GFC and regime shift in Central and Eastern Europe? Structural approach to labour markets of dependent market economies*

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Abstract

The paper aims at explaining the dynamics in Central and Eastern European (CEE) labour markets, as perceived by the joint evolution of wage share of income and employment rates. The key question we address is whether the squeeze of wage share and more variable employment rates in CEE after the Global Financial Crisis have been a cyclical phenomenon or a result of a regime shift. In order to distinguish between the cyclical and structural determinants of labour market outcomes, we develop a macroeconomic model in the Goodwin tradition with endogenous technical change and adjusted to the context of open economies. Adoption of its predictions to the real-world data demonstrates that the improved internationally competitive position of most CEE economies has counterbalanced the institutional change towards more labour market flexibility. In turn, the long-run equilibrium of CEE labour markets has not changed significantly.

Keywords: Labour markets, export-led growth, Goodwin cycles, Central and Eastern Europe

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1 Introduction

A substantial body of research marks a pivotal role played by the Global Financial Crisis (GFC) in igniting a series of significant, and sustained changes in the way economies operate and suggesting the GFC caused a major structural shift in macroeconomic regime (Klein and Liennemann, 2019). Phenomena such as the 'global trade slowdown' (Hoekman, 2015), 'productivity slowdown' (Riley et al., 2013) and especially 'secular stagnation' (Rawdanowicz et al., 2014), even if not entirely novel, have been used to describe but some of the primary reflections of this shift.

In Europe, GFC and the following austerity policies brought significant changes to the organization of labour markets, with a general tendency towards more flexibility, and market-based industrial relations. It coincided with weakening unions, the lower extent of industrial coordination of wages, and more pronounced temporary employment (Brancaccio et al., 2018). Thus, an increasingly prominent venue of research involves the long-run consequences of the labour market institutional change (Lastauskas and Stakenas, 2018), arguably also with a relevance for the possible paths for economic systems under the strains of post-COVID-19 crisis.

Emerging economies, and among them the countries of Central and Eastern Europe (CEE), have increasingly become a point of focus of labour market research (Bohle and Greskovits, 2012; Lissowska, 2017). This became especially pressing after the GFC, once acknowledging the relative success of CEE labour markets compared to the Western and Southern Europe in terms of wage dynamics and unemployment rates (Greskovits, 2015; Myant and Drahokoupil, 2012). It arguably has something to do with the effect of enormous FDI inflows over last decades, strongly integrating CEE countries into regional (especially German-led) value chains (Ambroziak, 2018), as well as improving labour productivity, which enhances competitive position of those economies.

A diagram of the nexus between employment rate and wage share of income (in relative terms, compared to EU-15) in 9 CEE economies (fig. 1) demonstrates two distinct distributive cycles, in 1995-2008 and 2009-2019. In the latter period, the CEE region was able not only to achieve very high employment rates but also to reduce significantly its initial gap to EU-15 in terms of wage share of income. Observing an improving position of workers in CEE countries is, on the first sight, difficult to reconcile with general knowledge on their institutional developments. Already in the 1990s, the transition paths towards a market economy included a strong drive of labour markets' deregulation. Despite an essen-

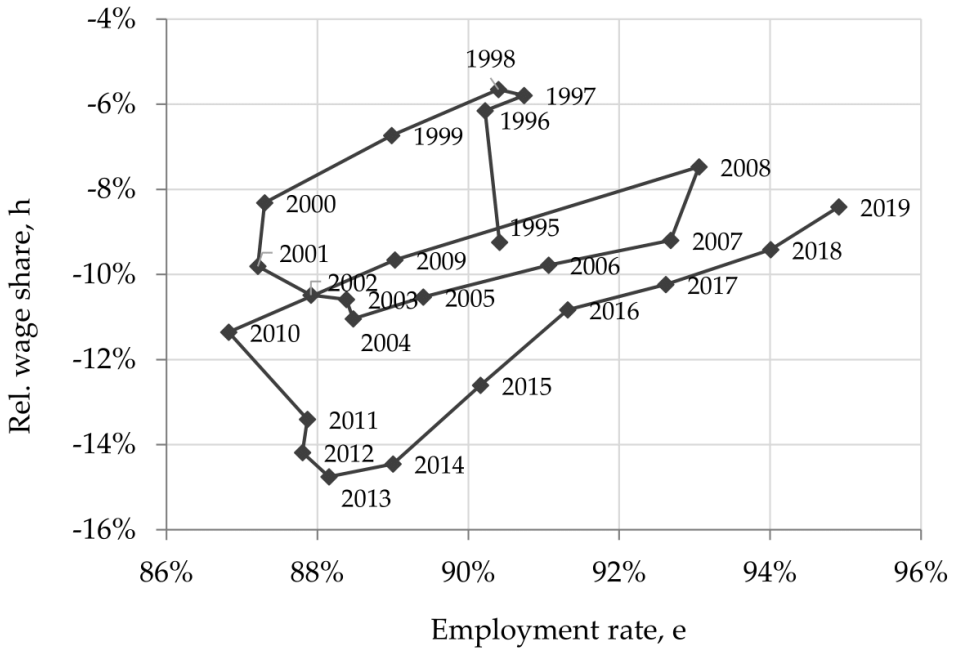

Figure 1: Employment rate - relative wage share, average for 9 CEE countries, 1995-2019 Source: own computations, based on AMECO database. Note: relative share informs about the perc. distance with respect to the EU-15 average.

tial institutional differentiation throughout the region, in most CEE countries industrial relations were subject to liberalization with a focus on attracting foreign capital (following VoC literature, we may label them as Dependent Market Economies, DMEs). After GFC, these countries become also subject to austerity and further flexibility, converging towards market-based relations (Tamesberger, 2017). It raises an important question, whether this positive development is sustainable, or is just an effect of short-run macroeconomic fluctuations. In other words we may wonder whether a structure of the relationships in DMEs changed in such a way to neutralize the improved flexibility of labour markets in the long-run. Nonetheless, the idea of an economic regime shift in these countries is rarely tested in the context of GFC.

This paper aims at partially filling this research gap, by utilizing Post-Keynesian theoretical framework. It can shed new light on many difficult to explain phenomena such as relative resilience of labour markets in the wake of crises (COVID-19 being a case in point), or persisting wage growth, by allowing for linking short-run and long-run processes. In our unified perspective, the political economy of labour markets in DMEs depends not only on institutional frameworks of industrial relations but also on the structural economic factors, in particular the export competitiveness and technical change. In that way, we contribute to the literature on Dependent Market Economies, providing a focus on labour and its peculiar position in the international macroeconomic regime.

This is done by way of constructing a simple, tractable theoretical model that illustrates these effects. An important novelty of our approach is the extension of the traditional Goodwin model by the requirements of international competition. Here, the rate of economic activity depends on foreign demand, but also the relative wage share of income and labour productivity. In turn, wage demands of workers may harm the competitive position of the export sector. We argue that the combination of the classical political economy approach with the post-Keynesian theory of open economies provides a useful framework, adequate for the export-oriented CEE countries.

We test the model econometrically in order to trace the evolution of labour market regimes in CEE countries. It is to our knowledge an original attempt to verify the predictions of Goodwin theory of distributive cycles in the context of this region. Using a dataset on basic macroeconomic variables in 9 CEE countries, we try to assess, whether we witnessed a structural shift in the labour market regime, and what could be consequences of that shift. We demonstrate that in the CEE context, the structure of economies changed visibly. Labour markets in these countries became less flexible in terms of employment changes,

and more so in terms of wages, which changed the way global demand affects the situation of workers. Our findings suggest that relatively high, upward pressure on wages in CEE countries witnessed in the years after the GFC should not translate into a visible decrease in employment, due to increased bargaining power of workers facilitated by high and robust global demand for their labour.

2 Determinants of labour markets development in CEE

2.1 Institutions

In the Varieties of Capitalism tradition CEE countries are considered an almost archetypical example of so-called 'Dependent Market Economies' (Nolke and Vliegenthart, 2009). Even if some differences between them are perceived (see (Bohle, 2018)), they are generally thought to be engaged in an intense competitive struggle for external capital, which takes a form of i.a. relaxing institutional constraints on labour markets, putting pressure on workers (Cazes and Nesporova, 2004). The overall flexibility of labour markets, together with a common 'exit strategy' of workers due to emigrations opportunities, made CEE economies seemingly more resistant to GFC aftermath compared to core, and predominantly southern European countries. This relative success may have contributed to changes in labour market policies across Europe after 2008, with a strong drive towards liberalization.

Institutional changes which raised labour market flexibility (Brancaccio et al., 2018) weakened the hand of labour against capital across Europe. Institutional changes of this type seem to generate between country spillovers, especially in closely integrated economies (such as EU), and in effect induce institutional competition, which resembles a race to the bottom (Lastauskas and Stakenas, 2018). Studies suggest that at least some of the reforms increasing flexibility traded off bargaining power for employability (e.g. for Italy see Raitano and Fana (2019)). The push towards more flexibility is visible among various countries trying to cope with reduced demand after the GFC, which generated pressure on their labour markets (Bertola, 2017), not to mention the need for fiscal consolidation, especially in countries most strongly affected by the crisis. It may, however, constitute a globally counterproductive move if weak labour leads to lower consumption or a further rise in the debt levels (for detailed argumentation see Stockhammer (2013)).

As Lissowska (2017) has noted collective bargaining institutions before the GFC were much weaker in the CEE countries than in Western Europe. After the crisis, the institutional

strength of labour within industrial relations seems to have weakened in countries with the previously stronger role of unions, such as Slovenia, while it did not change significantly in countries with more liberal regimes, such as Estonia (Feldmann, 2017). The same trend is visible across the region with regards to other labour market institutions, with either visible rise or sustained high share of temporary workers or weakening of employment protection regulation (Eichhorst et al., 2017).

These developments offer some explanation as to why after a sharp decline, employment rate strongly rebounded in CEE countries, which in aggregate can be labelled 'export-oriented' (Hagemejer and Mućk, 2019), after the GFC (see figure 1). The increased labour market flexibility makes it possible to account for both a dynamic rise in employment rates across the region thanks to rebounding world demand, as well as a general increase in wages in response to this when one acknowledges a smaller role for 'implicit contracts' in an environment of high labour market dualization and low impediments to firing workers (Manning, 1989). It would make workers better off in booms with a downside during recessions and would confirm simultaneous developments in western countries as well (Bulligan and Viviano, 2017).

However, it seems that another institutional development strengthens the bargaining power of workers irrespective of the employment rate and helps explain a significant improvement in the wage share. In the virtual absence of strong unions across CEE, this role has been taken by minimum wage policies (Kohl and Platzer, 2007), which were especially active and much better aligned with employment rate after the GFC in countries under consideration (according to the Eurostat data, the ratio of minimum to average wage increased in CEE from 34% in 2008 to nearly 42% in 2019). In this instance, the relationship between minimum wage and overall level of wages is assumed positive, but numerous studies confirm the minimum wage spillover effect (for a survey of literature on this see, e.g. Bodnár et al. (2018)).

2.2 Macroeconomic and international environment

Notwithstanding the importance of institutions in determining the labour market outcomes, the recent research in political economy has increasingly recognized its insufficiency to account for critical stylized facts, such as the persistence of unemployment and decline in the wage share of income in many industrial economies. The recently proposed explanations acknowledge the role of macroeconomic factors, such as the components of effective demand,

in driving international diversity as well as the regime shifts in labour markets (Baccaro and Pontusson, 2016; Heimberger, 2019). As Ferreiro and Gomez (2020) note, institutional changes, such as the evolution of employment protection legislation, are to slow to account for high labour market dynamics observed in reality, even if they mediate the effects of short-run macroeconomic developments and underpin some longer-term trends (Dimova, 2019).

A broad post-Keynesian perspective offers a partial way of introducing the most important economic and institutional characteristics into the labour market dynamics. It centres on the fundamental role of aggregate demand in shaping the most important macroeconomic variables, such as employment, wages or labour productivity. This approach most often implicitly assumes, that economic institutions are to a large extent reformed as a response to external pressures. In particular, in the case of export-led dependent economies with low technological unsophistication, the competition for export markets and foreign capital puts pressure on the labour markets institutions and may induce processes of deregulation. However, it may be argued that an ongoing industrial upgrading of dependent market economies helps them regain some freedom of shaping income distribution in favour of local capital or domestic workers. This may be the case if the opportunity cost of moving capital or sourcing intermediate goods rises for foreign companies. Obviously institutional path-dependence plays an important role in determining the instruments that societies have at their disposal. It is not straightforward to increase unionization rate, not to mention the revival of proper social dialogue. In this situation, the issue of shaping distribution, which in the post-Keynesian tradition is often associated with wage-share of income, is left to government policy. Nevertheless, what is first needed is the institutional 'wiggle-room' offered in specific macroeconomic circumstances. Wage share in turn (bidirectionally, as demonstrated in the next subsection) influences employment.

A significant cause of specificity of CEE economies is an oversized role of FDI in their development since at least the late 1990s, which has shaped them into what we perceive today as export-led dependent economies (Stockhammer and Onaran, 2009). The high stocks of FDI accumulated in these countries established them in time as an essential link in regional and global value chains. This simultaneously raised their bargaining power against foreign investors, due to above-mentioned opportunity cost of moving capital and made them more dependent on external demand[1].

[1]For clarity we do not enumerate other consequences, such as a creation of "dual economy", with competitive export sector and unsophisticated domestic firms (Myant and Drahokoupil, 2012).

It is also important to stress that in DMEs' export-led regime wages perform mostly the role of cost-factors and not domestic demand force. Because of this characteristic, as already noted, the 'race to the bottom' for FDIs is particularly intense in the region, leading to erosion in broad labour standards within a broader paradigm of so-called competition states (Bohle, 2009).

2.3 Unified approach to labour market dynamics

Both institutions and economic fundamentals, though different, often have a simultaneous impact on agents and the observable labour market outcomes. In turn, distinguishing between the two sources of dynamics is a highly ambiguous exercise in practice. One of the ways to solve this problem is formal modelling, combined with empirical quantitative analysis.

In our approach, we build upon the insights of post-Keynesian economics, which perceives labour markets through a macroeconomic lens. It means that the evolution of both wages and employment is determined primarily by the general activity rate and effective demand, which frames the microeconomic optimizations and adjustments of agents. Short-run horizon is not irrelevant, since it preconditions the long-run changes of institutions and technologies. In particular, income distribution between wages and profits may have an impact on the aggregate demand and employment rate, either positive (in wage-led economies) or negative (in profit- and export-led ones) (Baccaro and Pontusson, 2016; Bhaduri and Marglin, 1990). However, in line with the Goodwinian tradition of labour markets' theorizing, the relation between economic activity and wage growth is bidirectional, since the prevalent employment (and unemployment) rate is one of the critical determinants of wage bargains' outcomes (Goodwin, 1982).

In the context of DMEs, it is relevant to supplement the analysis with the view of technical change processes. Since the 1990's most of the countries of Central and Eastern Europe have been subject to a profound industrial transformation, leading first to stagnation but later to a remarkable upgrading and catching-up in terms of economy-wide labour productivities (Grodzicki and Geodecki, 2016). The process resided mostly in a substantial inflow of FDI; nonetheless, it had internal drivers as well. Labour productivity introduces to our approach more complexity, due to its ambiguous effect on employment, as demonstrated in the recent Goodwin-type models with endogenous technical change. In a typical approach, labour productivity growth is a function of both activity rates and income distribution.

The impact of the former variable resides in Kaldor-Verdoorn effect of increasing static and dynamic returns to scale at high capacity utilization, while the latter one can be perceived as a labour-saving technical change (LSTC), oriented at restoring the profit share of income (so-called Marx effect) (Barbosa-Filho and Taylor, 2006; Rezai, 2012). Other views link technical change to R&D activity (Tavani and Zamparelli, 2015) and capital formation (Dávila-Fernández and Sordi, 2019).
In open economies, we assume in particular that following relations hold:[2]

1. Employment rate (e) changes as a result of countervailing processes of GDP (Y) and labour productivity (q) growth. Output expansion translates into higher employment, while productivity growth is labour saving, at least in a short-run.

2. Output in short-run is determined by both foreign and domestic demand. The former, to which we give the primary role, is based on growing exports (X) in an established Harrod-multiplier fashion (McCombie and Thirlwall, 1994). The latter (D) depends on the willingness of both domestic private and public sectors to spend, which we assume to evolve counter-cyclically, in a negative relation to the prevailing employment rate (eq. 3 and 4). In other words, we assume that the domestic sectors of DMEs are profit-led.

3. Growing revenues from exports are expectantly the dominant force in the macroeconomy of DMEs, which makes them export-led economies. Its rate is a function of world market expansion and international competitive position (Thirlwall, 1979). The latter is based, in an evolutionary fashion, on both cost and technology absolute advantage, as measured by the levels of relative wage share ($\tilde{h}$) and relative labour productivity ($\tilde{q}$) respectively (eq. 5).

4. The growth rate of real wages (w) is determined in bargains between workers and capitalists, in which the bargaining power of the two classes depends on both institutional factors, as well as the current macroeconomic situation. In particular, in our view for the DMEs the two major variables in the short-run are current employment rate, and current wage share of income, as compared to the international competitors (eq. 6). The minimum-wage policy can supplement these processes with an addi-

[2]In the Appendix, we present a formal model that demonstrates all the relations and conclusions mathematically.

tional boost for wages, while the flexible institutional environment makes wages more elastic with respect to the employment rates.

5. Finally, the technical change leading to a growth in labour productivity has an ambiguous effect on labour markets. It helps achieve export success but also has an adverse influence on both employment (its labour-saving aspect) and wage share of income (since it augments profits in the first stance). Its dynamics is a complex process, depending on i. a. exogenous sources, including the R&D spending and FDI-related technology spillovers (f), catching-up effects, economies of scale, and labour-push mechanisms (see Shaikh, 2016, chap. 14) (eq. 7).

The above five relations can be summarized into three inter-related processes: industrial relations (bargaining over wages), international competition (that translates into the activity rate) and technical change (with its impact on distribution and employment) (see eq. 8). Table 1 summarizes these key short-run interdependencies, together with the expected directions of influence. Notably, the three endogenous variables feedback to each other in

Table 1: Labour productivity-employment rate-wage share nexus, theoretical predictions

Relation	Sign	Interpretation
$\tilde{q} \to \hat{q}$	$(-)$	Catching-up effects
$e \to \hat{q}$	$(+)$	Increasing returns to scale (Kaldor-Verdoorn effect)
$\tilde{h} \to \hat{q}$	$(+)$	Labour-push towards technical change ('Marx' effect)
$\tilde{q} \to \hat{e}$	$(+)$	Competitive advantage from high labour productivity, lower rate of LSTC
$e \to \hat{e}$	$(-)$	Counter-cyclical domestic sector, faster LSTC at high employment rates
$\tilde{h} \to \hat{e}$	$(-)$	Competition for market shares and capital
$\tilde{q} \to \hat{h}$	$(+)$	Slower labour productivity growth at high levels of labour productivity
$e \to \hat{h}$	$(+)$	Stronger bargaining power of workers at high employment rates
$\tilde{h} \to \hat{h}$	$(-)$	Race to the bottom in terms of wage share

Source: own elaboration. Note: q - labour productivity; e - employment rate; h - wage share of income. $\tilde{x}$ stands for a relative level of x, and $\hat{x}$ for a growth rate.

complex, both positive and negative, ways, which means that the resulting dynamics of an economy is *a priori* ambiguous. However, we are able, first, to identify its major properties employing algebra and, second, to fit it econometrically and numerically to real-world economies.

First, let us observe that changes in labour productivity, employment rates and wage share

can reinforce each other dynamically in a way that leads to dampening, stable-cyclical or exploding paths. The actual stability of the system depends on specific parameters, which should be subject to empirical scrutiny. One of the possibilities is the well-established Goodwin's distributive cycles, in which wage growth follows high employment, yet at the same time soaring wages undermine business confidence and lead to an economic slowdown (Goodwin, 1982).

Second, there is an intrinsic relation between short-run system dynamics and average long-run economic performance. It resides in a fact that in time the three variables tend do oscillate around a certain critical point, which (depending on the stability conditions) may be either a long-run equilibrium, a centre of oscillations or a spiral source. Thus, empirical observation of short-run dynamics of national economies can lead us towards theoretical predictions regarding the long-run distribution, employment and labour productivity. In other words, the secular tendencies in political economies can be attributed, based on our model, to specific observable shifts in short-run adjustments in labour markets.

Third, besides the inter-related dynamics of the three endogenous variables, there is a set of exogenous processes relevant to the equilibrium. Let us mention the FDI stock, changes in world demand and nominal exchange rates, diverse sources of bargaining power of workers, as well the exogenous technical change. Arguably, some of them may be endogenous in the middle- to long-run. In particular, the bargaining power is strongly affected by the expectations of major actors and the following institutional arrangements, and as such, could be subject to further research.

Focusing our considerations on two labour-market variables (and thus putting the labour productivity adjustment into the background), we obtain two fundamental mechanisms that determine long-run outcomes. As depicted in figure 2, they both refer to the relation between the employment rate and wage share; however, they capture its various properties, which could be understood as follows:

1. **Wage bargains line** in which a particular long-run level of employment rate allows the workers to achieve particular wage share of income. Its constant, which is interpreted in terms of a wage share achievable at full employment, depends mostly on labour market institutions and broad power relations in an economy. The positive slope reflects the wage share benefits for workers stemming from a higher employment rate and informs about the predominant type of demand-adjustments in an export-led economy (quantitative or wage ones). It depends on, first, the bargain-

ing power effects (due to strictness of labour market institutions) and, second, the intensity of international competition based on low labour costs (this coincides with macroeconomic relation). We can expect that in DMEs, the wage share responds to employment stronger than in the core countries, consistently with inflation differences.

2. **Macroeconomy line** in which particular long-run level of wage share allows the economy to maintain a specific employment rate, as mediated by its international competitive position. The relation thus is most probably a negative one, whereby a higher wage share diminishes national revenues from foreign markets. However, certain factors can mitigate this effect, which would be reflected in a steep slope of the line. They include the labour-productivity-based competitive position (rather than one based on wage share), and the low macroeconomic reliance on foreign demand, due to high propensity to import or relative size of domestic demand. An upward shift of the line means that the external constraint of the economy relaxes and that current employment rate is compatible with a higher wage share. It may be a consequence of robust global demand, exogenous technical change and non-cost type of competitiveness (low γ_3, high γ_1).

In the exemplary economy in fig. 2, the cross point of both initial, solid lines informs about the long-run equilibrium, around which short-run cycles occur. Now, a slowdown in the global economy (low rates of world demand growth) is reflected in a downward shift of the macroeconomy line, which tightens the external constraint and diminishes both long-run coordinates (shift from E0 to E1). The actual distribution of the slowdown costs between employment and wages depends on the labour market bargains, as reflected in the slope of wage bargains line (It can be utilized to distinguish between the quantity- and wage-adjustments).
Conversely, institutional changes introducing more wage flexibility may be presented as a shift in wage bargains line (steeper slope). It results in a trade-off between the higher wage share for lower employment rate (from E1 to E2). Again, the slope of the second curve is essential to observe to what extent economic activity and employment is fragile to changes of wage share.

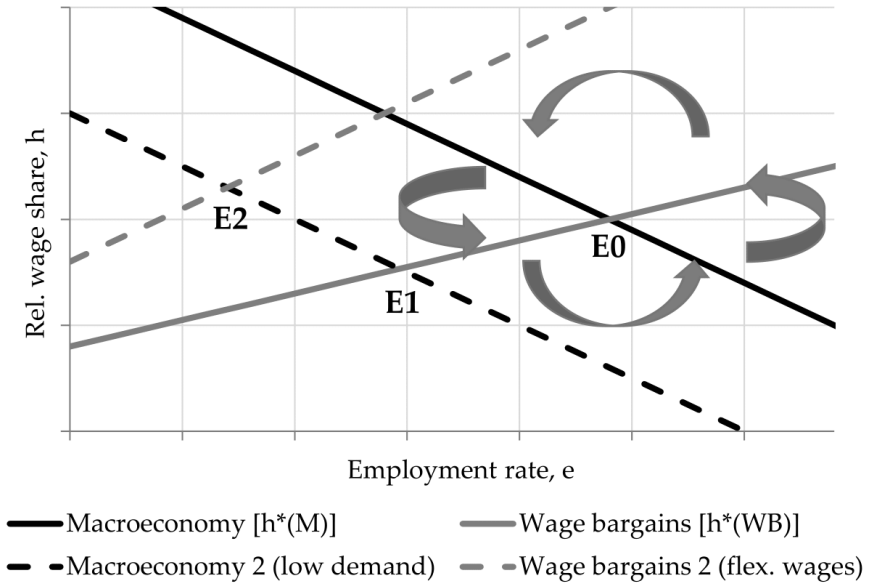

Figure 2: Employment rate - relative wage share functions

3 Data & Empirical Approach

In the empirical part, we aim at identifying the actual functioning of our model in the CEE region before and after the GFC. For this purpose, we estimate econometrically a model that includes significant determinants of growth rates of labour productivity, employment rates and wage share of income, as formulated theoretically in the equations system 8. After simple adjustments, we obtain three panel-data equations:

$$\begin{cases} \Delta q_{i,t} = a_0 + a_1 \tilde{q}_{i,t-1} + a_2 e_{i,t-1} + a_3 \tilde{h}_{i,t-1} + a_4 f_{i,t-1} + a^i + g_{q,i,t} \\ \Delta e_{i,t} = b_0 + b_1 \tilde{q}_{i,t-1} + b_2 e_{i,t-1} + b_3 \tilde{h}_{i,t-1} + b_4 \Delta z_{i,t} + b_5 f_{i,t-1} + b_6 exr_{i,t-1} + b^i + g_{e,i,t} \\ \Delta h_{i,t} = c_0 + c_1 \tilde{q}_{i,t-1} + c_2 e_{i,t-1} + c_3 \tilde{h}_{i,t-1} + c_4 f_{i,t-1} + c^i + g_{h,i,t} \end{cases} \tag{1}$$

On the left-hand side, we have the first-differenced natural logarithms of the three series under consideration, observed in country i in year t. Among the RHS variables, besides the lagged levels of the three variables, we include: lagged FDI stock (f) and exchange rates (exr), growth rates of world demand (Δz), as well as the sets of country-level fixed-effects (a^i, b^i, c^i) and standard errors (g). Relative labour productivity and wage share series have

been expressed as a difference between the country level and the average value in the EU-15 group. All RHS variables are formulated in natural logarithms.

In the analysis, we include 9 CEE economies (Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia) and 25 years (1995-2019), with a focus on average relations in the whole groups (the only source of heterogeneity is included in country-dummies). Bulgaria and Romania have been detected as significant outliers, and thus we have excluded them from further econometric investigations. In order to verify the hypothesis of a regime shift, we have conducted separate estimations for two sub-periods (1995-2008 and 2009-2019). We have utilized a standard panel-data fixed-effect estimator (LSDV), with robust standard errors[3].

The obtained values of the coefficients serve us together with their theoretical underpinnings, first, to make sense of the short-run functioning of CEE labour markets, with its structural and institutional determinants. Second, we utilize them in numerical simulations, to predict the long-run equilibrium values of the three dependent variables.

Our data on employment, the wage share of income, labour productivity as well as the exchange rates comes from the AMECO database (the annual macro-economic database of the European Commission's Directorate General for Economic and Financial Affairs). At the same time, series on FDI stocks (as % of GDP) has been derived from the UNCTADstat database. Finally, world demand series has been prepared based on World Bank WITS Database, as average growth rates of annual EU-15 imports, weighted by the sectoral composition of individual CEE exports (in order to control for structural differences).

4 Results and discussion

The estimated coefficients, summarized in table 2, support, in general, the adequacy of our modelling approach to the CEE context. Most of them have the expected signs and statistical significance, though they become more pronounced in the second sub-period. Also, higher R^2 values indicate a better fit of the model in the post-GFC reality. Notably, both external variables of global demand and FDI stock gain on relevance after the GFC, which suggests that dependent development only in time became embedded in the CEE region and started to dominate the primary sources of technical change and economic activity. Turning to the subsequent variables, labour productivity growth (Δq) depends

[3]We regress first-differenced variables on their lagged levels. It means that our model does not suffer from the Nickell-bias and that LSDV estimator is consistent and efficient.

Table 2: Estimation results

	1995-2008			2009-2019		
	Δq	Δe	Δh	Δq	Δe	Δh
$\tilde{q}_0$	-0.130**	0.007	0.063	-0.318***	0.105	0.138*
e_0	0.114	-0.060*	0.320**	0.070	-0.061	0.527***
$\tilde{h}_0$	-0.029	-0.180**	-0.243*	0.126**	-0.138**	-0.217**
world dem.	—	-0.012	—	—	0.045***	—
fdi stock	0.024**	0.007	-0.020	0.057*	0.001	-0.033*
exr.	—	-0.049***	—	—	0.136**	—
crisis	—	—	—	-0.005	-0.026**	-0.026**
const	-0.158**	0.034	0.134*	-0.405***	-0.136	0.259**
R^2-within	0.0953	0.3974	0.2978	0.2855	0.5154	0.6976
F	6.35	26.90	32.19	7.69	12.25	20.08
No. obs.	107	107	107	90	89	90
No. groups	9	9	9	9	9	9

Source: own computations. Notes: fixed-effect estimator with robust standard errors. p-values: *0.05, **0.01, ***0.001.

positively on the increasing FDI stock. The second primary source of technical change is the catching-up effect. Growth of the absolute value of this particular coefficient, from 0.130 to 0.318, may turn however harmful for the sustained convergence, since it slows down the LP growth, once economies are closer to the technology frontier. Another important novelty is the positive impact of high relative wage share, which could be interpreted in terms of a labour-push technical change. This so-called Marx-effect may lead to positive feedback in the distribution-productivity nexus, allowing for a high-road to development.

The employment regime (Δe) shows little dependence on relative labour productivities and lagged employment rate levels, whereas the relative wage share of income proves to harm jobs. It substantiates the profit-led model, in which higher wage share undermines the international competitiveness of CEE economies. This effect, however, has lost a part of its strength after the GFC. Also, the second sub-period is characterized by a pronounced dependence of changes in employment rates on world demand, which could be interpreted in terms of delayed embeddedness of the export-led regime in CEEs.

Finally, wage bargaining (Δh) seems to be adequately described by the Goodwin-type function. The wage share of income responds negatively to its relative level and positively

to the employment rate. After the GFC wage shares become more elastic concerning employment (steepening of the short-run wage Philips curve), and less with respect to relative wage shares (weakened international wage competition). Both effects combined contribute to the strengthening of wage flexibility in CEEs. Another important novelty in 2009-2019 is the beneficial effects for pro-labour income distribution stemming from industrial upgrading, in countries that achieve high labour productivity or low FDI-dependence.
On first sight, the thesis of a regime shift seems to be corroborated. It consists of a parallel change in the major determinants of employment rates (towards export-led, with a weakened relation to wage share) and wage shares (towards more flexibility). In both areas, the pressures of international competition on wages tend to weaken, which could be interpreted in terms of embeddedness of CEE economies in the networks of multinational corporations and lock-in of foreign capital. Also, in time there has emerged an interesting two-way relation of positive feedbacks between wage shares and labour productivities, which could be utilized by local governments for the purposes of win-win development strategies. To verify the long-run consequences of this shift, we calculated the respective equilibrium values and functions based on estimated coefficients and the eq. 13 and 10. They are presented in table 3 and figure 3. Despite the relevant differences, the locations of long-run equilibria for

Table 3: Equilibrium values - average for CEE

	Pre-GFC	Post-GFC
Relative labour productivity $\tilde{q}^*$	54.4% (-60.8%)	54.3% (-61.0%)
Employment rate e^*	90.6% (-9.9%)	90.0% (-10.5%)
Relative wage share $\tilde{h}^*$	96.2% (-3.9%)	98.7% (-1.3%)

Source: own computations. Notes: natural logarithms in parenthesis.

both sub-periods are similar. Our model predicts that labour markets of CEE economies would converge, on average, to employment rates of ca. 90%, wage shares at 96-99% of EU Core levels, and labour productivities at 54% of EU Core one.[4] Thus, employment rates are remarkably stable, with only benefits for labour coming from a slightly higher relative wage share. Also, the significant productivity gap is maintained, which supports the view of CEE lock-in on a dependent position in the international division of labour.
Figure 3 illustrates two major differences in the political economy of CEE labour markets

[4]The 3-equation systems for both sub-periods have been confirmed to match the stability conditions in eq. 12 and to generate counter-clockwise distributive cycles converging towards the presented equilibria.

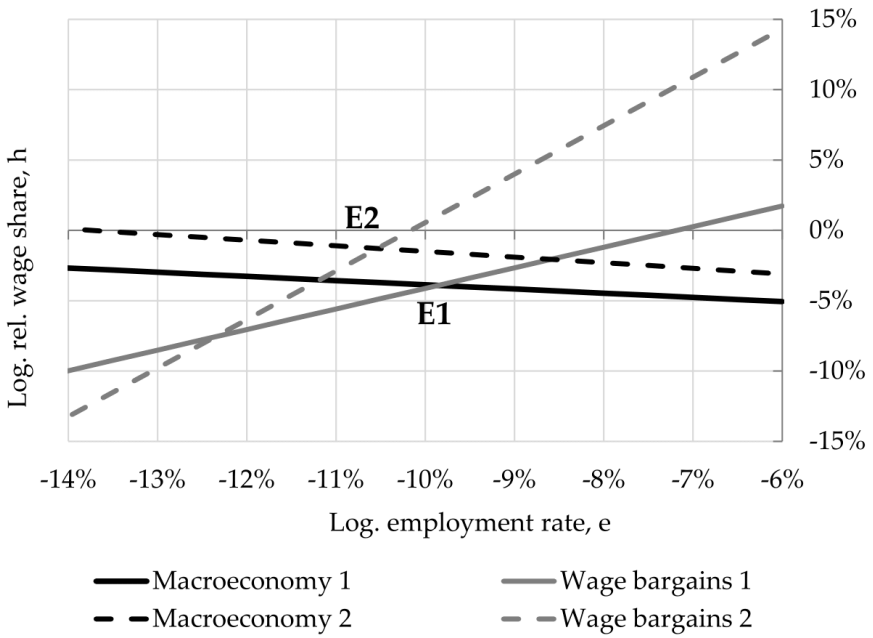

Figure 3: Long-run relations in CEE, pre- and post-GFC (Employment rate - relative wage share functions)

pre- and post-GFC. First, it is the upward shift in 'Macroeconomy' line, at a nearly the same slope, which informs about a relaxed external constraint, allowing for better labour market outcomes. It has occurred even though the growth of global demand was much weaker in the second sub-period. This change can be, however, attributed to a more stable position of CEEs in the international division of labour, combined with a slowdown of labour productivity (that had a robust labour-saving profile).

More interestingly, our model demonstrates that an evolution in wage bargains regime holds in the long-run as well, as depicted in the steepening of 'Wage bargains' line. Before the GFC the line was relatively flat, meaning that large increases in employment rates were necessary to achieve improvements for workers in terms of the income distribution. It had been a regime in which quantitative adjustments dominated, and the workers had to be cautious in their wage demands. After GFC wage shares are more reactive to employment rates, and the adjustments to technical change or foreign demand are balanced (include both employment and wages dimensions). The dashed grey line is also situated higher in terms of its constant, which could be ascribed to a shift in the minimum-wage policy of most of CEEs' governments.

5 Conclusions

The main message appearing from the demonstrated results refers to the evidence for a shift in labour market regimes in Central and Eastern European countries after the Global Financial Crisis. It consists of a combination of institutional, macroeconomic and external changes that jointly determine both cyclical dynamics and long-run tendencies in the critical dimensions of employment and income distribution. In the post-GFC reality we observe, first, pronounced wage flexibility which makes them more volatile and at the same time stabilizes employment. Second, the export-led macroeconomic model has become embedded in the CEE region, making business cycles and labour markets virtually dependent on global demand. Third, the labour productivity growth lost its intrinsic dynamics; however, it became closely and positively linked to the wage share of income, meaning that the sustained technical change does not contradict the labour market developments.

In that way, our empirical investigations are able to reproduce the stylized representations of the GFC impact on CEE economies, as enumerated in the literature review. However, thanks to our systematic theoretical approach, we can draw more general predictions on the dynamics of dependent market economies, also during the post-COVID crisis. These

dynamics, and the ultimate position of labour, are not unambiguous, just as the evolution of dependency is a highly complex issue. On the one hand, the productive structures of CEE countries seem to have established its vital role in the European value chains, which effectively stabilizes the demand for labour, and puts a limit to cost competition in a race-to-the-bottom manner. Also, the positive feedbacks between wage share and technical change pave the way towards more productive and labour-centred development strategies. On the other hand, our model predicts stability in the semi-peripheral position of CEEs in the international division of labour with a significant productivity gap (and in the long-run equilibrium of labour markets in general), and dependence of the robust world demand. In practice, the actual developments shall also depend on the governmental policies, in particular in the sphere of minimum wage adjustments.

We believe that the presented results contribute to the understanding of the political economy of labour markets, even beyond the investigated case of CEE. Our research approach combined theoretical modelling adjusted to the DME context with econometric analysis, and it proved fruitful in shedding new light on a complex and ambiguous phenomenon. In particular, it allowed assessing the role of diverse, macroeconomic and institutional, factors in the labour markets regimes. The structural approach to labour markets may find, in our view, further applications in the comparative and international political economy. These should include especially more explicit inclusion of the sources of inter-country labour markets heterogeneity, as well as the explanations to the processes of institutional change themselves.

6 Appendix: theoretical model of labour markets

Drawing from the New Cambridge model (McCombie and Thirlwall, 1994), equilibrium real output level Y can be described as :

$$Y = \frac{X + PSBR - NAFA}{m} = \frac{X + D}{m} \tag{2}$$

where $X, PSBR$ and $NAFA$ stand respectively for exports, public sector borrowing requirements and net acquisition of financial assets by the private sector, all in real terms, while m is the marginal propensity to import. Public sector borrowing less net private savings gives total domestic sector deficit, D. Dynamically, short-run GDP growth rate

equals a weighted average of its domestic and foreign components:

$$\hat{Y} = \frac{1}{m}\left(\frac{X}{X+D}\hat{X} + \frac{D}{X+D}\hat{D}\right) = \frac{1}{m}(\mu_f \hat{X} + \mu_d \hat{D}) \tag{3}$$

Eq. 3 reflects dynamically a multiplier relation between export demand and GDP growth, allowing for the influence of domestic sector balances. Following Barbosa-Filho and Taylor (2006), the latter can be expressed in a counter-cyclical manner, as a negative function of employment rate e:

$$\hat{D} = -\phi e, \phi > 0 \tag{4}$$

Exports growth itself is determined in the international competition, whereby the world market shares follow a replicator-dynamics process (Dosi et al., 1990; Amendola et al., 1993; Razmi and Blecker, 2008). Thus, it depends mostly on the relative levels (rather than changes) of labour productivity $\tilde{q}$, relative unit labour costs (wage share of income) $\tilde{h}$, as well as the dynamics of world demand $\hat{z}$:

$$\hat{X} = \epsilon\hat{z} + \gamma_1\tilde{q} - \gamma_3\tilde{h} \tag{5}$$

Bargains over real wages, w, follow a Goodwin-type relation, adjusted to a context of DME. We assume that average wage growth is a function of the prevailing employment rate, e, and of the relative wage share of income $\tilde{h}$ (in a competition for foreign capital that includes i.a. race to the bottom effects), whereby its parameters reflect diverse institutional aspects of the labour markets, contributing to the overall bargaining power of workers and wage flexibility:

$$\hat{w} = \beta_0 + \beta_2 e - \beta_3\tilde{h}, \beta_2 > 0, \beta_3 > 0 \tag{6}$$

In the CEE context of low union densities and collective bargaining rates, we find the minimum wage policy (w_M) and *de facto* employment protection (s) as the relevant institutions. The former, though to some extent reliant on the business cycle, largely resides on idiosyncratic government decisions, and thus could be formulated: $\beta_0 = \beta_0(\hat{w}_M)$, which has a positive first derivative. The latter includes both strictness of employment protection legislation, as well as the degree of compliance with the labour regulations and the prevalence of non-standard types of work (Prosser, 2016). These factors combined increase the wage flexibility and thus: $\beta_2 = \beta_2(s)$, with a negative first derivative.
Labour productivity (i.e. real output per worker), $q \equiv \frac{Y}{L}$, growth depends on: the lagged

relative level of LP (in a negative way, due to the diffusion of technology and catching-up); the employment rate (economies of scale, labour push), wage share of income (profit-squeeze 'Marx' effect), as well as spillovers from FDIs f:

$$\hat{q} = \lambda_0(f) - \lambda_1\tilde{q} + \lambda_2 e + \lambda_3\tilde{h} \tag{7}$$

Our key variables are wage share of income, $h \equiv \frac{wL}{Y} = \frac{w}{q}$ and employment rate, $e \equiv \frac{L}{N} = \frac{Y}{qN}$ (to simplify, we assume constant labour force N). Their growth rates are calculated in a following manner: $\hat{h} = \hat{w} - \hat{q}$ and $\hat{e} = \hat{Y} - \hat{q}$. In turn, we receive three growth functions of labour productivity, employment rate and wage share:

$$\begin{cases} \hat{q} = \lambda_0 - \lambda_1\tilde{q} + \lambda_2 e + \lambda_3\tilde{h} \\ \hat{e} = \delta_0 + \delta_1\tilde{q} - \delta_2 e - \delta_3\tilde{h} \\ \hat{h} = \alpha_0 + \lambda_1\tilde{q} + \alpha_2 e - \alpha_3\tilde{h} \end{cases} \tag{8}$$

where:

$$\delta_0 \equiv \frac{\mu_f}{m}\epsilon\hat{z} - \lambda_0(f), \delta_1 \equiv \frac{\mu_f}{m}\gamma_1 + \lambda_1, \delta_2 \equiv \frac{\mu_D}{m}\phi + \lambda_3, \delta_0 \equiv \frac{\mu_f}{m}\gamma_3 + \lambda_3$$

$$\alpha_0 \equiv \beta_0(\hat{w}_M) - \lambda_0, \alpha_2 \equiv \beta_2(s) - \lambda_2, \alpha_3 \equiv \beta_3 + \lambda_3$$

System 8 can be expressed in a matrix notation as:

$$\hat{M} = \Psi_0 + \Psi_1 M \tag{9}$$

where:

$$\hat{M} = \begin{bmatrix} \hat{q} \\ \hat{e} \\ \hat{h} \end{bmatrix}, M = \begin{bmatrix} \tilde{q} \\ e \\ \tilde{h} \end{bmatrix}, \Psi_0 = \begin{bmatrix} \lambda_0 \\ \delta_0 \\ \alpha_0 \end{bmatrix}, \Psi_1 = \begin{bmatrix} -\lambda_1 & \lambda_2 & \lambda_3 \\ \delta_1 & -\delta_2 & -\delta_3 \\ \lambda_1 & \alpha_2 & -\alpha_3 \end{bmatrix}$$

Equilibrium occurs when the three LHS variables in eq. 9 do not change, which gives:

$$\hat{M} = 0 \Leftrightarrow M^* = \Psi_0{\Psi_1}^{-1} \tag{10}$$

In order to formulate the stability conditions in the neighbourhood of the critical point M^*, let us write the characteristic equation of the Jacobian matrix Ψ_1:

$$\pi^3 + b_1\pi^2 + b_2\pi + b_3 = 0 \tag{11}$$

Following Araujo et al. (2019) and on the basis of Routh-Hurwitz criterion, we are able to formulate the condition for the local stability of $(\tilde{q}^*, e^*, \tilde{h}^*)$ that involves the real parts of the roots of the characteristic equation:

$$\begin{cases} b_1 = \lambda_1 + \delta_2 + \alpha_3 > 0 \\ b_2 = (\lambda_1\delta_2 - \lambda_2\delta_1) + (\delta_2\alpha_3 + \delta_3\alpha_2) + (\lambda_1\alpha_3 - \lambda_3\lambda_1) > 0 \\ b_3 = -det\Psi_1^* > 0 \\ b_1 b_2 - b_3 > 0 \end{cases} \tag{12}$$

Due to the high complexity of the the detailed position of macroeconomic equilibrium, given by $M^* = (\tilde{q}^*, e^*, \tilde{h}^*)$ and the solution to eq. 10, we shall analyse its properties indirectly. In particular, a phase-diagram can be constructed in which all three LHS variables equal 0, and the system is solved for $\tilde{q}^*, e^*, \tilde{h}^*$. We treat long-run labour productivity as stabilized at $\tilde{q}^* = \frac{\lambda_0 + \lambda_2 e^* + \lambda_3 \tilde{h}^*}{\lambda_1}$, and substitute it into the two remaining equations. In turn, two relations between employment rate and relative wage share are obtained:

$$\begin{cases} \hat{e} = 0 \Leftrightarrow \tilde{h}_M^* = A_0 - A_1 e^* \\ \hat{h} = 0 \Leftrightarrow \tilde{h}_{WB}^* = \frac{\beta_0}{\beta_3} + \frac{\beta_2}{\beta_3} e^* \end{cases} \tag{13}$$

$$A_0 \equiv \frac{\epsilon\hat{z}\lambda_1 + \gamma_1\lambda_0}{\lambda_1\gamma_3 - \lambda_3\gamma_1}, A_1 \equiv \frac{m\phi\lambda_1(\mu_d/\mu_f) - \lambda_2\gamma_1}{\lambda_1\gamma_3 - \lambda_3\gamma_1}$$

The first function, $\tilde{h}_M^*$, reflects the external, macroeconomic constraint for labour market outcomes, stemming from the international competitiveness and strength of world demand. We expect that in order to increase employment rate, relative wage share should diminish, so that the described relation is negative. However, it *a priori* cannot be decided unequivocally, as visible in the ambiguous sign of the slope A_1 (some properties of technical change can turn the relation positive). The second function, $\tilde{h}_{WB}^*$, describes the labour-market wage bargains, in which higher employment rate allows for a higher relative wage share as well. Notably, inclusion of the endogenous technical change leaves the relation dependent only on the initial parameters of the real wage bargains $(\beta_0, \beta_2, \beta_3)$. The intersection of $\tilde{h}_M^*$ and $\tilde{h}_{WB}^*$ informs us about the equilibrium levels of relative wage share and employment rate.

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