefficients

Variable	EMP_FIN_PRC	EMP_IND_PRC	VA_FIN_PRC	VA_IND_PRC
All EU countries				
EMP_FIN_PRC	1.000000	-0.356549	0.898882	-0.553361
EMP_IND_PRC	-0.356549	1.000000	-0.267364	0.762436
VA_FIN_PRC	0.898882	-0.267364	1.000000	-0.504940
VA_IND_PRC	-0.553361	0.762436	-0.504940	1.000000
Low-income countries				
EMP_FIN_PRC	1.000000	-0.080892	0.418601	-0.136312
EMP_IND_PRC	0.080892	1.000000	-0.110841	0.722056
VA_FIN_PRC	0.418601	-0.110841	1.000000	-0.272347
VA_IND_PRC	-0.136312	0.722056	-0.272347	1.000000
	EMP_FIN_PRC	EMP_IND_PRC	VA_FIN_PRC	VA_IND_PRC
Middle-income countries				
EMP_FIN_PRC	1.000000	-0.385984	0.527815	-0.511622
EMP_IND_PRC	-0.385984	1.000000	-0.215067	0.901102
VA_FIN_PRC	0.527815	-0.215067	1.000000	-0.453008
VA_IND_PRC	-0.511622	0.901102	-0.453008	1.000000
High-income countries				
EMP_FIN_PRC	1.000000	-0.042143	0.977371	-0.659369
EMP_IND_PRC	-0.042143	1.000000	-0.136407	0.681261
VA_FIN_PRC	0.977371	-0.136407	1.000000	-0.717032
VA_IND_PRC	-0.659369	0.681261	-0.717032	1.000000

Source: Authors' calculation

The data shows that, for all EU countries, as well as for all three groups of countries, the EMP_FIN_PRC have a negative correlation with EMP_IND_PRC and with VA_IND_PRC. This is also the case for VA_FIN_PRC. There is a positive and strong correlation between EMP_FIN_PRC and VA_FIN_PRC, as could have been

expected. These results support the assumption that the process of financialization has a negative relationship with the process of industrialization, and that is the starting point for the further regression analysis.

Employing Granger causality tests the direction of casualization has been detected. Table 2 contains the results:

Table 2: Pairwise Granger causality tests with 3 lags

Null Hypothesis:	Obs	F-statistic	Prob.
EMP_IND_PRC does not Granger Cause EMP_FIN_PRC	477	1.478	0.219
EMP_FIN_PRC does not Granger Cause EMP_IND_PRC*	477	4.99	0.002
VA_IND_PRC does not Granger Cause VA_FIN_PRC	477	0.975	0.404
VA_FIN_PRC does not Granger Cause VA_IND_PRC*	493	2.448	0.063

Note: * we can reject the hypothesis that the first variable does not Granger causes the second variable

Source: Authors' calculation

These tests show that we can reject the hypothesis that EMP_FIN_ PRC does not Granger cause EMP_IND_PRC, and hypothesis that VA_FIN_PRC does not Granger cause VA_IND_PRC. This indicates that there could be influential relationship between financialization and industrialization, and that the direction of influence goes from financialization to industrialization, and not vice versa.

In order to estimate the regression models that can describe in what way the changes of the level of financialization can be reflected on the level of industrialisation, the following two models for all EU countries and for three country groups are estimated:

$$EMP\_IND\_PRC_{i,t} = \alpha + \underset{-}{\beta_1} EMP\_FIN\_PRC_{i,t} + \underset{-}{\beta_2} PC\_GDP_{i,t} + \underset{+/-}{\beta_3} D\_REC_{i,t} + v_{i,t} \quad (6)$$

$$VA\_IND\_PRC_{i,t} = \alpha + \underset{-}{\beta_1} VA\_FIN\_PRC_{i,t} + \underset{-}{\beta_2} PC\_GDP_{i,t} + \underset{+/-}{\beta_3} D\_REC_{i,t} + v_{i,t} \quad (7)$$

These models, apart from the dependent and independent variables, also include two control variables. One is per capita GDP (PC_GDP) to account various levels of development of the countries, and one is the dummy variable (D_REC) that takes the value of 1 if the underlying country is in a recession and 0 otherwise. Underneath of the variables are the expected sign of the variable. According to the main hypothesis of the paper EMP_FIN_PRC should have negative sign. Variable

PC_GDP should also have negative sign because of faster rising of productivity in manufacturing than in service sector (Rowthorn and Ramaswamy, 1997; Tregenna, 2011). The previous analysis of the employment and value added in industry also verify the increasement of productivity in industrial sector. In recession we can expect that overall employment decrease, but we could not say anything about the possible changes of the structure of the employment between industry sector and service sector.

Next to these two models, additional model (model 3) is estimated and can be used to predict how changes in the level of financialization measured by VA_FIN_PRC will change the level of employment in the industry sector (EMP_IND).

$$\log(EMP\_IND)_{i,t} = \alpha + \underset{-}{\beta_1 VA\_FIN\_PRC_{i,t}} + \underset{+}{\beta_2 \log(EMP\_TOT)_{i,t}} + \\ + \underset{-}{\beta_3 \log(PC\_GDP)_{i,t}} + \underset{-/+}{\beta_4 D\_REC_{i,t}} + v_{i,t} \tag{8}$$

In this model, the total employment (EMP_TOT) as an additional control variable is introduced in order to account the levels of total employment. The expected sign for this variable is positive because it could be expected that if total employment increase, the employment in industry sector will also increase.

Tables 3, 4 and 5 contains the results for three fixed-effect panel regression models that are setup for all EU countries and for three groups of countries. Estimated coefficients and their t-statistics (in parentheses) were conducted using White cross-section standard errors to allow for general contemporary correlation between the country residuals. The non-zero covariances are allowed through cross-sections (clustering by a period). Standard error estimation, t-statistic values, and probabilities reflect the robust calculation of the coefficient covariances. Tables also include the values of adjusted R^2 as well as the results of the two redundant Fixed Effect Tests with *p* values [in brackets].

Both tests (Cross-section F and Cross-section Chi-square) evaluate the joint significance of the cross-section effects using sums-of-squares and the likelihood function. If these two statistic values are higher than the critical value, the p-value will be low, and that means that we should reject the null that the cross-section effects are redundant. The control variables are dropped in cases where they are not significant.

Table 3: Fixed-effect panel regression model 1

Dependent variable: EMP_IND_PRC, Method: Panel Least Squares – fixed effects, White cross-section standard errors & covariance (d.f. corrected)				
Variable	All EU countries	Low-inc. c.	Middle-inc. c.	High-inc. c.
Observation	534	171	175	202
Constant	0.357*** (24.839)	0.333*** (34.717)	0.408*** (21.321)	0.352*** (15.626)
EMP_FIN_PRC	-1.719*** (-3.645)	-1.142* (-1.900)	-3.435*** (-7.105)	-0.885 (-1.594)
PC_GDP	-2.86E-06*** (-9.185)	-1.79E-06*** (-3.156)	-4.08E-06*** (-5.674)	-2.68E-06*** (-15.059)
D_REC	0.0097** (2.487)		0.017** (2.075)	
Adj. R^2	0.899	0.879	0.884	0.822
Cross-section F	114.427 [0.000]	151.972 [0.000]	82.619 [0.000]	86.342 [0.000]
Cross-section χ^2	1049.855 [0.000]	367.924 [0.000]	283.563 [0.000]	328.706 [0.000]

Notes: t-statistics are in parentheses; p-values are in brackets; *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level

Source: Authors' calculation

Table 3 shows that the coefficient of the explanatory variable (EMP_FIN_PRC) is highly significant with a negative sign in models that include All EU countries and middle-income countries. It is also significant at 10% level in the model for low-income countries, but it is not significant in the model for high-income countries.

Table 4: Fixed-effect panel regression model 2

Dependent variable: VA_IND_PRC, Method: Panel Least Squares – fixed effects, White cross-section standard errors & covariance (d.f. corrected)				
Variable	All EU countries	Low-inc. c.	Middle-inc. c.	High-inc. c.
Observation	541	168	175	198
Constant	0.327*** (32.949)	0.306*** (45.340)	0.331*** (19.119)	0.369*** (21.878)
VA_FIN_PRC	-0.298*** (-2.722)	-0.272* (-1.898)	-1.001*** (-6.287)	-0.445** (-2.286)
PC_GDP	-2.24E-06*** (-8.126)	-1.07E-06*** (-1.836)	-2.77E-06*** (-4.135)	-2.23E-06*** (-9.234)
D_REC	0.016** (4.899)	0.004*** (2.459)	0.021*** (3.289)	0.014*** (2.909)
Adj. R^2	0.899	0.870	0.884	0.884
Cross-section F	119.543 [0.000]	118.998 [0.000]	82.619 [0.000]	61.833 [0.000]
Cross-section χ^2	1077.566 [0.000]	329.354 [0.000]	283.563 [0.000]	274.887 [0.000]

Notes: t-statistics are in parentheses; p-values are in brackets; *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level

Source: Authors' calculation

The regression analysis of another combination of indicators of deindustrialization and financialization are presented in Table 4. In this model, VA_IND_PRC is the dependent variable, and the explanatory variable is VA_FIN_PRC. The coefficient of the explanatory variable is significant and with a negative sign for all four groups of countries.

Table 5: Fixed-effect panel regression model 3

Dependent variable: log(EMP_IND), Method: Panel Least Squares – fixed effects, White cross-section standard errors & covariance (d.f. corrected)				
Variable	All EU countries	Low-inc. c.	Middle-inc. c.	High-inc. c.
Observation	534	171	175	202
Constant	1.657 (1.529)	-4.152*** (-6.404)	-0.715 (-0.640)	1.625** (2.051)
VA_FIN_PRC	-1.249*** (-2.633)	-1.745*** (-4.193)	-2.294*** (-2.968)	-2.211*** (-2.667)
Log(EMP_TOT)	0.737*** (5.999)	1.372*** (17.024)	1.145*** (6.600)	1.249*** (10.081)
Log(PC_GDP)	-0.089*** (-4.377)		-0.185*** (-3.875)	-0.488*** (-12.229)
D_REC	0.058*** (2.707)		0.096*** (2.618)	
Adj. R^2	0.996	0.997	0.997	0.997
Cross-section F Cross-section χ^2	72.684 [0.000] 849.664 [0.000]	102.050 [0.000] 309.287 [0.000]	68.103 [0.000] 257.807 [0.000]	97.151 [0.000] 348.942 [0.000]

Notes: t-statistics are in parentheses; p-values are in brackets; *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level

Source: Authors' calculation

Table 5 shows the fixed-effects regression results where the dependent variable is the log of employment in finance, the explanatory variable is VA_FIN_PRC, and the control variables are log(EMP_TOT), log(PC_GDP) and D_REC. In cases where these control variables are not significant, they are left out.

5. Results and discussion

This paper attempts to investigate and to assess the impact of financialization on the ongoing process of deindustrialization in EU countries, covering the 1995 – 2015 period. Both indicators (value added of finance/industry sector as a percentage of total value added, and employment in finance/industry sector as a percentage of total employment) reveal that the financialization and deindustrialization processes

have been developing in almost all EU countries. However, the detailed analysis by three groups of countries (low-income, middle-income and high-income countries) discloses certain differences between groups and countries.

Correlation analysis shows that, for all EU countries, as well as for all three groups of countries, the EMP_FIN_PRC have a negative correlation with EMP_IND_PRC and VA_IND_PRC. This is also the case for VA_FIN_PRC. There is a positive and strong correlation between EMP_FIN_PRC and VA_FIN_PRC. This results support the assumption that the process of financialization has a negative effect on the process of deindustrialization.

In order to test the direction of casualization Granger causality test has been employed. Tests show that we can reject the hypothesis that EMP_FIN_PRC does not Granger cause EMP_IND_PRC, and hypothesis that VA_FIN_PRC does not Granger cause VA_IND_PRC. Based on these tests results, the three regression models have been established. The first two models describe on what way the changes of the level of financialization will be reflected on the level of industrialization.

These results indicate that, if the level of financialization increases, measured by EMP_FIN_PRC for 1, the level of industrialization, measured by EMP_IND_PRC in EU decreases for 1.719. In low-income countries it will decrease for 1.142, in middle-income countries it will decrease for 3.435, and in high-income countries it will decrease only for 0.885.. This means that the process of financialization leaves its mark on the deindustrialization mostly in middle-income countries. Furthermore, if the level of financialization increases, measured by VA_FIN_PRC for 1, the level of industrialization, measured by VA_IND_PRC in EU will decrease for 0.298. In low-income countries it will decrease for 0.272, in middle-income countries it will decrease for 1.001, and in high-income countries it will decrease for 0.445. The results of model 2 are in line with the results of model 1 presented in Table 3.

Model 3 shows how the level of employment in the industrial sector in EU will change if the level of financialization measured by VA_FIN_PRC changes. The empirical evidence indicates that, if VA_FIN_PRC increases for 1, the level of employment in the industrial sector in EU will decrease for 1.249%. In the low-income countries group it will decrease for 1.745%, in middle-income countries it will decrease for 2.294%, and in high-income countries it will decrease for 2.211%.

Previous research was focused on impact of financialization on income distribution (Yeldan, 2000), firm structure (Epstein, 2001), accumulation (Sthockhammer, 2004), income disproportion and wage stagnation (Palley, 2007), and risk (Freedman, 2010). This research contributes to the findings of mentioned papers by examining the consequences that financialization has on industrial sector.

Economic significance of these results is in the indication of the possible relationship between process of industrialization and process of financialization and all consequences that may come out from this relationship. When the policy makers make their decisions about incentives in order to boost the financialization process, they should consider what kind of impact that could have on industrial part of the economy.

6. Conclusion

This paper attempts to assess the impact of financialization on the process of deindustrialization in EU countries, covering the period from 1995 to 2015. The working hypothesis of the research is that the financialization process encourages the process of deindustrialization. In order to prove or discard mentioned hypothesis, the presence of the financialization and deindustrialization in EU28 countries was investigated, applying two indicators for each: value added of finance/industry sector as a percentage of total value added, and employment in finance/industry sector as a percentage of total employment. All indicators reveal that both processes have been developing in almost all EU countries, but deeper analysis of the three groups of countries (low-income, middle-income and high-income countries) discloses certain differences between groups and countries. For example, the process of deindustrialization is much more clearly visible in employment in the industrial sector then in industry value added, especially in middle-income and high-income countries. Furthermore, correlation analysis, Granger causality test and three fixed-effect panel regression models show that process of financialization surely takes place within EU, and that it leaves its adverse consequences on the process of deindustrialization, which proves the working hypothesis. This paper also tries to supplement previous researches of impact of financialization by examining what kind of consequences it will bring to the process of deindustrialization in low, middle and high income EU countries separately. The most of results show that the negative relationship is the strongest in middle and high income countries, but it is also present in low income countries. The obtained results support recommendations to policy makers to be aware of all consequences of their policies that foster the process of financialization. Limitation of this research is in restricted number of variables that were used as a proxy for a process of financialization. Further research of this topic could be directed to assess the role of financial conditions measured with different variables (for example real interest rate, domestic credit outstanding provided to industrial sector, real effective exchange rate or similar), that are important for the changes in processes of industrialization and deindustrialization.

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Financijalizacija i njen utjecaj na proces deindustrijalizacije u zemljama Europske unije

Tonći Svilokos[1], *Ivan Burin*[2]

Sažetak

Cilj ovog istraživanja je ispitati da li i u kojoj mjeri proces financijalizacije utječe na proces deindustrijalizacije u Europskoj uniji upotrebom fiksnih učinaka panel regresijskog modela. U ovom je radu nezavisna varijabla koja ukazuje na razinu financijalizacije predstavljena dodanom vrijednošću sektora financija u ukupnoj dodanoj vrijednosti te udjelom zaposlenosti u sektoru financija u odnosu na ukupnu zaposlenost. U procesu deindustrijalizacije industrijska se djelatnost obično zamjenjuje uslužnim djelatnostima. Međutim, u situacijama kada uslužni sektor ne može apsorbirati dodatnu opskrbu radom i proizvesti dodatnu vrijednost koja bi nadoknadila smanjenje industrijskog sektora, može doći do povećane nezaposlenosti i nižeg gospodarskog rasta. U ovom radu deindustrijalizacija se mjeri udjelom dodane vrijednosti sektora industrije u ukupnoj dodanoj vrijednosti i udjelom zaposlenosti u industriji u odnosu na ukupnu zaposlenost. Korištenjem najnovijih podataka panela EUROSTAT-a i ILO-a za razdoblje od 1995. do 2015. autor otkriva značajne negativne učinke procesa financijalizacije na deindustrijalizaciju, kao i na zapošljavanje u sektoru industrije. To podupire zaključak da se proces deindustrijalizacije zemalja EU može jednim dijelom okarakterizirati kao financijalizacijski-vođen proces.

Ključne riječi: *deindustrijalizacija, financijalizacija, dodana vrijednost, nezaposlenost, panel regresijski model fiksnih učinaka*

JEL klasifikacija: *G01, O14*

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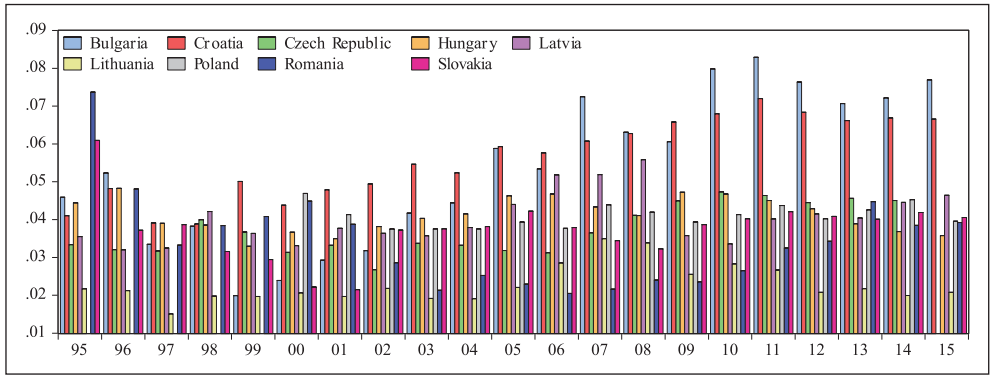
Appendices

Table A1: Variable description

Variable	Description
VA_FIN_PRC	Percentage of value added of finance in total value added
EMP_FIN_PRC	Percentage of employment in finance in total employment
VA_IND_PRC	Percentage of value added of the industry in total value added
EMP_IND_PRC	Percentage of employment in industry in total employment
PC_GDP	Gross domestic product per capita
D_REC	Dummy variable that takes value of 1 if country is in recession and 0 otherwise
EMP_IND	Level of employment in the industry sector
EMP_TOT	Total employment

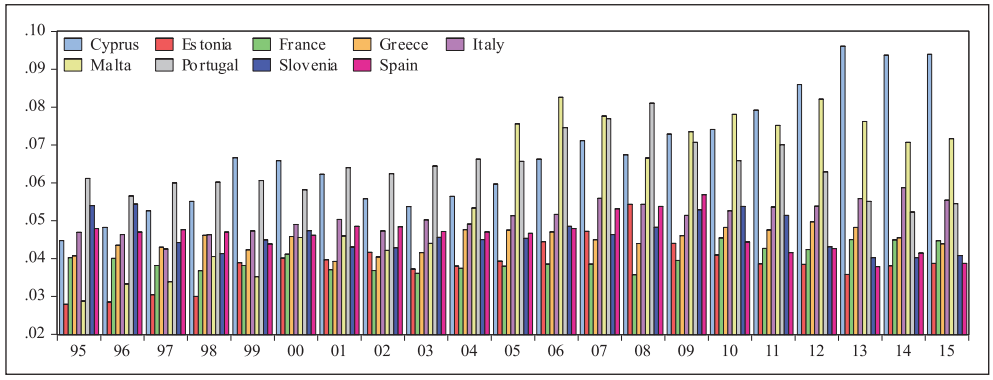
Source: Authors

Figure A1: Low income countries value added in finance sector as a percentage of total value added



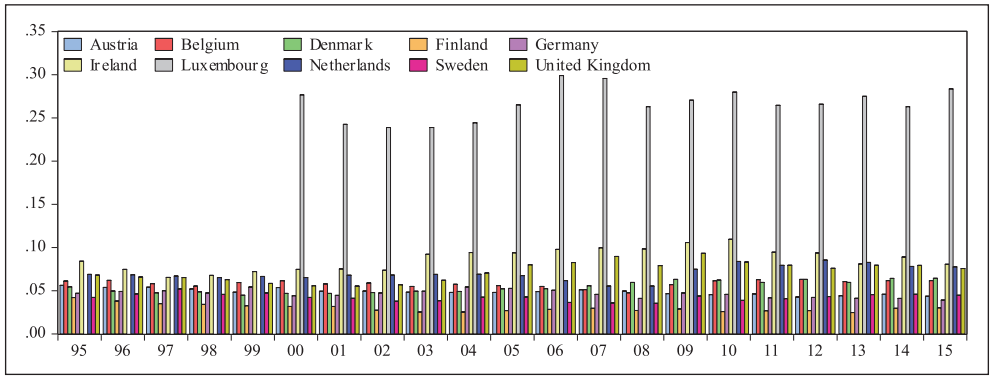
Source: Authors' calculation based on data from EUROSTAT

Figure A2: Middle income countries value added in finance sector as a percentage of total value added



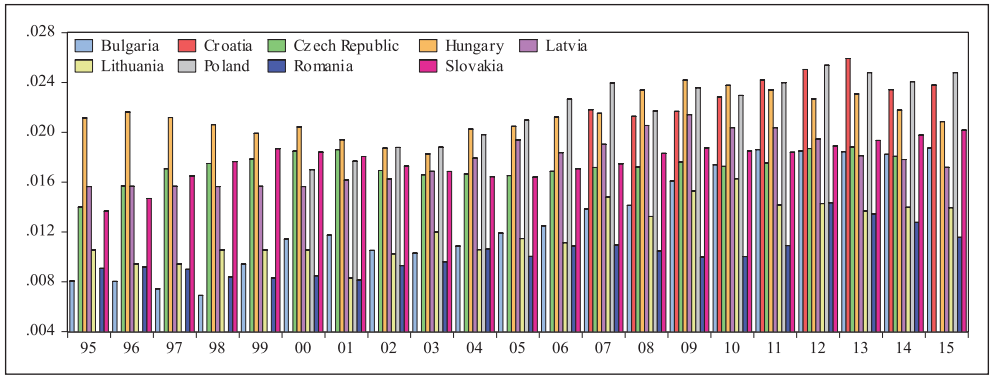
Source: Authors' calculation based on data from EUROSTAT

Figure A3: High income countries value added in finance sector as a percentage of total value added



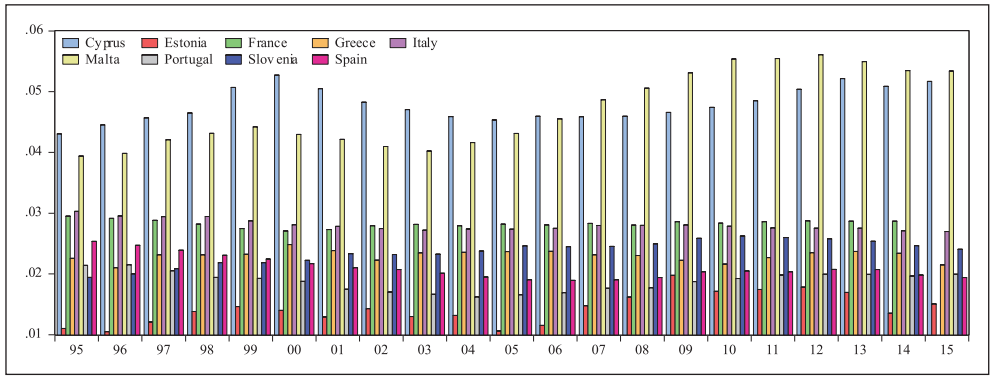
Source: Authors' calculation based on data from EUROSTAT

Figure A4: Low income countries employment in finance sector as a percentage of total employment



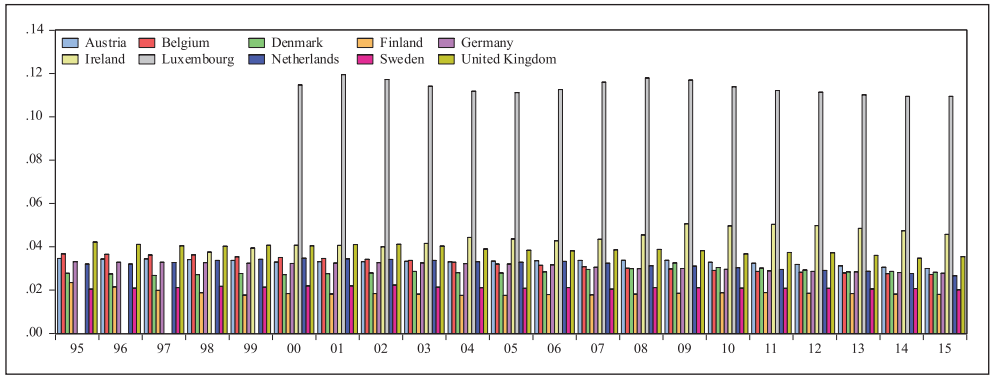
Source: Authors' calculation based on data from ILO and EUROSTAT

Figure A5: Middle income countries employment in finance sector as a percentage of total employment



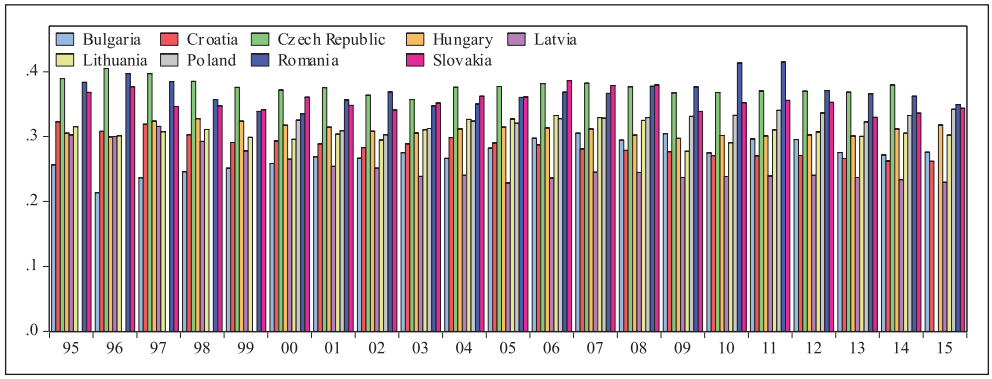
Source: Authors' calculation based on data from ILO and EUROSTAT

Figure A6: High income countries employment in finance sector as a percentage of total employment



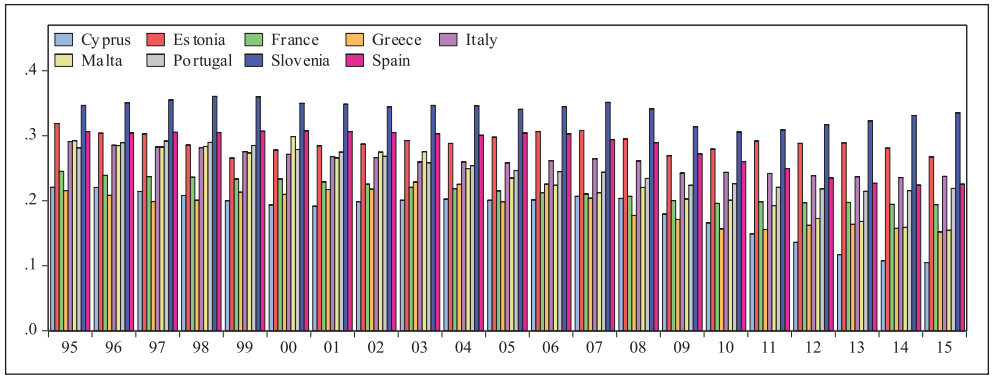
Source: Authors' calculation based on data from ILO and EUROSTAT

Figure A7: Low income countries value added in industry as a percentage of total value added



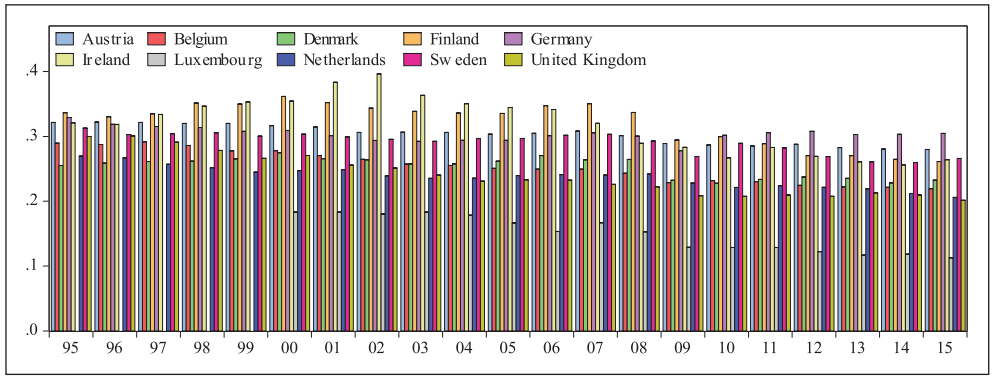
Source: Authors' calculation based on data from ILO and EUROSTAT

Figure A8: Middle income countries value added in industry as a percentage of total value added



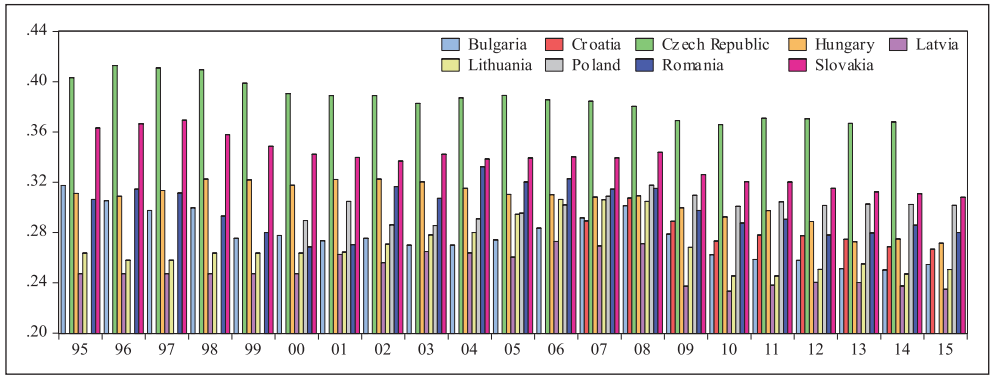
Source: Authors' calculation based on data from ILO and EUROSTAT

Figure A9: High income countries value added in industry as a percentage of total value added



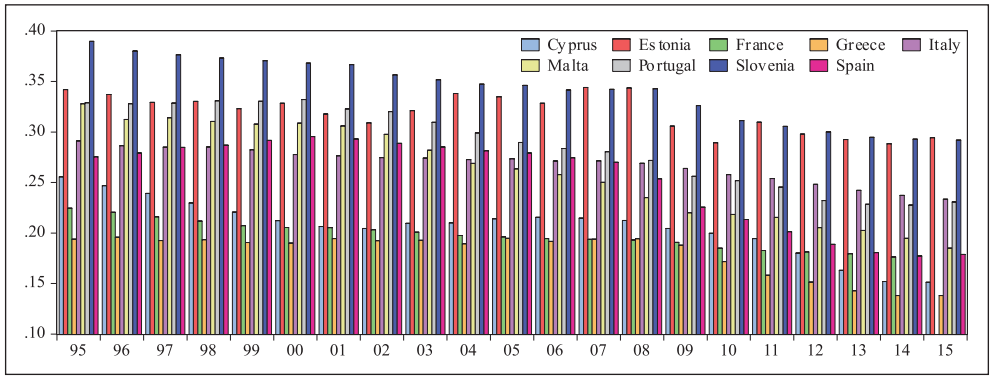
Source: Authors' calculation based on data from ILO and EUROSTAT

Figure A10: Low income countries employment in industry as a percentage of total employment



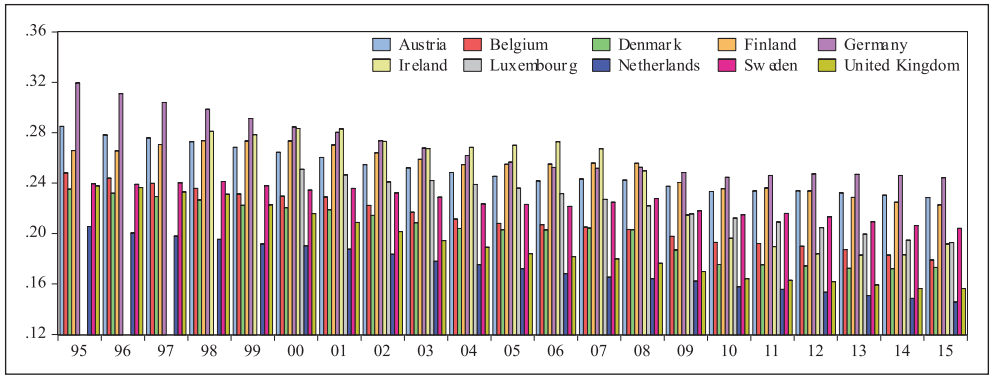
Source: Authors' calculation based on data from ILO and EUROSTAT

Figure A11: Middle income countries employment in industry as a percentage of total employment



Source: Authors' calculation based on data from ILO and EUROSTAT

Figure A12: High income countries employment in industry as a percentage of total employment



Source: Authors' calculation based on data from ILO and EUROSTAT