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Backwardness, Industrialisation and Economic Development in Europe: The developmental delay in Southeastern Europe and the impact of the European integration process since 1952

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Backwardness, Industrialisation and Economic Development in Europe

The developmental delay in Southeastern Europe
and the impact of the European integration process since 1952

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Abstract:

The present work uses long-term economic development data (1952-2010) as well as a detailed industry-level panel data (1963-2011) to analyse industrialisation patterns in Europe, implications of economic backwardness and the role of European integration in facilitating industrialisation and development. We find evidence of some income convergence in Europe, but mostly in countries that were able to exploit the 'advantages of (mild) backwardness'. Regions of extensive backwardness such as the Balkans had difficulties to catch up. Membership in the European Union helped especially more backward economies to develop faster.

Keywords: Economic development, economic growth, industrialisation, urbanisation

JEL classification codes: O14, O18, O43, O47,

1. Introduction

This work is inspired by Alexander Gerschenkron's (1952) seminal essay 'Economic Backwardness in Historical Perspective', which identifies three different 'promoters' of development via industrialisation in Europe, depending on the initial level of backwardness. (1) In the United Kingdom, the mother country of industrial revolution, entrepreneurs invested capital accumulated from earnings in trade, modernised agriculture and later from industry itself. (2) By contrast, in the relatively more 'backward' Western parts of Europe, where capital was scarce and diffused, and entrepreneurship was less developed, long-term investment banks took over the role of promoters of industrialisation. (3) Finally, in Eastern Europe, where the extent of backwardness was even more accentuated, the state was the institutional instrument of industrialisation due to the absence of entrepreneurs as well as banks.

According to Gerschenkron, the degrees of backwardness differ due to institutional settings, intellectual climate and natural industrial 'potentialities'. The obstacles to industrial development in a backward country hence include a lack of natural resources, institutional obstacles such as the

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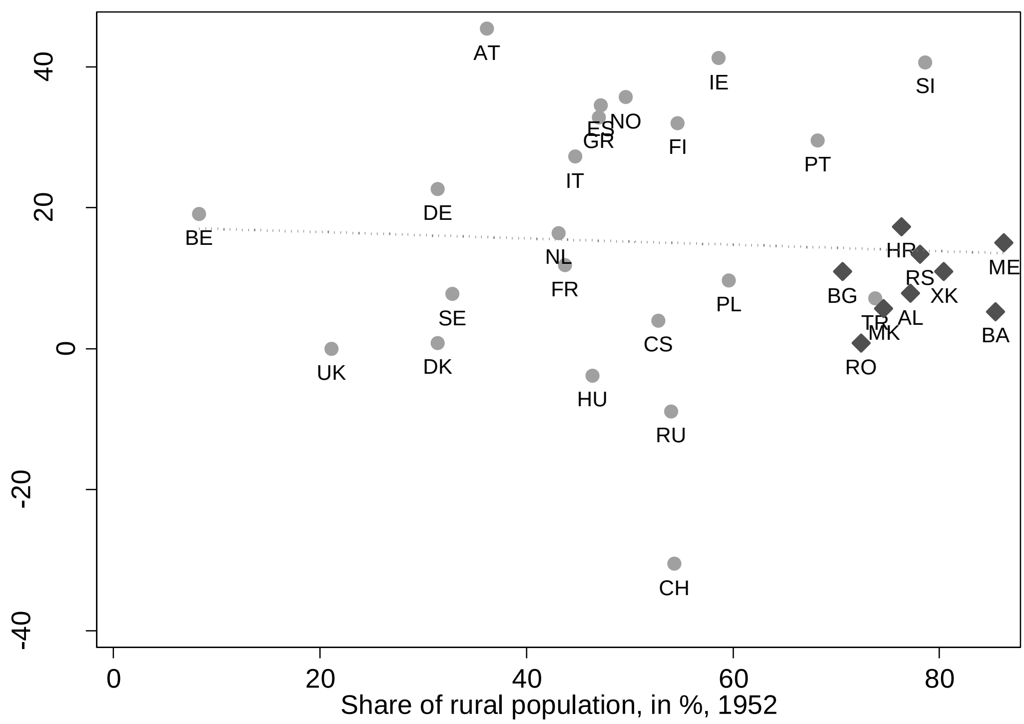
absence of political unification, poor quality of industrial labour force, lack of technological skills, absence of modern infrastructure and investment capital.

It is claimed that to the extent that industrialisation took place, it was largely by application of the most modern technology in large-scale plants of investment-goods industries. However, in certain extensive backward areas great delays in industrialisation tend to allow time for social tensions to develop and create further obstacles to industrialisation. The author concludes that the related problems are as much economic as they are political and thus not only the problems of the backward nations but can indirectly also become the problems of the advanced countries.

Figure 1: Initial backwardness and (no) catching up in Europe, 1952-2010



Source: New Maddison Project Database, Population Division of The Department of Economic and Social Affairs of the United Nations Secretariat, own calculations.

Southeastern Europe is a case in point. The Balkans are the least developed part of Europe. Since the region is unable to sustain the stable and persistent long term economic growth, backwardness was and still remains a major obstacle to widespread industrialisation. The area is to a large extent characterised by ongoing political fragmentation, instability, violent conflicts, poor infrastructure and a lack of regional cooperation. It is thus not by coincidence that 'Balkanisation' became a pejorative geopolitical term. The region is also a source of mass migration to Western Europe and a home base of organised crime operating all over the continent.

We take a country's share of rural population in 1952 as a proxy for its initial backwardness level reflecting the technological gap, scarce skilled labour, a lack of well-functioning institutions and infrastructure as well as a lack of funds for industrial investment. Plotting this measure against the long-run catching-up performance in GDP per capita relative to the UK[2] (Figure 1) indicates that the Balkans are among the least successful countries to exploit their 'advantages of backwardness' (as

[2] The United Kingdom was, apart from Switzerland, the richest country in Europe after the Second World War.

also paraphrased in the more recent literature on long-run development, e.g. Hsiao and Hsiao, 2004). Some long-established EU member countries with an almost equally backward starting position such as, for instance, Ireland and Portugal were much more successful in catching up. The generous flow of EU transfers, the adoption of better institutions, market access and a surge in foreign direct investment might have been at the basis of their development, which highlights the role of the EU as a modern promoter of industrialisation.

The theoretical conjecture and descriptive observations hence give rise to the following research questions we intend to address in the present study:
i) Are the Balkans an extensive backward area with particularly rigid obstacles to economic development and industrialisation over the long run? ii) What is the general impact of EU membership on long-term economic development and industrialisation? iii) What are the long-run industrialisation and deindustrialisation patterns in different sectors in Europe?

We analyse these research questions using econometric methods and a panel dataset that spans six decades from the mid-20th century up to the early-21st century for up to 31 European countries. The study is split into two major parts. First, long-run income convergence aspects at the aggregate country level are examined. Second, the patterns of industrialisation are studied via industry-level analysis.

2. Backwardness, catching up and economic development

2.1. Literature review

The catching-up hypothesis of the exploitation of the 'advantages of backwardness' dates back as far as to the contributions of Veblen (1915) and Gerschenkron (1952). While later contributions mostly focused on per capita income to depict the level of initial backwardness in the catching up process, Gerschenkron had a more complex indication of a range of institutional features in mind that more generally comprises the organisation of agriculture, the extent of urbanisation and the development of factor markets (Harley, 2015). Here we think that our chosen indicator of the share of rural population can add multiple dimensions to the concept of backwardness, in addition to the plain GDP per capita level. Nevertheless, most of the subsequent literature focuses on the later indicator only and consequently the literature on catching up is also referred to as the 'income convergence' literature (Verspagen, 1991).

Empirical literature testing the convergence hypothesis has been mostly constrained by the availability of reliable data. Early empirical literature such as Abramovitz (1986) and Baumol (1986) used the Maddison (1982) data base to report some of the first empirical findings on the catching up hypothesis. Both authors reported convergence based on a sample of advanced countries. On the other hand, De Long (1988) pointed to the sample selection bias and an inappropriate estimation strategy in Baumol's paper, and couldn't confirm convergence in a wider sample of 22 developed countries.

Later, Barro and Sala-i-Martin (Barro, 1991; Barro and Sala-i-Martin, 1992) introduced the concept of conditional convergence - the idea that different economies have different steady states and pioneering work on testing conditional convergence in cross-country regressions was done in Mankiw et al. (1992). The paper was also seen as the reinstatement of the neoclassical growth theory, which was losing ground against the endogenous growth theory at that time. The Mankiw et al. (1992) framework has remained popular in empirical studies on conditional convergence and saw many extensions including both cross-sectional and panel data analysis.

The panel data approach received significant interest in the literature (see Islam, 1995; Sala-i-Martin, 1996) because it was able to account for heterogeneous country effects along with the time dimension. Since the existence of endogenous and lagged dependent variables was potentially causing inconsistent and biased estimates in these specifications, first-difference and system GMM approaches were later used by many authors (see Caselli et al., 1996; Lee at al., 1998; Bond at al., 2001), but suffered from the problem of pronounced parameter estimation variation for the same data set. A predominant number of authors confirmed the conditional convergence hypothesis at different rates and for different samples. The most commonly found convergence rate was around 2% per year, but there were also some estimates in the range from 4-10% per year. Panel data approach yields generally a wider range of coefficients compared to cross-section estimates.

The development of non-stationary time series econometrics and the literature on stochastic convergence in the 1990s as well as the availability of longer data sets made it possible to test the income convergence hypothesis in the context of time series. This literature first started with the bivariate unit-root and cointegration tests in small samples (see Bernard and Durlauf, 1995) and moved to the testing of income convergence in broad samples of countries (Jones, 2002; Pesaran, 2007a) with extensions of the baseline approach were introduced (see Carlino and Mills, 1993; Li and Pappel, 1999; Strazicich et al., 2004).

In a later stage, the literature developed in the direction of panel data unit root tests (see Levin and Lin, 1993; Evans and Karras, 1996a; Fleissig and Strauss, 2001) which was followed with the application of more powerful panel stationarity and cointegration tests (Pedroni, 1999; Maddala and Wu, 2001; Pesaran, 2007b; see also Hurlin and Mignon, 2007; Phillips and Sul, 2007) that were able to account for cross-sectional dependence and heterogeneity of the sample became standard in income convergence testing.

In recent years also a literature on income convergence and its determinants in European transition countries developed. It can be broadly divided into three strands. The first strand refers to the analysis of income convergence between the East European countries and the EU and uses the methodology of sigma and beta regressions (Matkowski and Prochniak, 2004; ECB, 2007; Vojinovic and Oplotnik, 2008; Vojinovic and Prochniak, 2009; Vojinovic, Acharya and Prochniak 2009; Rapacki and Prochniak 2009).

The second strand analyses the income convergence of the New EU Member States to the EU income average by using time series methodology in the bivariate and panel context (Kutan and Yigit, 2004; Cunado and Grazia, 2006; Brüggermann and Trenkler, 2007; Reza and Zahra, 2008).

The third research strand focuses on the wider aspects of economic convergence of the New Member States towards European levels and includes monetary as well as real economy variables (Brada and Kutan, 2001; Brada, Kutan and Zhou, 2002; Backe et al. , 2002; Hermann and Jochem, 2003; Kocenda, 2001; Kocenda, Kutan and Yigit, 2006; Prochniak, 2011).

All of the mentioned papers focus on the post-1995 period, and therefore analyse the transition process of Eastern European countries, their EU integration or membership effects. This literature faces estimation problems related to short and small samples, as well as generalisation of results. There is some evidence of income convergence after the initial transition phase when cross-section and standard panel data estimators were used. On the other hand, time series estimators were able to confirm the convergence hypothesis in a much smaller number of cases.

Our research therefore adds to the existing convergence literature by analysing historical (longer than other work) income convergence, economic development processes and the impact of European Union membership, as well as backwardness, specifically in the Balkans, the poorest region of Europe.

2.2. Empirical strategy and data issues

Our empirical strategy is constrained by data availability as we are predominantly interested in the long-term impact of economic backwardness and the EU membership effects.

Since most of our variables of interest have low or no time variability, we use a cross-section approach as our preferred specification and panel data estimations as a robustness check using pooled ordinary least squares (OLS), fixed effects, generalized method of moments (GMM) and dynamic OLS (DOLS) estimators with annual data in levels and first differences.

To address the hypothesis of interest and following the convergence literature we consider the general cross sectional econometric model of the following general form:

$$\Delta GDP_i = Geography'_i + History'_i + Backwardness'_i + EU'_i + \varepsilon_i, \qquad (1)$$

where ΔGDP_i is the average annual percentage change of real GDP per capita of country i between the years 1952 (earliest available year for 31 European economies) and 2010 from the 2013 version of the New Maddison Project Database (for a discussion of the data see Bolt and van Zanden, 2014). The vector $Geography'_i$ contains the determinants latitude and longitude of the capital city in decimal format, the country's average 1961-1999 annual temperature in degrees Celsius as well as average annual precipitation in millimetres. Data on the average climatic conditions was taken from the World Bank's Climate Change Knowledge Portal.

The vector $History'_i$ includes a number of explanatory variables that mostly stand for distinctive institutional and political legacies. These comprise the years under Habsburg (see e.g. Dimitrova-Grajzl, 2007), years under Ottoman rule, fixed effects for the Habsburg rule in 1800, the Ottoman rule in 1800, and the Romanov rule in 1800. There are dummy variables for the World War I and World War II battleground sites, a Yugoslavia 1943, and a Comecon 1949 membership dummy. The Comecon dummy represents the participation in the Eastern Block's Council for Mutual Economic Assistance (Comecon) and hence a substantial period of about five decades of the Soviet-style central planning. The Yugoslavia membership dummy should indicate whether there was a specific effect of the Yugoslav Third Way of workers' self-management on the Yugoslav Republics' long-term growth.

The vector $Backwardness'_i$ covers the remaining factors reflecting economic backwardness in the spirit of Gerschenkron. Among these variables we also include GDP per capita in the year 1952. The initial income level is used as a control variable for economic convergence in most growth regressions such as in the seminal papers of Barro (1991) and Levine and Renelt (1992). In order to capture non-income facets of backwardness we also include the rural population share in 1952 as provided by the Population Division of The Department of Economic and Social Affairs of the United Nations Secretariat. The correlation coefficient for these last two variables is at -0.82, which is a rather high value but not too high to necessarily consider multicollinearity (see also correlation matrix in Table A2 of the Appendix). Yet, in certain cases these two variables may contain different information. A case in point being Greece, Norway and Switzerland which had in 1952 about half of the population still living in rural areas. However, the GDP per capita of Norway was at that time about triple the level of Greece and in the case of Switzerland this was almost five times the level of the Hellenic Republic.

In order to specifically capture the issue of backwardness in the Balkans we also include a Balkan dummy (takes the value of unity for Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Kosovo, Macedonia, Montenegro, Romania and Serbia), as well as an interaction term of the Balkan with the rural population share in 1952 (for better interpretation interacted data is centred). This variable should capture whether there is something specific about the initial level of Balkan backwardness that is stronger than Gerschenkron's moderate backwardness that can be exploited as an advantage in the growth catch-up. In this group of variables we also consider the urbanisation share change between 1952 and 2010 in percentage points, in order to see whether efforts of modernisation are being rewarded by faster development in the analysed sample of 31 European countries.

Finally in the EU' vector there is both an EU dummy and the membership years in the EU, both of which are of special interest. Both are also interacted with the rural population share in order to find out how EU membership has affected backward countries. Summary statistics for all the variables employed can be found in Table A1 of the Appendix.

A number of the most backward European economies did not have any substantial economic development even decades before the 1950s. This suggests the possibility that the rural population share is not a fully exogenous variable. Hence there might be the issue that Southeast Europe's dependence on low-productivity agriculture was not a cause, but a consequence of underdevelopment (see Kopsidis, 2012). Also, if the rural population share is to be interpreted as a proxy for more general institutional conditions, recent literature assumes here a certain degree of endogeneity as well (see e.g. Acemoglu et al. 2001, 2012). Moreover, it is suggested that geography (e.g. Bleaney and Dimico, 2010) and climate (e.g. Dell et. al. 2009) are important factors. However, formal tests of the rural population share indicate it can be treated as an exogenous variable in our specification.

Given the small sample size at hand we need to economise on the number of explanatory variables. Therefore different variable selection procedures are being employed, which also serves as a robustness check. We made use of a backward selection procedure where the significance level for removal from the model was chosen at 10%. Second, a forward selection was employed with a significance level for addition to the model of 10%. Finally, a backward stepwise and a forward stepwise selection procedure was used. In both cases the significance level for removal from the model is 10% and for addition to the model 9%. The results of these cross-section estimations can be found in Table 1.

2.3. Discussion of the results

The forward specifications yield same results, while the backward specifications have slightly different coefficients and significance levels. The Balkan rural 1952 population share interaction term is only significant at the 5% level in the backward selection and stepwise specifications. The coefficient has a negative sign, which hints at the possibility that the Balkan-specific backwardness was ceteris paribus an obstacle for subsequent economic development of the region. The Balkan dummy was nowhere found to be significant and the rural population share for all the countries in 1952 is only significant and interestingly also negative in the first specification only. However, it is also only in the backward selection specification that the urbanisation share change variable is significant and positive, which hints at the gains from actively overcoming backwardness.

However, statistical significance is much stronger in the case of the remaining indicator related to backwardness. In all the specifications the log of initial GDP per capita is negative significant at the 1% level. This could be interpreted as an 'advantage of backwardness' at least for the countries outside the Balkans that were poor in 1952 but had fairly low shares of rural population – thus some sort of 'moderate backwardness'.

Table 1: Impact of backwardness on economic development in a European cross section

Dependent variable: GDP per capita growth 1952-2010	backward selection[1]	forward selection[2]	backward stepwise[3]	forward stepwise[3]
Log of GDP per capita 1952	-1.4234	-0.8113	-1.1043	-0.8113
	(6.36)***	(6.56)***	(6.53)***	(6.56)***
Rural population share 1952	-0.0213			
	(2.54)**			
Balkan rural population share 1952[4]	-0.0245		-0.0249	
	(2.33)**		(2.69)**	
Urbanisation share change 1952-2010	0.0207			
	(2.49)**			
EU dummy		0.3812	0.4590	0.3812
		(2.84)***	(3.49)***	(2.84)***
EU years and rural 1952 interaction[4]	0.0003			
	(1.73)*			
Years under Ottoman rule	-0.0008	-0.0008		-0.0008
	(1.79)*	(1.90)*		(1.90)*
Comecon 1949 dummy	-0.5854	-0.7679	-0.7426	-0.7679
	(4.34)***	(5.86)***	(5.85)***	(5.86)***
Latitude	0.0427		0.0215	
	(2.40)**		(1.88)*	
Average annual temperature	0.0588			
	(2.94)***			
Average annual precipitation	0.0008		0.0006	
	(2.89)***		(2.91)***	
Constant	11.9173	9.1344	9.8937	9.1344
	(6.61)***	(8.86)***	(9.41)***	(8.86)***
R^2	0.83	0.73	0.80	0.73
Adjusted R^2	0.75	0.69	0.74	0.69
N	31	31	31	31

Note: T-statistics in parentheses. 1) The significance level for removal from the model is 10%; 2) The significance level for addition to the model is 10%; 3) The significance level for removal from the model is 10% and for addition to the model 9%; 4) Data has been centred.

Regarding the impact of the EU integration, the following can be observed. The EU dummy variable was not selected into the backward selection specification, but showed up positive significant in the three other specifications. The coefficient seems to be of quite considerable size indicating the substantial positive effects of the EU internal market, at least until recently. The free flow of capital within the Union might have been an important channel for the positive relationship of EU membership and growth. In the first specification the EU years and rural 1952 population share interaction term plays a similar role.

From the history group of indicators only two variables were selected. A strong and negative effect seems to emanate from the Comecon dummy variable which is highly significant in all the specifications. Having been part of the Eastern Block seems to be a long lasting drag on economic development. Also the number of years under Ottoman rule has a certain negative but only weakly significant effect on long run GDP per capita growth in three of the four specifications. Institutional legacy might be the underlying reason.

Among the group of geography-related deterministic variables we find latitude and the average annual precipitation to be positive and (mostly) significant in the backward specifications. In the first specification also the average annual temperature coefficient shows up to be positive and significant. This does not necessarily come as a surprise as the three variables together indicate that an intermediate climate (not too warm – latitude, and not too cold – temperature) with enough rainfall has a positive impact on long run growth.

While we recognize the limitations of the analysis based on only 31 observations, overall, it is quite surprising that given the small sample many coefficients are statistically significant. Also the adjusted R^2 is in all the specifications close to 70% or above. Hence the selected models cover a huge share of the variation in the average GDP per capita growth variable for the period of 1952 to 2010.

Generally, the results show that a moderate initial 1952 backwardness provided for some advantage in the European catching-up process until 2010. However, there are indications that initial backwardness in the Balkans was so deeply rooted that it was an impediment for long run economic development, ceteris paribus. Nevertheless it was especially the Balkan countries that increased the share of urban population in the last six decades, a modernisation factor that contributed to economic growth.

Among the historical, institutional variables we find long lasting negative effects of the years under Ottoman rule and the participation in the Eastern Block's Council for Mutual Economic Assistance. Inheritance of poor institutions, misallocation of resources and a substantial technology gap could be some of the important features of this heritage. By contrast, EU membership during the period of analysis seems to have boosted economic growth quite substantially, especially in the southern EU convergence countries that also had rather high shares of initial rural population. Free flow of capital might have been an important impact channel in this case.

In the group of geographical, purely deterministic variables we find especially average annual precipitation to be related to long-run growth. Highly productive agriculture and cheap hydro power energy production might be some possible explanations behind this correlation.

The resulting policy recommendation might be to increase efforts of overcoming desperate backwardness in the Balkans. By the year 2010 in this subset of European economies still about 40% to 60% of the population lived in rural areas with limited access to functioning institutions, up-to-date technology, modern education, contemporary infrastructure and adequate financing. These are figures which the Central European new EU member states experienced in the early 1950s. Finally, an EU membership seemed at least so far to have had quite some positive impact on long run economic development. Hence, remaining non-EU Balkan countries should increase efforts to join the EU, which in many ways can act as a promoter of development.

As a further robustness check we conduct similar analysis using the full dimension of the underlying panel data set with almost 2,000 observations for 31 European countries. However, all the time-invariant variables from the cross section cannot be used in this case. Thus we end up with less explanatory variables including, the rural population share, the (evolving past years of) EU membership, the interaction terms between the former two and also with the Balkan dummy as well as a communism dummy for those years where a specific country was under communist rule. First the panel data model is estimated in levels using a simple pooled OLS, a fixed effects, a system GMM as well as a DOLS estimator.

The last one is our preferred model as (according to Kao and Chiang, 2001) it is the most appropriate estimator for potentially non-stationary level data that may represent a long-run cointegrated relationship. However, it is unclear whether our GDP and rural population data is really non-stationary or not (about half of the different tests available show either result). Nevertheless, allowing each country to have its own short-run dynamic interactions and feedbacks (here we use one lead and two lags of the first differences) should give consistent estimates of the parameters that are also robust to reverse causality.

Table 2: Impact of backwardness on economic development in a European panel data setting

Dependent variable: GDP per capita 1952-2010	OLS	FE	SYS-GMM	DOLS
Rural population share	-0.0307	-0.00945**	-0.00967*	-0.0103**
	(0.0276)	(0.00416)	(0.00551)	(0.00457)
Balkan rural population share	0.0592	-0.00131	0.000869	-0.00286
	(0.0369)	(0.00453)	(0.00121)	(0.00453)
EU dummy and rural interaction	0.0184	0.00561**	-0.00179*	0.00481**
	(0.0274)	(0.00212)	(0.00103)	(0.00235)
EU dummy	1.114***	0.184***	-0.000453	0.175***
	(0.316)	(0.0381)	(0.00870)	(0.0376)
EU dummy and Balkan interaction	-0.400	-0.215***	0.00279	-0.126**
	(0.559)	(0.0573)	(0.0125)	(0.0581)
Yugoslavia dummy	-3.380**	0.311**	0.0521*	0.338**
	(1.402)	(0.119)	(0.0259)	(0.124)
Comecon dummy	-0.282	0.324***	0.0172	0.283***
	(0.533)	(0.0869)	(0.0241)	(0.0942)
Lagged log of GDP per capita			0.822***	
			(0.0913)	
Constant	9.572***	7.945***		1.062***
	(1.166)	(0.214)		(0.235)
Observations	1,829	1,829	1,767	1,736
R-squared	0.430	0.902		0.995
Number of countries	31	31	31	31

Note: Robust standard errors in parentheses. Interaction data has been centred. Like the FE specification, DOLS includes fixed country and time effects.

Simply taking first differences of all the variables, to eliminate non-stationarity, results in an estimation that may fail to capture the long-run relationship in levels that is at the heart of this analysis. Nevertheless we have also estimated specifications in first differences (see Tables A4 and A5 in the Appendix), which however do not result in very different outcomes. Also, we have used for levels as well as first differences system GMM and first differenced GMM, respectively. The coefficients of these estimates are often insignificant though and in any case the GMM methodology is being used for panels with a 'large N and small T', which is not the case with our panel.

The results (Table 2) portray a picture quite similar to the one from the cross-section estimations. Backwardness, as indicated by the share of the rural population, seems to be impeding economic development. On the other hand, membership in the European Union seems to be favourable, especially for those countries that are quite backward. The coefficient of the interaction term of EU membership and the Balkan dummy is negative. In the specifications where we use EU membership years instead of the EU dummy (see Appendix Table A3) that coefficient is insignificant altogether. However, given that Romania and Bulgaria are the only Balkan countries that joined the EU until 2010 (both in 2007) we have only eight non-zero observations for this variable for the period of the global financial crisis which makes it less reliable. Interestingly, the coefficients of both communism dummies (Yugoslavia and Comecon) are positive significant in all the DOLS specifications.

Overall, the panel data approach seems to support the main insight from the cross section. It appears that the EU is a promoter of economic development especially in backward countries. The observation that the Balkans are an extensive backward area with substantial impediments to economic development can only be confirmed in the first differences fixed effects models and can hence not be seen as perfectly robust.

In the next chapter we shift the focus from the macro to the industry level. The implications of (Balkan) backwardness and the EU membership are analysed with the help of data for different manufacturing industry sectors for different periods.

3. Industrialisation and economic development

3.1. Literature review

While in the early literature such as in Veblen (1915), Gerschenkron (1952) or Rosenstein-Rodan (1943) industrialisation was almost seen synonymous to economic development, later literature used the term increasingly to convey the rising manufacturing sector. In the 1980s, a period of fascination with the service sector has set in and soon industrial policy earned a bad name due to many cases of large, selective and often ill-designed backward-looking subsidies to ailing firms and sunset industries in the 1960s and 1970s (Crafts, 2010). However, in the wake of the global financial crisis a return of industrial policy (Wade, 2012) and even a 'European Industrial Renaissance' (EC, 2014) have been proclaimed. De-industrialisation is being widely complained of and re-industrialisation is being propagated, though not without critique (Ambroziak, 2014).

The debate is closely related to concerns about loss of employment, trade imbalances and sluggish technological development in advanced economies, as well as doubts about the development model and premature deindustrialisation in transition and emerging economies. The revival of interest for the manufacturing sector can also be seen as related to rising scepticism about the role of services as the main driver of economic growth, the prevailing view over the last three decades. The prime example of the switch towards manufacturing can be seen in recent state interventions in the automotive industry or government policies aimed towards preserving a strong manufacturing basis at the national level.

It has long been acknowledged by classical development economists (Hirschman, Prebisch and Kaldor) that industrialization plays an important role for economic growth (see also Peneder, 2003; Rodrik, 2009; and Szirmai and Verspagen, 2011). This is not surprising given that manufacturing is seen as a major source of technological progress and as a high productivity growth sector (Stöllinger et al., 2013). Furthermore, capital accumulation seems to be faster and more intense in manufacturing than in other sectors (Cruz, 2015). Felipe, Mehta, and Rhee (2014) point to the economies of scale in the manufacturing sector that don't exist in other sectors and that technological development and diffusion towards other sectors starts from manufacturing. Linkage and spillover effects seem to be strongest in the manufacturing sector (Tregenna, 2009). Moreover, manufacturing offers greatest opportunities for raising the exporting potential of the economy (Pacheco and Thirlwall, 2013), which might be important in order to profit from expanding global markets.

Since there has been no unanimous consensus about the precise definition, many different empirical proxies for industrialisation are present in the literature, the most common ones being the change in manufacturing employment and manufacturing output shares. Liu and Li (2015) stress that relying on these measures only underscores the multidimensionality of structural change related to (de-)industrialisation. They suggest a way to merge economic growth literature with empirics of industrialisation where they regress the following vector of dependent variables: GDP growth, agriculture, and industry and service sector shares in GDP as well as output growth rates of these three sectors on a set of 43 control variables. The analysis uses a global sample of 164 countries in the period of 1970 to 2010 and comes up with some important findings. The variables used to explain GDP growth can also explain sector shares and growth with similar explanatory power but different independent variables have a varying impact on each dependent variable. Some independent variables have consistent effects, while others exhibit variable effects on growth and sectoral shares. Their empirical results generally support the link between economic growth and industrialisation.

Tregenna (2009) addresses the complexity aspects of deindustrialisation as well, stressing that (de-)industrialisation should be defined as a concomitant (fall) increase in the share of manufacturing in total employment and the share of manufacturing value added in GDP. Focusing on the manufacturing share in total employment only would therefore undermine the importance of distinguishing different patterns of deindustrialisation. The paper suggests a decomposition of changes in levels and shares of manufacturing employment into components related to changes in the share of manufacturing value added in GDP, growth of manufacturing value-added, labour intensity of manufacturing production and economic growth. The results, on the data sample of 48 countries for a period from 1980 to 2003 (but shorter for some countries due to data availability), show that the globally observed manufacturing employment fall is dominantly related to declining labor intensity, i.e. ratio of employment to value-added, in manufacturing as opposed to an overall decline in the size or share of the manufacturing sector.

Besides definition issues, empirical growth literature was mostly concerned with the impact (de-)industrialisation has on economic growth and/or its determinants. Szirmai (2012) stresses the historical importance of manufacturing for economic growth. His results, on a sample of 67 developing and 21 rich countries in the period 1950 to 2005, show that manufacturing was especially beneficial to successful Asian countries and partly explains the disappointing performance of some African countries. Similar to that, Rodrik (2015) documents worldwide deindustrialisation trends for 42 countries in the period from the 1950s to the 2010s, where his dependent variables are manufacturing employment as well as output shares, in current and real prices. The results point to globalisation and trade as factors driving the diverging patterns of successful Asian and prematurely deindustrialised Latin American countries whereas labour saving technological progress can well explain concomitant manufacturing employment loss and fairly well manufacturing output performance in advanced economies.

Building on a neoclassical model, Nickell, Redding and Swaffeld (2008) develop an empirical approach that allows them to decompose the deindustrialisation process into contributions of prices, technology and factor endowments. Several findings, based on a sample of 14 OECD countries and industries for the period 1975 to 1994, emerge from their analysis. The fast decline in the manufacturing to GDP share in the UK and USA relative to Germany and Japan can be explained by productivity growth and the relative price changes of manufacturing and nonmanufacturing goods. Decline in the agricultural sector share of GDP in Italy and Japan depends on productivity growth and relative price movements. Different education endowments explain well why the share of services in GDP had differential growth patterns in OECD countries.

Palma (2008) identifies a few major global sources of manufacturing employment shrinkage. The first is that the share of manufacturing declines as the economy moves to a more developed stage. Second, the level of income per capita at which deindustrialisation starts in developing countries is at a lower level than in early industrialisers. Lastly, there might be a set of other factors, ranging from policy issues to resource discovery, which can affect deindustrialisation processes.

The effects of trade on deindustrialisation are analysed in Rowthorn and Coutts (2004). Their results, in a sample of 23 OECD countries for the period 1963 to 2002, point to trade being a stronger driver of deindustrialisation in the North than in the South. Interestingly, the analysis finds that domestic factors have generally a stronger impact on deindustrialisation than trade. That result is similar to the one in Cruz (2015) whose results confirm the importance of income per capita, domestic income distribution, labour manufacturing productivity and capital accumulation, i.e. of domestic factors on deindustrialisation in Mexico. The weak impact of trade on deindustrialisation is also confirmed in an earlier paper of Rowthorn and Ramaswamy (1997) that uses a smaller sample of 18 OECD countries in the period 1963 to 1994. Their results show that the faster relative productivity growth in manufacturing as compared to the services sector explains the manufacturing employment shrinkage. It is interesting to note that the authors don't consider deindustrialisation as a negative, but rather a natural consequence of economic development. Contrasting results can be found in Kucera and Milberg (2003) who use input-output analysis in a sample of 10 OECD economies for the period of the 1970s to the 1990s to show that the manufacturing employment decline is mainly due to North-South trade.

The literature about the determinants of the long term industrialisation process in transition economies has been scarce and is mostly related to country case studies. Comparative research that focused on the Balkan countries has been missing as well. However, in the case of the Balkan economies, some of which never had experienced extensive industrialisation, it is to a large extent undisputed that (similarly to the recommendations of Rosenstein-Rodan in 1943) industrialisation is the key to sustainable economic development. In the following we want to find out whether there are specific Balkan obstacles to industrialisation and whether the European Union membership can act as a promoter of industrialisation. All of that we want to investigate for different types of industries and different time periods in order to learn more about sector and time specific patterns.

3.2. Empirical strategy and data issues

Our empirical strategy combines several approaches used in the relevant industrialisation literature: i) It makes use of a simple, but powerful baseline specification employed by Rajan and Subramanian (2011) for manufacturing growth at the industry level; ii) We acknowledge in the choice of our dependent variables the complexity of industrialisation as emphasised by Tregenna (2009); iii) Finally, we also distinguish industrial sectors by stage of development as defined in Haraguchi (2014).

According to Haraguchi (2014), it is likely that the pattern of transformation induced by technological changes, economic integration, institutional convergence and other factors is likely to differ across industries depending on their technological sophistication. Hence developing nations should have a higher propensity to specialise in labour-intensive industries, while advanced economies, conversely, should tend to transform to more technology-intensive industries. Therefore, following Haraguchi

(2014), we split all manufacturing industries into three categories: early, middle and late industries. Note that this is opposite to the historical observations of Gerschenkron (1952) that industrialisation took place largely by application of the most modern technology in large-scale plants of investment-goods industries.

We measure industrialisation in a number of different ways for robustness, as suggested in Tregenna (2009). In particular, we incorporate indicators based on sectoral value added and employment data to measure the degree of industrialisation. This includes the employment growth as well as the change in the employment share, the value added growth as well as the change in the value added share and in addition also labour productivity. Defining industrialisation in a traditional way (that is, in terms of employment share) is conceptually limiting given that some of the Kaldorian processes operate primarily through output rather than employment. Hence we use several measures of industrialisation based on employment and value added data for extra robustness. Tregenna (2009) emphasises that from a Kaldorian perspective industrialisation could have substantial implications for long-run growth, given the special growth-pulling properties of manufacturing (Kaldor, 1966, 1967).

Thus the empirical strategy focuses on identifying the industry-level developments in the context of backwardness and European integration over a long time horizon differentiating between types of industries. In particular, the following specification, based on the Rajan and Subramanian (2011) approach, is used:

$$\Delta^{10Yavg} Industrialisation_{ic} = Initial_{ic}^{t=0} + FE'_{ic} + Interaction'_{ic} + \varepsilon_{ic}\,, \quad (2)$$

where the subscripts i and c represent 2-digit ISIC Revision 3 industries and countries, respectively. We use several measures of industrialisation, as previously described, to capture various aspects of the phenomenon (10-year average annual growth values), defined for each 2-digit ISIC industry:

A) Average change in industry i value added as a share of GDP;

B) Average growth of real value added of industry i;

C) Average change in industry i employment as a share of total country employment;

D) Average growth of employment in industry i;

E) Average growth of labour productivity in industry i, defined as the ratio of real value added to employment in industry i.

Given the maximum available time dimension of the industry and GDP data the following five periods are used: 1963-1972, 1973-1982, 1983-1992, 1993-2002, and 2003-2011. Averages for industry data available for seven or more years were used. Information for industries with less than 7 observations per period of analysis was not employed. In addition, we analyse the longest period available for as many countries as possibly: 1965-2011.

The vector of fixed effects, FE'_{ic} includes country and industry fixed effects. $Initial_{ic}^{t=0}$ denotes the initial conditions at the first year of the respective 10-year period, and is manufacturing value added, in % of GDP for the specifications (A), (B), initial manufacturing employment share for specifications (C) and (D), and the initial labour productivity for specification (E). Its coefficient thus reflects the speed of convergence.

We also introduce the vector $Interaction'_{ic}$, containing interaction terms between industry stage dummy variables (early, middle and late industries) and each of the following: EU membership, Communist, Balkans dummy variables. The ‘Balkans’ dummy variable takes the value of unity for the following countries: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Kosovo, Macedonia, Montenegro, Romania, Serbia, and, for earlier periods, Yugoslavia. The countries included in the group share similar transition experience and historical background. The 'Communist' dummy variable takes the value of unity for countries which are communist (for the pre-1990 periods) or were communist in the past (for the periods post-1990). The 'EU membership' dummy variable takes the value of unity if a country is or becomes an EU member within the corresponding decade.

In addition, we introduce three interaction terms with $Backward_{ic}^{t=0}$ - our 'backwardness' variable, measured as rural population as a percentage of total population at the beginning of the respective decade (*t=0*), and capturing the extent to which initial backwardness matters for the pace of industrialisation over the course of the following decade for each of the industry groups. The industry stage dummy variables, early, middle and late, take the value of unity if an industry belongs to an 'early-', 'middle-' or 'late-stage' industry group defined according to Haraguchi (2014) as follows:

- Early-stage industries comprise the sectors of Food and beverages, Tobacco, Textiles, Wearing apparel, Wood products, Publishing, Furniture, Non-metallic minerals (i.e. the ISIC Rev.3 industries: 15, 16, 17, 18, 19, 20, 22, 26, 36);
- Middle-stage manufacturing includes Coke and refined petroleum, Paper, Basic metals, Fabricated metals (i.e. ISIC sectors: 21, 23, 27, 28);
- Late-stage sector group consists of Rubber and plastic, Motor vehicles, Chemicals, Machinery and equipment, Electrical machinery and apparatus, Precision instruments (i.e. ISIC manufacturing industries: 24, 25, 29, 30, 31, 32, 33, 34, 35, 37).

The early-stage industries are labour-intensive and/or domestic-oriented industries. The middle-stage industries process natural resources to be used by industries further down the value-added chain. Late-stage industries are relatively more technology-intensive and in most cases produce output for final use by firms and households.

ε_{ic} denotes the error term. We use standard errors clustered by country.

The panel dataset used in the study spans the period of 1963-2011 and includes a maximum of 43 European countries (including faded countries, such as Czechoslovakia, GDR, Yugoslavia and USSR). The dataset is constructed using United Nations Industrial Development Organization (UNIDO) and Penn World Table (PWT) databases. Industry-level data (value added, employment) at the 2-digit level of ISIC Revision 3 were obtained from the UNIDO INDSTAT database. Country GDP, employment, deflators were obtained from the Penn World Table 8.1 (for details, see Feenstra et al., 2015). Rural population share was computed using the data from the Population Division of The Department of Economic and Social Affairs of the United Nations Secretariat database.

The measure of industrialisation relies on the various indicators of industry-level value added and employment which allows us to better capture industrialisation or deindustrialisation, as, e.g. industry value added may increase as a result of labour productivity gains or higher employment. We use value added rather than output data as it excludes the value of intermediate inputs and therefore represents a more accurate measure of manufacturing activity. In order to make the value added data (expressed in nominal USD) consistent with the real GDP data used in the analysis (PPP-adjusted production-side GDP from the PWT 8.1), we deflate the value added data using the GDP deflator used to construct the PWT real GDP series, which is equivalent to computing nominal GDP series). To aid economic interpretation of the corresponding interaction terms the backwardness variable (share of rural population) is centred by demeaning, and thus the magnitudes of the respective interaction effects should be interpreted as elasticities at the sample mean.

3.3. Discussion of the results

For better readability we have summarised the statistically significant coefficients for different specifications pertaining to different industrialisation indicators and time periods in Table 3. The underlying regression results can be found in the Appendix.

Table 3: Industry level regression results for different industrialisation indicators

	employment share	employment growth	value added share	value added growth	productivity growth	dominant overlap
1963-1972	**Neg.: earlyEU**		**Neg.: earlyEU, midEU**		Neg.: midRur	**Neg.: earlyEU**
1973-1982	Pos.: midCom, lateCom; Neg.: earlyEU	Pos.: earlyCom; Neg.: earlyEU, midEU, lateEU	**Pos.: earlyCom, midCom, lateCom; Neg.: lateRur**	Pos.: earlyCom	**Pos.: earlyCom, midCom, lateCom**	**Pos.: earlyCom, midCom, lateCom**
1983-1992	Pos.: earlyEU, midEU, lateEU	**Pos.: earlyEU, midEU, lateEU; Neg.: lateCom**	Neg.: lateCom	Pos.: earlyEU, lateEU, earlyCom	Pos.: earlyEU, earlyCom	**Pos.: earlyEU, midEU, lateEU; Neg.: lateCom**
1993-2002	Pos.: earlyEU, midEU, lateEU	*Pos.: earlyEU, midEU, earlyCom, midCom; Neg.: earlyBalk, lateBalk*	**Pos.: earlyBalk, midBalk, lateBalk**	Pos.: earlyBalk	**Pos.: earlyBalk, midBalk**	**Pos.: earlyBalk, midBalk**
2003-2011	**Pos.: midEU, lateEU, earlyBalk, midBalk, lateBalk**		**Pos.: lateEU, earlyBalk**		*Neg.: earlyBalk*	**Pos.: lateEU, earlyBalk**
1965-2011	**Pos.: earlyEU, midEU, lateEU; Neg.: lateRur**	*Neg.: earlyEU, midEU, lateEU, earlyRur, midRur, lateRur*	**Pos.: earlyEU, midEU, lateEU; Neg.: lateRur**	**Pos.: earlyEU, midEU, lateEU; Neg.: earlyRur, midRur, lateRur**	*Pos.: earlyEU, midEU, lateEU, earlyRur, lateRur*	**Pos.: earlyEU, midEU, lateEU; Neg.: lateRur**

Note: This is a summary of the underlying regression presented in the Tables A6-A10 in the Appendix. **Pos.:** refers to statistically significant positive coefficient results. **Neg.:** refers to statistically significant negative coefficient results. The prefix **early**, **mid** and **late** indicates the stages of industries as outlined in Haraguchi (2014) and roughly refers to, respectively, labour intensive and/or domestic-oriented industries, industries that process natural resources to be used by industries further down the value-added chain and relatively more technology-intensive industries mostly producing output for final use by firms and households, respectively. The ending **EU** refers to countries that were during the respective period members of the EU or the European Communities earlier. The ending **Com** refers to countries that were communist dictatorships during the 20th century. The ending **Balk** refers to Balkan countries and the ending **Rur** to the share of rural population in percent of total population as a measure for backwardness.

Interpreting the regression results in a chronological order, during the first period (1963-1972) early-stage industries in the EU (or what was then the European Communities) saw a drop in both the value added as well as the employment share. It is worth noting that since the early 1960s a build-up of overcapacities occurred in many sectors also due to emerging Asian economies such as Japan and South Korea entering the world markets (Grabas and Nützenadel, 2013). This might have been a trigger for the deindustrialisation process in the early-stage EU manufacturing.

The post-WWII high-growth period came to an end in the year 1973 when the Organization of the Petroleum Exporting Countries (OPEC) decided to increase the oil prices and thereby caused the first oil shock, to be followed by the second oil shock of 1979 (Baily and Kirkegaard, 2004). During most of the 1970s inflation was high and global real interest rates were negative. Several countries from the Eastern Bloc (notably Poland, Romania and Hungary) embarked on large-scale industrialisation drives in the 1970s by borrowing heavily from Western commercial banks (Boughton, 2001). This is reflected in our regression results for the period 1973-1982. All the three types of industries (early, middle and late) have experienced increases in the value added share as well as in productivity and partly also in the employment share.

n the early 1980s the new Chairman of the Federal Reserve Paul Volcker hiked the federal funds rate in order to fight inflation. Several of the Eastern Bloc countries had been highly indebted and under the new circumstances found themselves unable to roll over and repay their foreign debt. At the same time oil prices started to drop dramatically, which caused major problems for the Soviet economy, the main market for exports from other Comecon members. As a consequence, our regression results reflect a negative change in late-stage manufacturing value added shares as well as negative employment growth in these industries in the Communist countries. For the Western European countries falling oil prices were helpful, which also manifests in the regression results for the decade as positive growth of employment and employment shares in all three types of industries in the countries of the European Communities in the period 1983-1992. This is partly also true for value added and productivity growth.

From March 1989 to April 1992 a revolutionary wave terminated the Communist rule in Central, Eastern and Southeastern Europe. The simultaneous break-up of Yugoslavia was accompanied by a series of wars, the most bloody of which ended in 1995. Afterwards the region saw a certain recovery of industrial production. Our regressions for the period 1993-2002 include now enough Balkan countries (Albania, Bulgaria, Croatia, Macedonia, Romania) in order to have in addition to the other interactions also a Balkan dummy and industry stages interaction term. Indeed, especially early-stage (and partly also medium and late) Balkan industries experienced re-industrialisation with increasing value added shares, rising value added and productivity growth over this decade. However, at the same time, early- and late-stage Balkan industries experienced a drop in employment. This hints at the fact that most of the Balkan economies generally experienced a rather restrained and bumpy recovery throughout the late 1990s accompanied by a banking crisis, the Kosovo war (1998-1999), and, later on, the 2001 insurgency in Macedonia. It was a period of 'jobless growth'.

From 2003 up to 2007 a global growth spurt was also carrying away the Balkans. As a result, for the regressions over the period 2003-2011 we find a positive development for the early-stage Balkan industries in terms of value added shares as well as employment shares (productivity growth was on the decline). Interestingly, also the late-stage EU industry sectors experienced both value added share and employment share growth during that period. This is probably related to favourable demand developments in the emerging markets for Western European high-end final manufacturing goods even after the outbreak of the global financial crisis due to ongoing high commodity prices supporting many emerging economies for a few more years.

Finally, in the long term regression for the period 1965-2011 results are fairly uniform. Across all industries of the EU member states we find positive results in terms of employment and value added share change as well as value added growth. It seems that the main channel was the rise in the respective productivity growth rates as employment growth was negative in the EU countries' industries. However, the major shortcoming of this regression is the fact that in the sample there is only one country that did not become a member of the EU and that is Norway. Interestingly, late-stage industries in the more rural areas of the European continent experienced negative employment and value added growth as well as declines in employment and value added shares. This points at extensive backwardness in countries that were not able to industrialise in the Gerschenkron style by application of the most modern technology in large-scale plants of investment-goods industries.

As a robustness check we also run all the industry level regressions with the years of EU membership instead of the EU membership dummy, which yields similar results (see Tables A11-A16 in the

Appendix). EU industries experienced a downturn in the 1960s. Communist countries had a period of industrialisation in the 1970s and a period of deindustrialisation in the 1980s. In the 1980s we find a divergent pattern for the EU industries now weighted by years of EU membership as compared to the earlier EU dummy. Industries in then old EU Member States had a period of deindustrialisation while at that time Southern countries joined the EU which apparently have had a phase of industrialisation. We also observe for the 1990s and 2000s a post-war recovery, especially for lower-tech industries in the Balkans. Finally, in the long-term regression for the full time period since the mid-1960s we find an overall positive effect of a long-lasting EU membership on the industrialisation of the economy. In some specifications also the long-run deindustrialisation process in backward economies is confirmed.

4. Conclusions

Southeastern Europe is comprised of the poorest and the most 'backward' countries of Europe in terms of political unification, stable labour force, sufficient technological skills, adequate infrastructure and available investment capital, as defined by Gerschenkron (1952). Excessive levels of backwardness could be a major obstacle for economic development and industrialisation in the region. Other countries that initially had similar levels of backwardness half a century ago, but became members of the European Union and benefited from generous EU transfers, the adoption of better institutions, market access and inflow of foreign direct investment have taken a different development path, suggesting the important role that the EU played as a promoter of long-term development and industrialisation. We explore these hypotheses in the present paper via cross section and panel data analysis based on the long-term economic development and industrialisation data over the period 1952-2010 in Europe, which has become available recently. This is complemented by a detailed country/industry panel analysis of industrialisation and deindustrialisation patterns in European industries for single decades between 1963 and 2011. In both parts the main backwardness indicator chosen is the share of rural population in total population.

We find that there has been some income convergence in Europe, but mostly in countries that were able to exploit the 'advantages of (mild) backwardness'. Areas of excessive backwardness such as the Balkans had difficulties to catch up. Membership in the European Union helped especially more backward economies to develop faster. In terms of industrialisation we find that industries of the EU member states tend to grow faster than other European industries throughout most of the period. In addition, after the Yugoslav wars a certain recovery can be detected especially for lower-tech Balkan industries. However, over the long run, notably, higher-tech industries in more backward countries faced deindustrialisation both in terms of their employment and value added shares. This hints at a lack of strong promoters of industrialisation in backward European regions. Our results also suggest that integration with the EU might be such a promoter of growth and industrialisation, as traditional promoters of industrialisation such as entrepreneurs, banks or the state have so far failed in the Balkans, implying that integration with the EU and a faster EU accession strategy for the eligible Balkan countries is strongly needed to set off manufacturing growth and economic development.

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Appendix

Table A1: Descriptive summary statistics of the cross section data

Variables	Obs.	Mean	Std. Dev.	Min.	Max.
GDP pc growth 1952-2010	31	2.64	0.52	1.63	3.54
EU dummy	31	0.65	0.49	0	1
Years in the EU	31	18.3	21.5	0	58.0
EU rural population share interaction	31	-5.6	14.8	-48	22.5
EU years rural pop. share interaction	31	-296.7	405.4	-1896	118.8
Log of GDP per capita 1952	31	7.95	0.69	6.38	9.17
Balkan rural pop. share interaction	31	6.34	10.4	0	30.1
Balkan dummy	31	0.29	0.46	0	1
Rural population share 1952	31	56.08	19.9	8.3	86.2
Urbanisation share change 1952-2010	31	25.1	11.8	2.1	49.3
Comecon 1949 dummy	31	0.23	0.43	0	1
Yugoslavia 1943 dummy	31	0.23	0.43	0	1
World War I battle ground dummy	31	0.39	0.50	0	1
World War II battle ground dummy	31	0.71	0.46	0	1
Latitude	31	47.8	6.4	38.0	60.2
Longitude	31	14.8	10.8	-9.1	37.6
Average annual temperature	31	8.23	4.21	-6.30	15.0
Average annual precipitation	31	849	279	435	1646
Habsburg rule in 1800 dummy	31	0.16	0.37	0	1
Ottoman rule in 1800 dummy	31	0.32	0.48	0	1
Romanov rule in 1800 dummy	31	0.10	0.30	0	1
Years under Habsburg rule	31	100.4	186.8	0	636
Years under Ottoman rule	31	151.3	210.6	0	624

Note: The sample includes Albania, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czechoslovakia (there is no separate 1952 GDP data for the Czech and the Slovak Republic available, other data had to be constructed using population shares as weights), Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Kosovo (Kosovo rural population data is estimated as the average of the values for Montenegro and Macedonia), Macedonia, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Russia (Russian GDP per capita data is proxied by USSR data), Serbia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom. Interaction terms are centred.

Source: New Maddison Project Database, Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, Climate Change Knowledge Portal, Wikipedia.

Table A2: Correlation matrix of selected cross section data

	Balkan rural population share 1952	Rural population share 1952	Latitude	Log of GDP per capita 1952
Rural population share 1952	0.723			
Urbanisation share change 1952-2010	0.521	0.783		
Years in the EU	-0.516	-0.714		
Log of GDP per capita 1952	-0.791	-0.817	0.668	
Average annual temperature			-0.750	
Years under Ottoman rule	0.704	0.652	-0.624	-0.770

Note: Those variable pairs have been selected where at least one correlation coefficient in the resulting matrix is above 0.7. All the correlation coefficients displayed are significant at the 5% level.

Table A3: Impact of backwardness on GDP in levels, panel data setting including EU years

Dependent variable: GDP per capita 1952-2010	OLS	FE	SYS-GMM	DOLS
Rural population share	-0.0306	-0.0110**	0.000714	-0.0159**
	(0.0185)	(0.00486)	(0.000705)	(0.00590)
Balkan rural population share	0.0554*	-1.18e-05	0.000127	-0.00249
	(0.0318)	(0.00449)	(0.00128)	(0.00444)
EU years and rural interaction	0.00274*	0.000335**	-3.36e-05	0.000194
	(0.00151)	(0.000153)	(6.30e-05)	(0.000164)
EU membership years	0.0748**	0.0127***	-0.00104	0.0130***
	(0.0331)	(0.00418)	(0.00170)	(0.00415)
EU years and Balkan interaction	-0.101	-0.0188	0.00338	0.000470
	(0.0853)	(0.0182)	(0.00225)	(0.00770)
Yugoslavia dummy	-3.303**	0.248**	0.0117	0.293**
	(1.267)	(0.113)	(0.0707)	(0.108)
Comecon dummy	-0.289	0.260***	-0.00633	0.203**
	(0.557)	(0.0941)	(0.00811)	(0.0958)
Lagged log of GDP per capita			1.009***	
			(0.0219)	
Constant	9.487***	8.034***	-0.0673	1.493***
	(0.701)	(0.274)	(0.207)	(0.321)
Observations	1,829	1,829	1,798	1,736
R-squared	0.461	0.906		0.996
Number of countries	31	31	31	31

Note: Robust standard errors in parentheses. Interaction data has been centred. Like the FE specification, DOLS includes fixed country and time effects.

Table A4: Impact of backwardness on GDP in first differences, panel data setting including EU years

Dependent variable: Δ GDP per capita 1952-2010	OLS	FE	FD-GMM	DOLS
Δ Rural population share	-0.00835	-0.00125		
	(0.00506)	(0.00379)		
Δ Balkan rural population share	-0.0104*	-0.0189**		
	(0.00596)	(0.00760)		
Δ EU years and rural interaction	0.000330***	0.000179		
	(0.000109)	(0.000184)		
Δ EU membership years	0.00487	0.00461		
	(0.00348)	(0.00562)		
Δ EU years and Balkan interaction	-0.0102*	0.0164*		
	(0.00533)	(0.00902)		
Yugoslavia dummy	-0.00760*	-0.0144	0.0173	0.293**
	(0.00429)	(0.0114)	(0.0207)	(0.108)
Comecon dummy	-0.00577	-0.00949	-0.00925	0.203**
	(0.00520)	(0.00730)	(0.0215)	(0.0958)
Lagged log of GDP per capita			0.964***	
			(0.0406)	
Rural population share			-0.000685	-0.0159**
			(0.00128)	(0.00590)
Balkan rural population share			0.000370	-0.00249
			(0.00146)	(0.00444)
EU years and rural interaction			2.17e-05	0.000194
			(2.44e-05)	(0.000164)
EU membership years			0.000919	0.0130***
			(0.00113)	(0.00415)
EU years and Balkan interaction			-0.0171***	0.000470
			(0.00317)	(0.00770)
Constant	0.0221***	0.0376***		1.493***
	(0.00268)	(0.0104)		(0.321)
Observations	1,798	1,798	1,767	1,736
R-squared	0.021	0.263		0.996
Number of countries	31	31	31	31

Note: Robust standard errors in parentheses. Interaction data has been centred. Like the FE specification, DOLS includes fixed country and time effects.

Table A5: Impact of backwardness on GDP in first differences, panel data setting including EU dummy

Dependent variable: Δ GDP per capita 1952-2010	OLS	FE	FD-GMM	DOLS
Δ Rural population share	-0.00954*	-0.00178		
	(0.00497)	(0.00343)		
Δ Balkan rural population share	-0.0115*	-0.0192**		
	(0.00585)	(0.00757)		
Δ EU dummy and rural interaction	-0.000155	0.000291		
	(0.000400)	(0.000231)		
EU dummy	-0.00161	0.00288	-0.000453	0.175***
	(0.00282)	(0.00516)	(0.00870)	(0.0376)
EU dummy and Balkan interaction	-0.00574*	0.0184**	0.00279	-0.126**
	(0.00307)	(0.00853)	(0.0125)	(0.0581)
Yugoslavia dummy	-0.00885**	-0.0160	0.0521*	0.338**
	(0.00406)	(0.0110)	(0.0259)	(0.124)
Comecon dummy	-0.00593	-0.0108	0.0172	0.283***
	(0.00535)	(0.00704)	(0.0241)	(0.0942)
Rural population share			-0.00967*	-0.0103**
			(0.00551)	(0.00457)
Balkan rural population share			0.000869	-0.00286
			(0.00121)	(0.00453)
EU dummy and rural interaction			-0.00179*	0.00481**
			(0.00103)	(0.00235)
Lagged log of GDP per capita			0.822***	
			(0.0913)	
Constant	0.0222***	0.0386***		1.062***
	(0.00261)	(0.0102)		(0.235)
Observations	1,798	1,798	1,767	1,736
R-squared	0.018	0.262		0.995
Number of countries	31	31	31	31

Note: Robust standard errors in parentheses. Interaction data has been centred. Like the FE specification, DOLS includes fixed country and time effects.

Table A6: Industry level regression results for the change in the share in total employment (EU dummy)

Dependent variable: Annual change in the employment share	1963-1972	1973-1982	1983-1992	1993-2002	2003-2011	1965-2011
initial empl. share	0.003	-0.003	-0.023***	-0.047**	-0.030***	-0.018***
	(0.005)	(0.008)	(0.007)	(0.017)	(0.006)	(0.001)
earlyEU	-0.045**	-0.021**	0.084***	0.108**	0.026*	0.035***
	(0.015)	(0.008)	(0.015)	(0.041)	(0.015)	(0.005)
midEU	-0.039*	-0.006	0.090***	0.123**	0.047***	0.037***
	(0.018)	(0.004)	(0.020)	(0.044)	(0.014)	(0.005)
lateEU	-0.033	-0.011*	0.092***	0.114**	0.057***	0.038***
	(0.019)	(0.006)	(0.018)	(0.046)	(0.017)	(0.004)
earlyRur	-0.001	-0.000	0.000	-0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)
midRur	-0.001	-0.000	-0.002*	-0.001	0.000	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)
lateRur	-0.001	-0.000	-0.001	-0.000	0.000	-0.001**
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
earlyCom		0.007	0.015	0.094	-0.005	
		(0.014)	(0.014)	(0.064)	(0.010)	
midCom		0.022***	0.023	0.084	0.014	
		(0.007)	(0.020)	(0.065)	(0.010)	
lateCom		0.023**	0.018	0.073	0.021	
		(0.011)	(0.024)	(0.075)	(0.012)	
earlyBalk				0.066*	0.079***	
				(0.037)	(0.009)	
midBalk				0.028	0.059***	
				(0.031)	(0.013)	
lateBalk				-0.031	0.045***	
				(0.038)	(0.014)	
Observations	228	322	311	388	504	230
R-squared	0.411	0.453	0.511	0.453	0.640	0.780
Adj. R-squared	0.304	0.371	0.435	0.364	0.589	0.740

Note: Robust standard errors in parentheses. **Pos.:** refers to statistically significant positive coefficient results. **Neg.:** refers to statistically significant negative coefficient results. The prefix **early**, **mid** and **late** refers to labour intensive and/or domestic-oriented industries, industries that process natural resources to be used by industries further down the value-added chain and relatively more technology-intensive industries mostly producing output for final use by firms and households, respectively. The ending **EU** refers to countries that were during the respective period members of the EU or the European Communities earlier. The ending **Com** refers to countries that were communist dictatorships during the 20th century. The ending **Balk** refers to Balkan countries and the ending **Rur** to the share of rural population in percent of total population as a measure for backwardness.

Table A7: Industry level regression results for employment growth (EU dummy)

Dependent variable: Annual growth in employment	1963-1972	1973-1982	1983-1992	1993-2002	2003-2011	1965-2011
initial empl. share	-0.707*	-0.348*	-0.127	-2.729***	-2.202	-0.080
	(0.376)	(0.172)	(0.171)	(0.569)	(2.854)	(0.877)
earlyEU	0.439	-1.632***	7.008***	10.308***	38.403	-12.164***
	(1.232)	(0.543)	(0.895)	(1.747)	(63.032)	(2.376)
midEU	-0.341	-2.396***	7.447***	9.448***	39.499	-9.099***
	(1.284)	(0.544)	(1.179)	(1.962)	(62.555)	(2.126)
lateEU	-2.376	-1.843**	6.413***	4.519*	62.478	-12.422***
	(1.396)	(0.720)	(0.945)	(2.617)	(67.887)	(1.968)
earlyRur	0.021	0.011	0.075	-0.033	1.599	-1.759***
	(0.097)	(0.055)	(0.046)	(0.098)	(2.379)	(0.066)
midRur	0.121	-0.003	-0.078	-0.099	2.214	-1.685***
	(0.137)	(0.058)	(0.065)	(0.077)	(2.532)	(0.100)
lateRur	-0.030	0.056	0.004	-0.134*	1.848	-1.710***
	(0.106)	(0.069)	(0.058)	(0.067)	(2.872)	(0.063)
earlyCom		1.878***	-0.792	11.231***	-48.968	
		(0.324)	(0.685)	(2.204)	(79.269)	
midCom		-0.034	-1.328	12.229***	-56.652	
		(0.584)	(0.909)	(2.937)	(82.422)	
lateCom		0.186	-3.595***	6.342*	-84.087	
		(1.042)	(1.229)	(3.124)	(91.471)	
earlyBalk				-7.047***	32.588	
				(1.298)	(50.456)	
midBalk				-5.740	21.907	
				(5.781)	(48.742)	
lateBalk				-13.428***	17.605	
				(2.991)	(48.217)	
Observations	226	320	309	387	501	230
R-squared	0.650	0.556	0.494	0.331	0.365	0.600
Adj. R-squared	0.586	0.489	0.415	0.222	0.275	0.525

Note: Robust standard errors in parentheses. **Pos.:** refers to statistically significant positive coefficient results. **Neg.:** refers to statistically significant negative coefficient results. The prefix **early**, **mid** and **late** refers to labour intensive and/or domestic-oriented industries, industries that process natural resources to be used by industries further down the value-added chain and relatively more technology-intensive industries mostly producing output for final use by firms and households, respectively. The ending **EU** refers to countries that were during the respective period members of the EU or the European Communities earlier. The ending **Com** refers to countries that were communist dictatorships during the 20th century. The ending **Balk** refers to Balkan countries and the ending **Rur** to the share of rural population in percent of total population as a measure for backwardness.

Table A8: Industry level regression results for the change in the value added share in GDP (EU dummy)

Dependent variable: Annual change in the value added share	1963-1972	1973-1982	1983-1992	1993-2002	2003-2011	1965-2011
initial v.a. share	-0.004	-0.044***	-0.012	-0.021	-0.035***	-0.016***
	(0.003)	(0.015)	(0.010)	(0.015)	(0.008)	(0.002)
earlyEU	-0.030***	0.001	0.032	-0.015	0.013	0.024***
	(0.009)	(0.033)	(0.024)	(0.068)	(0.015)	(0.007)
midEU	-0.038**	-0.016	0.041	-0.014	0.009	0.028***
	(0.013)	(0.033)	(0.028)	(0.075)	(0.017)	(0.006)
lateEU	-0.015	0.017	0.027	-0.006	0.042**	0.032***
	(0.017)	(0.037)	(0.031)	(0.067)	(0.021)	(0.005)
earlyRur	-0.000	-0.004*	-0.000	-0.001	-0.000	-0.000
	(0.001)	(0.002)	(0.001)	(0.001)	(0.000)	(0.000)
midRur	-0.000	-0.003*	-0.001	0.000	-0.000	-0.000
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.000)
lateRur	-0.000	-0.003**	-0.000	0.001	0.000	-0.001***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
earlyCom		0.128***	-0.017	-0.095	-0.006	
		(0.042)	(0.027)	(0.077)	(0.016)	
midCom		0.111***	0.028	-0.109	0.010	
		(0.038)	(0.026)	(0.087)	(0.019)	
lateCom		0.124**	-0.102***	-0.105	0.014	
		(0.052)	(0.035)	(0.088)	(0.016)	
earlyBalk				0.117***	0.044***	
				(0.012)	(0.012)	
midBalk				0.055**	0.029	
				(0.021)	(0.018)	
lateBalk				0.043**	0.005	
				(0.020)	(0.012)	
Observations	232	322	316	460	562	234
R-squared	0.414	0.761	0.481	0.343	0.591	0.682
Adj. R-squared	0.310	0.726	0.401	0.250	0.539	0.625

Note: Robust standard errors in parentheses. **Pos.:** refers to statistically significant positive coefficient results. **Neg.:** refers to statistically significant negative coefficient results. The prefix **early**, **mid** and **late** refers to labour intensive and/or domestic-oriented industries, industries that process natural resources to be used by industries further down the value-added chain and relatively more technology-intensive industries mostly producing output for final use by firms and households, respectively. The ending **EU** refers to countries that were during the respective period members of the EU or the European Communities earlier. The ending **Com** refers to countries that were communist dictatorships during the 20th century. The ending **Balk** refers to Balkan countries and the ending **Rur** to the share of rural population in percent of total population as a measure for backwardness.

Table A9: Industry level regression results for growth of value added (EU dummy)

Dependent variable: Annual growth in value added	1963-1972	1973-1982	1983-1992	1993-2002	2003-2011	1965-2011
initial v.a. share	-0.245	0.633	0.049	-4.449	-3.702*	-1.085**
	(0.431)	(1.363)	(0.470)	(3.235)	(1.931)	(0.386)
earlyEU	0.899	3.982	7.456***	16.129*	108.202	5.234***
	(2.325)	(4.854)	(1.804)	(9.363)	(101.383)	(1.613)
midEU	-1.383	1.355	4.667	29.304	112.492	7.932***
	(2.215)	(4.392)	(3.083)	(17.552)	(103.956)	(1.605)
lateEU	-1.087	2.156	4.665**	22.718	131.383	6.383***
	(2.358)	(3.872)	(1.838)	(14.617)	(109.045)	(1.277)
earlyRur	-0.076	0.179	-0.048	-0.133	3.784	-0.311***
	(0.132)	(0.151)	(0.116)	(0.406)	(3.954)	(0.088)
midRur	-0.023	0.212	-0.140	-0.372	4.404	-0.383***
	(0.129)	(0.184)	(0.119)	(0.935)	(4.148)	(0.123)
lateRur	-0.094	0.186	-0.125	0.456	4.591	-0.314***
	(0.122)	(0.141)	(0.122)	(0.443)	(4.659)	(0.100)
earlyCom		20.894***	5.751**	3.522	-133.078	
		(6.897)	(2.633)	(13.170)	(130.655)	
midCom		9.307*	4.307	45.437	-146.176	
		(4.578)	(5.019)	(41.228)	(136.425)	
lateCom		7.259	-4.378*	10.188	-172.698	
		(6.345)	(2.383)	(15.246)	(150.766)	
earlyBalk				19.034***	82.518	
				(6.219)	(81.405)	
midBalk				-5.182	86.929	
				(21.701)	(79.777)	
lateBalk				-7.480	71.612	
				(9.492)	(77.250)	
Observations	230	318	309	415	525	234
R-squared	0.743	0.244	0.444	0.197	0.343	0.667
Adj. R-squared	0.697	0.129	0.356	0.075	0.253	0.607

Note: Robust standard errors in parentheses. **Pos.:** refers to statistically significant positive coefficient results. **Neg.:** refers to statistically significant negative coefficient results. The prefix **early**, **mid** and **late** refers to labour intensive and/or domestic-oriented industries, industries that process natural resources to be used by industries further down the value-added chain and relatively more technology-intensive industries mostly producing output for final use by firms and households, respectively. The ending **EU** refers to countries that were during the respective period members of the EU or the European Communities earlier. The ending **Com** refers to countries that were communist dictatorships during the 20th century. The ending **Balk** refers to Balkan countries and the ending **Rur** to the share of rural population in percent of total population as a measure for backwardness.

Table A10: Industry level regression results for growth of productivity (EU dummy)

Dependent variable: Annual growth in productivity	1963-1972	1973-1982	1983-1992	1993-2002	2003-2011	1965-2011
initial productivity	-0.000**	-0.000	-0.000***	0.000	0.000	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
earlyEU	0.886	6.950	3.104***	7.261*	0.237	4.300***
	(1.688)	(7.036)	(0.860)	(3.555)	(4.163)	(0.232)
midEU	-0.148	4.390	0.186	6.087*	2.080	6.929***
	(1.724)	(6.174)	(2.565)	(3.515)	(6.042)	(0.860)
lateEU	1.614	5.625	1.163	3.499	-8.020	6.466***
	(1.397)	(5.950)	(1.382)	(3.879)	(8.534)	(0.269)
earlyRur	-0.128*	0.050	-0.189*	0.708	-0.003	0.117***
	(0.063)	(0.125)	(0.107)	(0.486)	(0.161)	(0.016)
midRur	-0.139**	0.085	-0.114	0.705	0.139	0.032
	(0.051)	(0.163)	(0.097)	(0.513)	(0.260)	(0.044)
lateRur	-0.099*	0.012	-0.207*	0.801	0.154	0.091***
	(0.047)	(0.080)	(0.105)	(0.729)	(0.149)	(0.008)
earlyCom		22.449**	5.401***	-13.365	-2.540	
		(10.621)	(1.650)	(8.089)	(4.716)	
midCom		10.792**	5.632	-12.316	-8.166	
		(4.843)	(4.727)	(8.665)	(7.422)	
lateCom		10.371**	-0.285	-0.899	-2.359	
		(4.755)	(1.525)	(8.788)	(4.864)	
earlyBalk				17.996**	-11.660***	
				(6.682)	(4.188)	
midBalk				19.115***	3.205	
				(6.495)	(6.596)	
lateBalk				4.286	-9.250	
				(6.347)	(7.155)	
Observations	226	318	308	349	490	228
R-squared	0.635	0.178	0.559	0.148	0.303	0.653
Adj. R-squared	0.568	0.053	0.489	-0.002	0.202	0.590

Note: Robust standard errors in parentheses. **Pos.:** refers to statistically significant positive coefficient results. **Neg.:** refers to statistically significant negative coefficient results. The prefix **early**, **mid** and **late** refers to labour intensive and/or domestic-oriented industries, industries that process natural resources to be used by industries further down the value-added chain and relatively more technology-intensive industries mostly producing output for final use by firms and households, respectively. The ending **EU** refers to countries that were during the respective period members of the EU or the European Communities earlier. The ending **Com** refers to countries that were communist dictatorships during the 20th century. The ending **Balk** refers to Balkan countries and the ending **Rur** to the share of rural population in percent of total population as a measure for backwardness.

Table A11: Industry level regression results for different industrialisation indicators (EU years)

	employment share	employment growth	value added share	value added growth	productivity growth	dominant overlap
1963-1972	**Neg.: earlyEU, midEU, lateEU**	**Neg.: earlyEU, midEU, lateEU**	**Neg.: earlyEU, midEU, lateEU**	**Neg.: earlyEU, midEU, lateEU**	**Neg.: earlyEU, midEU, lateEU**	**Neg.: earlyEU, midEU, lateEU**
1973-1982	Pos.: midCom, lateCom	**Pos.: earlyCom**	**Pos.: earlyCom, midCom, lateCom; Neg.: earlyEU, midEU, lateEU**	**Pos.: earlyCom**	**Pos.: earlyCom**	**Pos.: earlyCom**
1983-1992	Pos.: earlyRur; Neg.: earlyEU, midEU, lateEU, earlyCom	**Pos.: earlyRur; Neg.: earlyEU, midEU, lateEU, earlyCom, midCom, lateCom**	**Neg.: earlyEU, midEU, lateEU, earlyCom, lateCom**	**Neg.: earlyEU, midEU, lateEU, lateCom**	**Neg.: earlyEU, midEU, lateEU, lateCom**	**Neg.: earlyEU, midEU, lateEU, lateCom**
1993-2002	Neg.: earlyEU, midEU, lateEU, earlyCom, midCom, lateCom	*Neg.: earlyEU, midEU, lateEU, earlyCom, midCom, lateCom, earlyBalk, lateBalk*	Pos.: earlyBalk, midBalk, lateBalk	**Pos.: earlyBalk; Neg.: earlyCom, lateCom**	**Pos.: earlyBalk, midBalk; Neg.: earlyCom, midCom**	**Pos.: earlyBalk; Neg.: earlyCom, lateCom**
2003-2011	**Pos.: lateCom, earlyBalk, midBalk**		**Pos.: earlyBalk**		*Neg.: earlyBalk*	**Pos.: earlyBalk**
1965-2011	**Pos.: earlyEU, midEU, lateEU**	*Neg.: earlyEU, midEU, lateEU, earlyRur, midRur, lateRur*	**Pos.: earlyEU, midEU, lateEU**	**Pos.: earlyEU, midEU, lateEU; Neg.: earlyRur, midRur, lateRur**	**Pos.: earlyEU, midEU, lateEU, earlyRur, lateRur**	**Pos.: earlyEU, midEU, lateEU**

Note: This is a summary of the underlying regression presented in the Tables A6-A10 in the Appendix. **Pos.:** refers to statistically significant positive coefficient results. **Neg.:** refers to statistically significant negative coefficient results. The prefix **early**, **mid** and **late** refers to labour intensive and/or domestic-oriented industries, industries that process natural resources to be used by industries further down the value-added chain and relatively more technology-intensive industries mostly producing output for final use by firms and households, respectively. The ending **EU** refers to countries that were during the respective period members of the EU or the European Communities earlier. The ending **Com** refers to countries that were communist dictatorships during the 20th century. The ending **Balk** refers to Balkan countries and the ending **Rur** to the share of rural population in percent of total population as a measure for backwardness.

Table A12: Industry level regression results for the change in the share in total employment (EU years)

Dependent variable: Annual change in the employment share	1963-1972	1973-1982	1983-1992	1993-2002	2003-2011	1965-2011
initial empl. share	-0.009*	-0.003	-0.031***	-0.047**	-0.030***	-0.018***
	(0.004)	(0.011)	(0.007)	(0.017)	(0.006)	(0.001)
earlyEU	-0.008***	0.000	-0.009***	-0.081**	0.004*	0.005***
	(0.001)	(0.003)	(0.002)	(0.032)	(0.002)	(0.001)
midEU	-0.008***	0.001	-0.007***	-0.081**	0.004*	0.005***
	(0.001)	(0.003)	(0.002)	(0.032)	(0.002)	(0.001)
lateEU	-0.007***	0.001	-0.008***	-0.081**	0.004*	0.005***
	(0.001)	(0.003)	(0.002)	(0.032)	(0.002)	(0.001)
earlyRur	-0.000	-0.001	0.001**	-0.000	-0.000	-0.000
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
midRur	-0.001	-0.000	-0.001	-0.001	0.000	-0.001
	(0.001)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)
lateRur	-0.001	-0.000	-0.000	-0.000	0.000	-0.001*
	(0.001)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
earlyCom		0.009	-0.014**	-0.584***	0.028	
		(0.006)	(0.006)	(0.205)	(0.023)	
midCom		0.022***	0.008	-0.607***	0.043*	
		(0.006)	(0.012)	(0.203)	(0.021)	
lateCom		0.025***	0.001	-0.608***	0.053**	
		(0.007)	(0.012)	(0.193)	(0.023)	
earlyBalk				0.067*	0.071***	
				(0.037)	(0.007)	
midBalk				0.029	0.044**	
				(0.032)	(0.016)	
lateBalk				-0.031	0.029*	
				(0.038)	(0.016)	
Observations	228	322	311	388	504	230
R-squared	0.469	0.456	0.536	0.452	0.630	0.781
Adj. R-squared	0.369	0.372	0.461	0.364	0.579	0.740

Note: Robust standard errors in parentheses. **Pos.:** refers to statistically significant positive coefficient results. **Neg.:** refers to statistically significant negative coefficient results. The prefix **early**, **mid** and **late** refers to labour intensive and/or domestic-oriented industries, industries that process natural resources to be used by industries further down the value-added chain and relatively more technology-intensive industries mostly producing output for final use by firms and households, respectively. The ending **EU** refers to countries that were during the respective period members of the EU or the European Communities earlier. The ending **Com** refers to countries that were communist dictatorships during the 20th century. The ending **Balk** refers to Balkan countries and the ending **Rur** to the share of rural population in percent of total population as a measure for backwardness.

Table A13: Industry level regression results for employment growth (EU years)

Dependent variable: Annual growth in employment	1963-1972	1973-1982	1983-1992	1993-2002	2003-2011	1965-2011
initial empl. share	-1.495**	-0.387*	-0.501*	-2.716***	-1.423	-0.071
	(0.611)	(0.213)	(0.273)	(0.630)	(3.035)	(0.876)
earlyEU	-0.535**	-0.037	-0.436***	-7.067***	3.856	-1.631***
	(0.185)	(0.093)	(0.129)	(1.469)	(7.831)	(0.315)
midEU	-0.588**	-0.041	-0.358**	-7.080***	3.660	-1.596***
	(0.224)	(0.100)	(0.128)	(1.439)	(7.631)	(0.312)
lateEU	-0.719***	-0.002	-0.390***	-7.138***	3.063	-1.635***
	(0.207)	(0.095)	(0.124)	(1.441)	(7.512)	(0.320)
earlyRur	0.056	0.006	0.119**	-0.022	1.573	-1.816***
	(0.095)	(0.054)	(0.051)	(0.097)	(2.399)	(0.078)
midRur	0.134	-0.004	-0.039	-0.090	2.120	-1.732***
	(0.135)	(0.056)	(0.064)	(0.075)	(2.516)	(0.104)
lateRur	-0.014	0.057	0.033	-0.120*	1.615	-1.768***
	(0.106)	(0.070)	(0.050)	(0.067)	(2.819)	(0.071)
earlyCom		1.702***	-2.375***	-47.857***	-4.668	
		(0.410)	(0.546)	(10.687)	(14.287)	
midCom		0.086	-2.074***	-46.451***	-16.471	
		(0.600)	(0.652)	(9.827)	(19.996)	
lateCom		0.326	-3.903***	-49.525***	-61.304	
		(0.914)	(0.993)	(9.304)	(44.020)	
earlyBalk				-6.986***	16.718	
				(1.320)	(41.981)	
midBalk				-5.666	5.683	
				(5.793)	(39.966)	
lateBalk				-13.412***	-6.204	
				(3.019)	(38.839)	
Observations	226	320	309	387	501	230
R-squared	0.659	0.557	0.504	0.323	0.366	0.597
Adj. R-squared	0.594	0.488	0.424	0.214	0.276	0.523

Note: Robust standard errors in parentheses. **Pos.:** refers to statistically significant positive coefficient results. **Neg.:** refers to statistically significant negative coefficient results. The prefix **early**, **mid** and **late** refers to labour intensive and/or domestic-oriented industries, industries that process natural resources to be used by industries further down the value-added chain and relatively more technology-intensive industries mostly producing output for final use by firms and households, respectively. The ending **EU** refers to countries that were during the respective period members of the EU or the European Communities earlier. The ending **Com** refers to countries that were communist dictatorships during the 20th century. The ending **Balk** refers to Balkan countries and the ending **Rur** to the share of rural population in percent of total population as a measure for backwardness.

Table A14: Industry level regression results for the change in the value added share in GDP (EU years)

Dependent variable: Annual change in the value added share	1963-1972	1973-1982	1983-1992	1993-2002	2003-2011	1965-2011
initial v.a. share	-0.011**	-0.055***	-0.021	-0.021	-0.035***	-0.017***
	(0.005)	(0.016)	(0.013)	(0.015)	(0.008)	(0.002)
earlyEU	-0.006**	-0.017**	-0.010**	0.012	0.002	0.004***
	(0.002)	(0.006)	(0.004)	(0.050)	(0.002)	(0.001)
midEU	-0.006**	-0.017**	-0.009**	0.012	0.002	0.003***
	(0.002)	(0.006)	(0.004)	(0.050)	(0.002)	(0.001)
lateEU	-0.005**	-0.016**	-0.010**	0.012	0.003	0.004***
	(0.002)	(0.006)	(0.004)	(0.050)	(0.002)	(0.001)
earlyRur	0.000	-0.002	0.001	-0.001	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)
midRur	-0.000	-0.002	-0.000	0.000	0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)
lateRur	-0.000	-0.002*	0.001	0.001	0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
earlyCom		0.075***	-0.040**	0.009	0.010	
		(0.016)	(0.016)	(0.346)	(0.022)	
midCom		0.078***	0.015	-0.018	0.021	
		(0.016)	(0.013)	(0.340)	(0.022)	
lateCom		0.098***	-0.109***	-0.012	0.034	
		(0.029)	(0.024)	(0.336)	(0.023)	
earlyBalk				0.117***	0.042***	
				(0.012)	(0.010)	
midBalk				0.055**	0.028*	
				(0.021)	(0.016)	
lateBalk				0.043**	-0.003	
				(0.020)	(0.013)	
Observations	232	322	316	460	562	234
R-squared	0.439	0.785	0.501	0.344	0.585	0.686
Adj. R-squared	0.336	0.752	0.422	0.251	0.533	0.629

Note: Robust standard errors in parentheses. **Pos.:** refers to statistically significant positive coefficient results. **Neg.:** refers to statistically significant negative coefficient results. The prefix **early**, **mid** and **late** refers to labour intensive and/or domestic-oriented industries, industries that process natural resources to be used by industries further down the value-added chain and relatively more technology-intensive industries mostly producing output for final use by firms and households, respectively. The ending **EU** refers to countries that were during the respective period members of the EU or the European Communities earlier. The ending **Com** refers to countries that were communist dictatorships during the 20th century. The ending **Balk** refers to Balkan countries and the ending **Rur** to the share of rural population in percent of total population as a measure for backwardness.

Table A15: Industry level regression results for growth of value added (EU years)

Dependent variable: Annual growth in value added	1963-1972	1973-1982	1983-1992	1993-2002	2003-2011	1965-2011
initial v.a. share	-1.913**	-0.478	-1.354*	-4.394	-2.716	-1.174**
	(0.631)	(0.602)	(0.648)	(3.138)	(1.807)	(0.385)
earlyEU	-1.374***	-1.663	-1.580***	-13.788*	12.531	0.744***
	(0.231)	(1.376)	(0.261)	(6.990)	(12.382)	(0.221)
midEU	-1.504***	-1.703	-1.569***	-13.643*	12.310	0.697***
	(0.236)	(1.396)	(0.273)	(6.976)	(12.144)	(0.225)
lateEU	-1.470***	-1.702	-1.558***	-13.542*	11.499	0.730***
	(0.236)	(1.414)	(0.250)	(6.952)	(11.698)	(0.233)
earlyRur	0.007	0.379	0.118	-0.157	3.722	-0.272**
	(0.131)	(0.280)	(0.079)	(0.428)	(3.959)	(0.098)
midRur	0.020	0.355	-0.047	-0.378	4.269	-0.371***
	(0.125)	(0.250)	(0.095)	(0.951)	(4.092)	(0.116)
lateRur	-0.055	0.305	-0.033	0.437	4.216	-0.284**
	(0.123)	(0.199)	(0.100)	(0.421)	(4.512)	(0.106)
earlyCom		15.552***	1.705	-111.730**	-6.956	
		(3.992)	(2.092)	(48.041)	(14.320)	
midCom		5.964	3.092	-77.304*	-24.905	
		(4.846)	(3.062)	(39.245)	(26.981)	
lateCom		5.029	-4.791***	-105.081**	-74.381	
		(6.318)	(1.538)	(49.672)	(54.566)	
earlyBalk				19.041***	57.063	
				(6.213)	(64.827)	
midBalk				-5.182	60.071	
				(21.725)	(62.020)	
lateBalk				-7.451	38.327	
				(9.466)	(57.634)	
Observations	230	318	309	415	525	234
R-squared	0.762	0.260	0.475	0.197	0.345	0.667
Adj. R-squared	0.717	0.145	0.390	0.074	0.256	0.607

Note: Robust standard errors in parentheses. **Pos.:** refers to statistically significant positive coefficient results. **Neg.:** refers to statistically significant negative coefficient results. The prefix **early**, **mid** and **late** refers to labour intensive and/or domestic-oriented industries, industries that process natural resources to be used by industries further down the value-added chain and relatively more technology-intensive industries mostly producing output for final use by firms and households, respectively. The ending **EU** refers to countries that were during the respective period members of the EU or the European Communities earlier. The ending **Com** refers to countries that were communist dictatorships during the 20th century. The ending **Balk** refers to Balkan countries and the ending **Rur** to the share of rural population in percent of total population as a measure for backwardness.

Table A16: Industry level regression results for growth of productivity (EU years)

Dependent variable: Annual growth in productivity	1963-1972	1973-1982	1983-1992	1993-2002	2003-2011	1965-2011
initial productivity	-0.000***	-0.000	-0.000***	0.000	0.000	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
earlyEU	-0.556***	-1.747	-1.011***	-5.772*	-0.110	0.562***
	(0.065)	(1.582)	(0.158)	(2.790)	(0.591)	(0.054)
midEU	-0.603***	-1.782	-1.042***	-5.836*	-0.015	0.528***
	(0.155)	(1.600)	(0.140)	(2.789)	(0.591)	(0.096)
lateEU	-0.498***	-1.813	-1.039***	-5.565*	-0.126	0.563***
	(0.115)	(1.620)	(0.164)	(2.697)	(0.599)	(0.072)
earlyRur	-0.070	0.343	-0.023	0.706	-0.038	0.122***
	(0.060)	(0.281)	(0.078)	(0.482)	(0.166)	(0.014)
midRur	-0.099*	0.301	-0.019	0.690	0.115	0.016
	(0.048)	(0.252)	(0.099)	(0.513)	(0.266)	(0.043)
lateRur	-0.064	0.200	-0.092	0.837	0.114	0.093***
	(0.045)	(0.195)	(0.079)	(0.736)	(0.154)	(0.010)
earlyCom		13.365***	0.257	-61.648**	-2.668	
		(3.922)	(1.296)	(28.270)	(2.588)	
midCom		4.459	3.087	-61.052**	-6.053	
		(5.165)	(3.027)	(26.858)	(4.244)	
lateCom		3.770	-3.676***	-42.434*	-2.333	
		(5.646)	(0.915)	(21.136)	(2.389)	
earlyBalk				17.950**	-11.374***	
				(6.648)	(3.792)	
midBalk				19.040***	3.145	
				(6.449)	(6.699)	
lateBalk				4.137	-6.551	
				(6.314)	(6.202)	
Observations	226	318	308	349	490	228
R-squared	0.649	0.209	0.588	0.151	0.297	0.651
Adj. R-squared	0.583	0.085	0.521	0.002	0.195	0.587

Note: Robust standard errors in parentheses. **Pos.:** refers to statistically significant positive coefficient results. **Neg.:** refers to statistically significant negative coefficient results. The prefix **early**, **mid** and **late** refers to labour intensive and/or domestic-oriented industries, industries that process natural resources to be used by industries further down the value-added chain and relatively more technology-intensive industries mostly producing output for final use by firms and households, respectively. The ending **EU** refers to countries that were during the respective period members of the EU or the European Communities earlier. The ending **Com** refers to countries that were communist dictatorships during the 20th century. The ending **Balk** refers to Balkan countries and the ending **Rur** to the share of rural population in percent of total population as a measure for backwardness.