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One economy, but different growth regimes: why Germany's rural east is still lagging

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Abstract

Purpose – This study aims to elucidate the quantitative and qualitative differences in employment development between German districts. Building on ideas from competitive development and resource-based theory, the paper particularly seeks to explain enduring East-West differences between rural regions by two different forms of competitive advantage: cost leadership and quality differentiation.

Design/methodology/approach – This study follows a two-step empirical approach: First, an extended shift-share regression is conducted to analyze employment development in Western and Eastern German districts between 2007 and 2016. Second, the competitive share effect and other individual terms of the shift-share model are further examined in additional regressions using regional economic characteristics as exogenous variables.

Findings – The findings suggest that the above-average employment growth of the rural districts in the West is owed to the successful exploitation of experience in manufacturing that has been gathered by firms in the past 100 years or so. While their strategy is largely based on advanced and specialized resources and an innovation-driven differentiation strategy, the relatively weak employment development of Eastern rural districts might be explained by a lack of comparable long-term experiences and the related need to focus on the exploitation of basic and general resources and, accordingly, on the efficiency-based strategy of cost leadership.

Originality/value – This study offers an in-depth empirical analysis of how the competitive share effect, i.e. region-specific resources beyond industry structure, contributes to regional employment development. The analysis reveals that quantitative differences in rural employment development are closely related to qualitatively different levels of input factors and different regimes of competitiveness.

Keywords Structural change, East Germany, Rural regions, Employment development, Shift-share regression, West Germany

Paper type Research paper

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1. Introduction

Ever since the German reunification, regional economic research has been concerned with the comparison of economic developments in West and East Germany. From a policy perspective, it was hoped that these developments would be accompanied by a steady decrease in economic disparities between the West and the East. In this regard, however, the results are still mixed. On the one hand, the first half of the 1990s had witnessed perceivable signs of economic convergence as, for instance, Eastern labor productivity had quickly risen from only 34% of the Western level in 1991 to 64% in 1995. On the other hand, though, not only was the rise in productivity partly driven by a sharp drop in employment, but it also had come more or less to a halt during the 2000s. In 2015, that is, 25 years after re-unification, productivity in East Germany still amounted to only 79% of the West while at the same time unemployment rates, though decreasing, were still significantly higher in the East (Müller *et al.*, 2017).

Conceivably, given the fundamental institutional change in Eastern Europe, convergence may have been hampered by a lack of "systemic competitiveness" (Esser *et al.*, 2013), i.e. a lack of effective institutional support for open markets and businesses. Within Germany, however, there have long been few profound differences in formal institutions between the East and West. Rather, a variety of additional support structures and services were created for the economic development of the East. Many other reasons for the persistent East-West divide in employment dynamics have indeed been proposed, among them the difficult starting conditions for East German companies after reunification and – partly as long-term consequences – a smaller manufacturing sector, a smaller average firm size, lower investment rates, and, not less crucial, the lack of corporate headquarters and thus less research and development activities (Niebuhr, 2017).

Against this background, the question arises as to which economic mechanisms might explain the enduring structural and performance differences between German regions in the East and West. The present paper proposes a conceptual frame that seeks to explain enduring East-West differences by the existence of different "competitive development" stages or growth regimes (Porter, 1990). The concept of "competitive development" perishes arguments from the comparative advantage theorem and offers points of connection to the resource-based view of Barney (1991) which we will exploit for this paper. Although the concept was originally introduced to describe developments at the national level, for this paper we want to transfer it to the regional level. The above theories lead us to assume that the still lacking East-West convergence is mainly due to the relative weakness of the rural East, where knowledge-intensive manufacturing experiences a relatively backward stage of "competitive development" due to a lack of tacit knowledge and complementary specific production capacities.

We use an extended shift-share regression model that illuminates the employment development in urban and rural districts in Germany's East and West between 2007 and 2016. The shift-share analysis is a suitable approach for analyzing regional advantages and identifying "competitiveness effects" that become apparent when certain industries develop differently in certain locations than in others (Lahr and Ferreira, 2020). Previously, shift-share regressions have been carried out for German regions by Blien and Wolf (2002) and Suedekum *et al.* (2006) who each put a focus on Eastern Germany, and by Klinger and Wolf (2008) and Blien *et al.* (2014) who, respectively, investigated the development in Western Germany and Bavaria. Shift-share regressions attribute regional development differences to particularities in the developments of cross-industry regional factors and individual industries.

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Many apparent weaknesses of the shift-share approach stem from its inherently descriptive nature (for an overview, see Lahr and Ferreira, 2020). We deal with this descriptive character in three ways: First, we do not expect the empirical results themselves to reveal a mechanism, but only to confirm or refute the phenomena predicted based on the proposed mechanism. Second, we subdivide the usual shift-share regression by estimating all effects separately by four location types: Western-rural, Western-urban, Eastern-rural and Eastern-urban. We thereby introduce *spatial location effects* to capture both, the historically evolved differences inherent in the socialist and capitalist past of Eastern and Western Germany and the varying economic environments in urban and rural areas. This step of analysis also provides us with the "competitive share effect" which represents a region-specific trans-industrial advantage often explained by agglomeration economies (Hanson, 2001). Third, based on the estimators and the structural data of each district in the analysis, we calculate the region-specific manifestations of the industry effects and the unexplained deviations. The latter denotes deviations in regional employment dynamics within individual industries and could result from industry-specific localization effects. Eventually, we analyze the relationships between all effects and how they relate to further regional economic characteristics.

The remainder of this study is organized as follows: Section 2 presents Porter's concept of "competitive development" stages as a frame to explain economic differences between Western-rural, Western-urban, Eastern-rural and Eastern-urban German regions. Section 3 introduces the empirical strategy and the individual elements of the shift-share regression model. Section 4 contains the two-step empirical analysis consisting of, first, an extended shift-share regression to analyze the employment development in German districts and, second, a group of supplementary regression models to explore the driving forces behind the competitive share effect and the unexplained deviations. Section 5 proposes a theory-led explanation of the empirical findings, while Section 6 critically addresses some inevitable shortcomings of our approach.

2. Conceptual frame

Economic convergence between different locations is one of the classic expectations that economists associate with the free market. The persistence of economic differences between Eastern and Western Europe or Germany after the fall of the Iron Curtain is an example of how these expectations are often not fulfilled. Such observations have led to a wealth of empirical analyses on the patterns and causes of this failure (Rey and Janikas, 2005). Many analyses have found that convergence depends on a region's structural characteristics, or that regions form "convergence clubs" that differ in their initial conditions (Bartkowska and Riedl, 2012). In other words: Differences in economic structures are crucial, as "convergence in outcomes is more likely if the structures are more similar" (Marelli, 2004, p. 36). However, there are many different theoretical approaches to explaining persistent regional differences in economic structure and development (Rey and Janikas, 2005). One of them is the theory of comparative advantages (TCA).

The TCA serves as the explanation for regional specialization and trade. It states that industries locate where the factors they require most are relatively abundant (Jones, 1956). However, the TCA only considers labor, capital, land and other basic factors that have not been created in the production process themselves. Porter (1990), in contrast, claims that production factors might have to be defined in more detail to explain differences in enterprise activities and performance. He proposes a differentiation between "basic" factors such as climate and unskilled labor and "advanced" factors which have to be created, for instance, computer scientists or telecommunications infrastructure (Table 1). Advanced

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	Basic resources	Advanced resources
General resources	Land, unskilled or semi-skilled labor, and debt capital	(Academically) Trained labor, Modern general infrastructure
Development stage	*Factor- and efficiency-driven*	*Innovation-driven (R&D)*
Competitive advantage	*Cost minimization*	*Quality lead through differentiation (in general)*
Specialized resources	Scarce natural resources and related production factors	Know-how, market-specific technological solutions
Development stage	*Factor- and efficiency-driven*	*Innovation-driven (Experience and R&D)*
Competitive advantage	*Resource exploitation and cost minimization*	*Quality lead through **focused** differentiation*

Table 1.
Matrix of different types of factors or resources and related development stages

Source: Own figure

factors open up the possibility for the dynamic creation of comparative advantages; the ability of the static TCA to explain differences in regional specialization is then restricted. This is recognized, for example, by spatial equilibrium models (Moretti, 2011) from urban economics and by models from the New Economic Geography (Krugman, 1998) where spatial agglomerations are fueled by "comparative advantages stemming from economies of scale and the market structure" (Dosi and Tranchero, 2019, p. 3). As these models explain the development of agglomerations, they therein confirm that innovative, dynamic and knowledge-intensive industries locate in economic core regions, where capital, including human capital, is abundant. Relatively land-intensive low-tech manufacturing industries, on the other hand, are assumed to settle mainly in the economic peripheries (Desmet and Henderson, 2015).

Margarian (2022b) points out that the simplistic deficiency-oriented characterization of peripheral locations in these approaches is due to their concentration on general resources that are homogenous across enterprises and cities, not least because they are well observable (upper half of Table 1). If only general resources are considered, peripheral regions are defined by a relative abundance of basic resources such as land, and unskilled and semi-skilled labor (upper left quadrant of Table 1). Agglomerations or large cities, on the other hand, are then characterized by a relative abundance of advanced resources, e.g. academically trained labor and knowledge infrastructure (upper right quadrant of Table 1). Enterprises in (peripheral) locations that provide only access to general basic resources lack access to advanced resources and belong to low-tech industries that are under fierce price competition. They have to maximize technical efficiency and minimize production costs to survive globalization and structural change. These enterprises and locations would then be specifically negatively affected by structural change (Desmet and Henderson, 2015) in which employment and expenditures in the service sector increased at the expense of agriculture and manufacturing (Bárány and Siegel, 2018). In high-wage countries, the exploitation of scarce natural (basic) resources (right quadrant in the bottom half of Table 1) would then be the best opportunity for the manufacturing sector to withstand the increasing competitive pressure. Unfortunately, in Germany, these resources are very scarce.

However, according to the resource-based view of Barney (1991) firms should not only specialize in industries for which resources are relatively abundant, but should also engage

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in gainful advanced activities that allow them to generate and exploit resources that are valuable, rare, inimitable, and nonsubstitutable (VRIN). VRIN resources would eventually enable firms to realize not only comparative but also competitive, i.e. absolute, advantages and thus make them less reliant on external location conditions (Barney, 1991). Porter (1990) supports Barney's argument through his introduction of "specialized factors" that are location- or firm-specific and created by firms or other institutions. They could therefore be classified as "advanced specialized resources" (Margarian, 2022b; right quadrant in the bottom half of Table 1), helping firms resist negative general industry trends caused by globalization and structural change (Dauth and Suedekum, 2016). If these advanced specialized resources spill over between neighboring/cooperating firms (Feldman, 1994) or if they are created and/or provided by other institutions within the region (Porter, 1990), they can generate competitive, i.e. absolute, advantages at the regional and industry level (Ricci, 1999).

According to Porter (1990, p. 79) "to support competitive advantage, a factor must be highly specialized to an industry's particular needs," or, we would add in line with Barney (1991), it would have to belong to industry or firm-specific VRIN resources. "Specialization to particular needs" creates complementarities, which in turn explain the immobility of advanced specialized resources in the presence of firm heterogeneity (Adegbesan, 2009). This immobility prevents other firms from acquiring the same factors and resources, thus guaranteeing lasting competitive advantages (Barney, 1991). Complementarity arises from technological co-evolution (Hullova *et al.*, 2016); it implies that one production factor has to be complemented by a different factor to realize its full productivity potential (Adegbesan, 2009). To the advantage of small firms in particular (Feldman, 1994), not only firm-specific but also location-specific resources can be a source of complementarity (Brave and Mattoon, 2020). Due to the important "employee-technology interface," company-specific complementarities are more pronounced in the manufacturing sector than in the service sector (Boxall, 2003). In the service sector, scale effects and entry barriers tend to be relatively low due to low (sunk) investment costs, and service industries suffer from a weak "regime of appropriability" because innovative services can be observed and copied more easily than innovative manufacturing processes (Bharadwaj *et al.*, 1993). In manufacturing, machinery and other capacities are frequently developed, improved and adapted to specific requirements in the course of production. production (Hullova *et al.*, 2016). Their operation then requires the locally specific know-how of those employees that have received "on-the-job training" or otherwise acquired tacit knowledge within their firms (Tyler, 2001). This know-how cannot be easily transferred to other firms or locations that lack the initial firms' specific machinery. If workers or machinery move separately to another location, they, therefore, lose their specific productivity.

The complementary development that creates specialized advanced factors, therefore, requires relatively stable industry structures and employment relations (Margarian *et al.*, 2022). Stable employment relations are characteristic of rural locations with their sparse labor markets (Margarian, 2022b). Many rural districts in the West, in particular in the German South, benefit from more than 100 years of experience in manufacturing industries under free market conditions. Here, complementary and locally specific capacities and capabilities have been (co-)created within manufacturing firms over time. Due to locally restricted knowledge spillovers through common labor- and local product markets and direct contacts along the value chain, positive cluster effects that serve the stabilization of firms might have supported this manufacturing-based development. The rural East, by contrast, joined the world market only thirty years ago and is thus less experienced with market-driven growth. One consequence is a relative lack of locally specific capacities and

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capabilities for the exploitation of market opportunities. This might be one reason why firms in the East experience competition on prices rather than competition on quality, which favors low-cost production with low-wage jobs (Schnabel, 2016). This holds specifically true for rural locations (Margarian, 2022b; Belitz *et al.*, 2019). Hence, the long-term processes required for the creation of "sustained competitive advantages" (Barney, 1991) could explain the persistent differences between rural regions in Germany's East and West.

As a result, we expect many rural locations in the West to benefit today from the specialized advanced resources that have been created there in recent decades; in contrast, we expect rural locations in the East to lack competitive advantages because their market-economy development was interrupted by the socialist order during the decades of German division. Enterprises there will then be forced to exploit the relative abundance of general basic resources in their locations, i.e. cheap land or real estate and cheap labor if any. Urban cores, on the other hand, both in the East and the West, should more or less benefit from a relative abundance of general advanced resources (see Table 1).

With the expectations formulated above, we have sketched an idea of a mechanism that could explain enduring structural and economic differences specifically between rural locations in the East and West. Building on this, we will now examine the extent to which the development patterns of rural and urban districts in Germany's East and West correspond to these expectations and, in particular, to the notion that specialized advanced resources might be specifically important for rural development. These expectations would be supported if we find clear differences between rural locations in East and West not only in dynamics but also in development patterns. Further evidence would be if, contrary to its general trend, manufacturing makes a particularly positive contribution to employment development in certain rural regions and especially in the west.

3. Empirical analyses

We start with a data-based characterization of the four location types that are crucial for our analysis before we discuss the shift-share analysis. To gain a first impression of the economic capacities of each location type, we use a multinomial logistic regression, where the log odds for classified as "West rural," "West urban" or "East urban" in reference to the type "East rural" are being explained by selected economic indicators:

$$ln\big(\Pr(\delta_z = i)/\Pr(\delta_z = east\,rural)\big) = \sum_j \beta_j X_{j,z} \tag{1}$$

with i ∈ {urban west, rural west, urban east} and δ_z as spatial location of region z and $X_{j,z}$ as explanatory variable j in region z. Frequently used explanatory variables are used to characterize the economic strength and structure of regional economies, such as industry and enterprise structure, export orientation, knowledge intensity, productivity and income as well as sector shares. According to Marelli (2004, p. 37), for example, "there is a close relationship between the level of development of national and regional economies on one hand, and their productive structure on the other. Sectors may, in turn, differ because of differences in capital intensity, scale economies, intersectoral linkages and technical progress as well as, according to more recent theories, the use of human capital, the knowledge intensity and some tradability characteristics."

Figure 1 presents the results of this descriptive categorization in terms of economic fundamentals' marginal effects on districts' probabilities to belong to a specific location. The marginal effect has been calculated as the difference in probabilities when the determinant takes on the value of its first and its third quartile, while all other determinants remain at the

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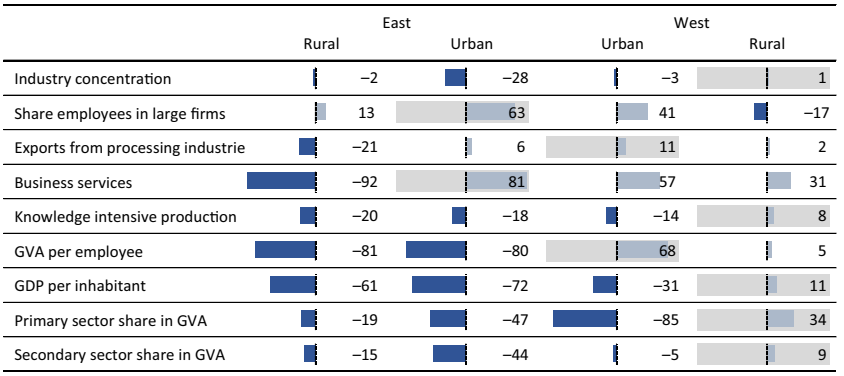

Notes: Cox-Snell Pseudo R-square of 0.7. Grey shaded are the highest marginal effects per line, which distinguish locations from each other. Industry concentration is measured according to the "National Averages Index" (see Mack *et al*., 2007). Large firms are firms with more than 250 employees. Exports of the processing industries are measured in 1000 Euro per employee. Business services is the share of employees in industries 62-64, 66, 69, 70-74 according to the NACE Statistical classification of economic activities 2008. Knowledge intensive production is the share of employees in industries 20, 21 and 26-30

Source: Own figure based on data from INKAR 2016 edited by the Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR), Bonn, and on data from the Federal Employment Agency on employment (within the scope of national insurance) for specified industry groups, Nuremberg 2017. For the National Averages Index see Mack *et al*. (2007)

Figure 1. Characterization of spatial locations in terms of economic fundamentals' marginal effects on the probability to belong to a specific spatial location

median level. If, for example, the share of employees in large firms with more than 250 employees is on its third-quartile level, a district's probability to belong to the location "East urban" is 63% higher than if this share is on its first-quartile level all other determinants equal.

Urban districts in the West can thereby be characterized by a high level of exports from processing industries and a high degree of productivity (measured as gross value added [GVA] per employee). Rural districts in the West, in turn, distinguish themselves by relatively high shares of GVA from the primary and secondary sectors, high-income potentials in terms of gross domestic product (GDP) per inhabitant, and a high share of employees in knowledge-intensive production, i.e. in those processing industries that are usually classified as knowledge intensive. Specific characteristics of urban districts in the East include a relatively high share of large firms with at least 250 employees and employees in business services. The rural East, by contrast, does not show a specific strength in any of these dimensions and thereby shows signs of being structurally disadvantaged.

Overall, the economic features of the West seem to be more favorable for economic growth than the features of the East. This finding largely corresponds with the employment dynamics observed for the period between 2007 and 2016. As displayed in Figure 2, districts in the East and distinctively in the rural East show a weaker development in terms of employment than districts in the West while the greatest differences can be observed

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between the Rural West and the Rural East (upper part of Figure 2). At the same time, changes in productivity have been at comparable levels in all four region types (bottom part of Figure 2). These deviations suggest the existence of three different growth regimes: one in the urban East and West, one in the rural West, where productivity growth is complemented by strong employment growth as their competitiveness allows firms to serve growing (global) markets; and one in the rural East, which is characterized by labor-saving technical progress and productivity growth at the expense of employment development. The strong positive deviations in the rural West fit the expectation that specialized advanced resources can accumulate under stable and favorable conditions.

3.1 Shift-share regression

With shift-share regressions, we analyze spatial patterns of economic development in Germany from 2007 to 2016. For our analyses, we use data from the German Federal Labor Agency at the district level that reports the number of employees liable for social security insurance by industry. Industries have been further aggregated based on the two-digit level (NACE 2008) to minimize a loss of observations due to data protection disclosure rules. The number of industries in our sample thus amounts to 22.

Shift-share analyses decompose the development into an industry- and a region-specific element, where the industry-specific dynamic is reflected by the national mean in industry development, and the region-specific dynamic describes local development deviations from the national mean across industries. Regression-based approaches further allow for a differentiation between systematic region-level and random region-level effects. Our analysis does not focus on shift-share results themselves but takes them as starting point for further analyses that explore, why there are location- and region-specific dynamics.

The starting point is a shift-share regression as proposed by Patterson (1991). We follow the standard assumptions of modern shift-share regressions (Blien and Wolf, 2002; Blien *et al.*, 2014; Patterson, 1991; for more details see Margarian and Hundt, 2019). We explain the development of employment (*emp*) in relative terms:

$$y_{r,\,z,s,t} = \frac{emp_{r,z,s,t} - emp_{r,z,s,\,t-1}}{emp_{r,z,s,t-1}} \tag{2}$$

where $y_{r,z,s,t}$ represents the relative employment development in region z in the industry s at time t differentiated by spatial location r (with $r \in$ {urban West, rural West, urban East, rural East}).

The estimated fixed effect panel model simply is:

$$\hat{y}_{r,z,s,t} = \delta_r + \alpha_{r,s} + \beta_t + \gamma_{r,z} + \varepsilon \tag{3}$$

with δ_r as *spatial location effect* that measures the change in regional employment attributable to a region's spatial location r; $\alpha_{r,s}$ as *industry mix effect* that attributes changes in regional employment to changes in the regional industry structure while reflecting the impact of regional specialization in sectors that are slow or fast growing relative to the national average across industries; β_t as a *time effect* that controls for annual cyclical trends using dummy variables; $\gamma_{r,z}$ as *competitive share effect* that measures the change in regional employment attributable to region-specific competitive advantages that are the same to all firms in the region (e.g. physical infrastructure); and ε as *stochastic error term* with $\varepsilon_i \sim N(0, \sigma^2)$.

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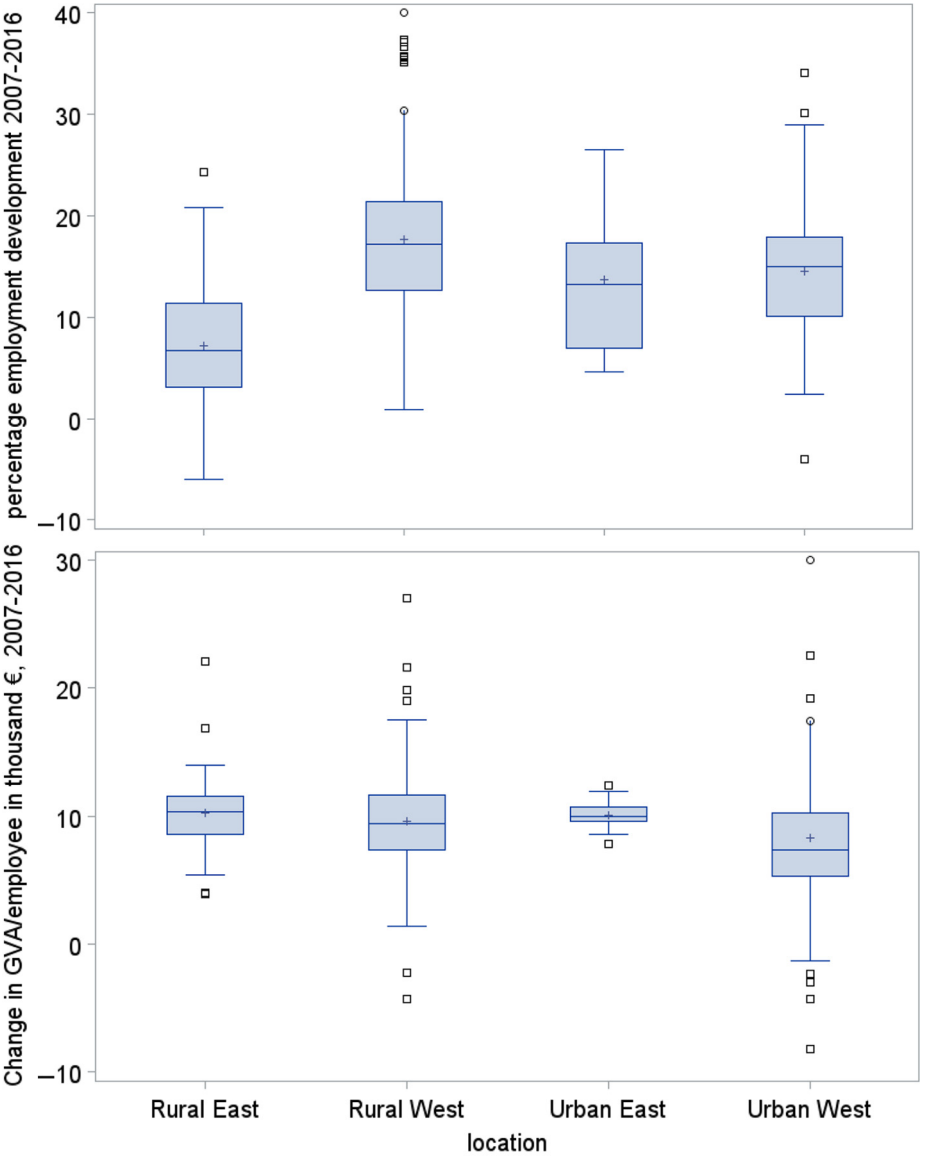

Source: Own figure based on data from the Federal Employment Agency on employment (within the scope of national insurance), Nuremberg, and from INKAR, Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR)

Figure 2. Changes in employment and productivity by spatial location, 2007–2016

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The industry mix effects are differentiated by location and represent each industry's distinct contribution to employment development in each of the four spatial locations.

To convert the general industry mix effects into the district-specific *industry structure effect* ζ_z, we weight the industry mix effects ($\alpha_{s,r(z)}$) in each case with their regional industry shares ($I_{s,z}$) and then sum them up:

$$\zeta_z = \sum_s \alpha_{s,r(z)} I_{s,z} \tag{4}$$

The industry structure effect implies that if industries that are growing or declining at the national level have a strong presence in a region, the respective regional economy would be expected to grow or decline in terms of employment as well. Finally, we calculate the unexplained deviations. Unexplained deviations indicate that employment development in individual industries within a region has deviated from the industry's mean employment development and from the region's systematic employment trend that is captured by the competitive share effect. Hence, they describe dynamics that are neither systematically related to general industry dynamics nor region-specific dynamics beyond isolated industry effects. Instead, they reflect specific conditions within a specific industry of a specific region that may be caused by idiosyncratic shocks or by specific local conditions that affect the competitiveness of selected industries (Jofre-Monseny *et al.*, 2018).

Accordingly, we compute *unexplained deviations* on district level (ξ_z) in reference to $\bar{y_z}$ as mean observed region specific employment development over time $y_{z,t}$ by the subtraction of the spatial location effect($\delta_{r(z)}$), the competitive share effect (γ_z)and the industry structure effect(ζ_z) [1]:

$$\xi_z = \bar{y}_z - \delta_{r(z)} - \gamma_z - \zeta_z \tag{5}$$

Figure 3 presents the spatial location effects and the industry mix effects differentiated by the spatial location that have been identified in the basic shift-share regression. Spatial location effects (intercepts) capture the differences in levels of development between locations, while industry mix effects represent each industry's distinct contribution to employment development in each of the four spatial locations. According to the linear industry coefficients, employment in rural districts in the West would grow by 2.21 percentage points per year assuming mean industry structure.

In the hypothetical case, in contrast, where 100% of employees were employed in "simple production," employment development would be reduced by 2.64 percentage points, i.e. in this region, employment would decrease by 0.43 percentage points per year. The results reveal signs of heterogeneity among the industry mix effects depending on spatial location. Production of electronics and machines, for example, contributes negatively to employment development in the West according to industry mix effects but positively so in the East. Information and communication technology activities are positive for employment development everywhere but in rural districts in the East. Logistics and "health and social services" contribute positively to employment development in rural districts in the East. This heterogeneity implies the existence of between-location heterogeneity in the relative development of employment in specific industries.

Instead of presenting long tables with competitive share effects, which are determined separately for each of the 401 districts, we discuss the relationship between the different effects or terms from the shift-share regression (Figure 4). In general, and in line with assumptions of standard shift-share analyses, employment at a location would be expected

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	Development employees							
	East Urban		West Urban		East Rural		West Rural	
Intercept	1.11	(0.21)	1.51	(0.07)	0.76	(0.09)	2.21	(0.05)
Agriulture, Forestry, Fish; Mining, pit and query	-1.35	(1.46)	-0.61	(0.37)	-1.23	(0.34)	0.40	(0.19)
Food and feedingstuff	-2.02	(1.26)	-0.81	(0.36)	-0.02	(0.42)	-1.30	(0.22)
Simple production	-0.14	(0.98)	-2.98	(0.29)	-0.54	(0.39)	-2.64	(0.20)
Mineral oil, rubber, glas etc.; Chemistry & Pharmaceuticals	-0.34	(1.24)	-0.57	(0.37)	0.22	(0.45)	-1.09	(0.25)
Metal processing	-1.35	(1.08)	-2.30	(0.31)	-0.19	(0.39)	-1.24	(0.21)
Electric & electronic products; Machines and vehicles	1.13	(1.02)	-1.41	(0.32)	0.86	(0.43)	-0.71	(0.22)
Supply and disposal; Construction	-1.42	(0.67)	-0.22	(0.20)	-0.64	(0.25)	-0.41	(0.14)
Vehicle trade & maintenance	1.07	(0.85)	-0.22	(0.26)	-0.57	(0.33)	-1.01	(0.18)
Wholesale	-2.73	(0.79)	-1.55	(0.23)	-1.51	(0.35)	-1.07	(0.18)
Retail sale	1.56	(0.63)	-0.04	(0.19)	0.37	(0.26)	-0.26	(0.14)
Logistics	0.86	(0.83)	0.61	(0.25)	0.70	(0.33)	0.63	(0.18)
Hotel and restaurants	1.49	(0.72)	1.80	(0.22)	1.71	(0.30)	1.08	(0.16)
Information	0.11	(1.19)	-0.33	(0.37)	-0.55	(0.69)	-0.16	(0.35)
Communication (ICT)	2.63	(0.87)	1.40	(0.27)	-1.28	(0.49)	1.24	(0.26)
Finance- & insurance services	-1.69	(0.84)	-1.37	(0.27)	-1.69	(0.37)	-2.35	(0.19)
General services	2.51	(0.66)	2.61	(0.21)	1.90	(0.30)	2.81	(0.18)
Business services	2.20	(0.61)	2.69	(0.20)	0.96	(0.31)	2.22	(0.16)
Labour placement & temporary employment	0.84	(1.03)	1.99	(0.36)	3.39	(0.56)	3.95	(0.34)
Public sector; Education & Training	-1.69	(0.81)	0.37	(0.26)	-2.12	(0.33)	-0.28	(0.17)
Health & social services	2.34	(0.61)	1.81	(0.20)	2.02	(0.27)	0.77	(0.15)
Arts, entertainment, recreation	-2.23	(0.76)	0.21	(0.25)	-0.91	(0.36)	0.61	(0.19)
Private & household services	-1.80	(0.80)	-1.08	(0.23)	-0.87	(0.34)	-1.18	(0.17)

Note: Standard errors in brackets
Source: See Figure 1; own calculation

Figure 3. Location effects (intercepts) and industry mix effects by spatial location

to grow or decline if growing respectively declining industries concentrate there. Instead, as displayed in line 1 of Figure 4-A, the correlation between the industry structure effect and employment development is *negative* (−0.16): employment development tends to be slower in regions with high employment shares in fast-growing industries. At the same time, employment development is highly and positively correlated with the spatial location effect (+0.46) and in particular with the competitive share effect (+0.72) which is why the latter two seem to explain regional employment development much better than the industry structure effect. The unexplained deviations show a rather weak positive correlation with employment development (+0.15).

As can be seen from line 2 or 4 in Figure 4-A, the industry structure effect also exhibits a strong negative relationship with the location effect. As the industry structure effect is the weighted sum of the industry mix effects, it will be low, whereas the share of employment in manufacturing is high because most manufacturing industries have experienced a weak employment development between 2007 and 2016 (see Figure 3 and for more details, Margarian and Hundt, 2019). It follows that the industry structure effect is low in the rural West (where the share of manufacturing is high, see Figure 1). However, its seemingly unfavorable industry structure does not prevent the rural West from achieving the highest location coefficient of all four locations (see Figure 3).

In contrast, the industry structure effect is relatively high in urban regions, where services have a high share in employment due to services' positive employment development (see Figure 3 and, for more details, Margarian and Hundt, 2019). Line 1 of Figure 4-B confirms that the expected positive correlation between employment development and the industry structure effect applies to urban, but not so to rural districts. In other words, a higher share of jobs in fast-growing industries (services) contributes to positive development in urban but not in rural districts. Consequently, the industry

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A	Correlations of all effects in all locations	Location effect	Competitive share effect	Industry structure eff.	Unexplained deviations
1	Employment development	0.46	0.72	-0.16	0.15
2	Location effect	1	0.00	-0.58	-0.06
3	Competitive share effect	0.00	1	-0.05	-0.31
4	Industry structure effect	-0.58	-0.05	1	-0.13

B	Correlations of industry structure effects by locations	Urban west	Rural west	Urban east	Rural east
1	Employment development	0.26	0.04	0.57	-0.05
2	Location effect	-0.70	Identical	0.66	Identical
3	Competitive share effect	0.02	-0.11	0.56	-0.20

Figure 4.
Pearson correlation coefficients between economic characteristics at the regional level

Source: Own calculation

structure effect relates positively (negatively) to the spatial location effect in the East (West), where the spatial location effect is higher (lower) in urban locations (see line 2 of Figure 4-B and Figure 3). Only in the urban east is a more positive industry structure effect accompanied by a higher tendency toward a strong competitive share effect (see line 3 of Figure 4-B). In other words, high shares of high-growth services contribute little to region-specific employment dynamics in all other locations.

3.2 Further analyses of shift-share terms

To further investigate these observations, we use four identical OLS models to respectively explain the observed employment development (y_z), the competitive share effect (γ_z) (as estimated in the initial shift-share regression), the industry structure effect (ζ_z) and the unexplained deviations (ξ_z) (as derived from the estimated effects) by selected economic fundamentals ($X_{j,z}$). The model(s) can be written as follows:

$$\psi_{i,z} = \beta_0 + \sum_j \beta_j X_{j,z} + \varepsilon \quad \text{for} \quad i \in \{y, \gamma, \zeta, \xi\} \tag{6}$$

The results are presented in Figure 5, and they are to be interpreted as follows: If, for example, the share of academically trained employees is one standard deviation above the mean:

- employment development (Model 1) increases by 0.25 percentage points;
- the competitive share effect (Model 2) increases by 0.148 percentage points, which implies that regions with more academically trained employees tend to experience more positive employment development across industries;
- the industry structure effect (Model 3) increases by 0.027 percentage points, which is probably because many academics are employed in fast-growing industries like business or health services; and

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		Employment dev.	Comp. share effect	Ind. Struct. effect	Unexplained dev.
		Model 1	Model 2	Model 3	Model 4
	Intercept	1.804 (0.052)	-0.029 (0.053)	-0.007 (0.012)	-0.189 (0.030)
	Location east	-1.159 (0.209)	0.169 (0.214)	0.114 (0.049)	0.166 (0.121)
z-standardised	Population potential	-0.127 (0.042)	-0.037 (0.043)	0.070 (0.010)	0.010 (0.024)
z-standardised	Share academically trained employees	0.248 (0.072)	0.148 (0.074)	0.027 (0.017)	0.100 (0.042)
z-standardised	Share untrained employees	0.005 (0.075)	0.109 (0.077)	-0.078 (0.018)	0.053 (0.043)
z-standardised	Industry concentration	-0.124 (0.039)	-0.106 (0.040)	-0.036 (0.009)	0.002 (0.023)
z-standardised	Share employees in large firms	-0.191 (0.051)	-0.169 (0.052)	0.041 (0.012)	0.051 (0.029)
z-standardised	Exports from processing industries	-0.0084 (0.0384)	-0.0314 (0.0392)	0.0472 (0.0090)	-0.0211 (0.0222)
z-standardised	Business services	-0.054 (0.067)	-0.054 (0.068)	0.046 (0.016)	0.038 (0.039)
z-standardised	Knowledge intensive production	-0.059 (0.053)	0.025 (0.054)	-0.012 (0.012)	0.108 (0.031)
z-standardised	GVA per employee	0.176 (0.068)	0.228 (0.069)	-0.054 (0.016)	0.018 (0.039)
z-standardised	GDP per inhabitant	0.033 (0.078)	0.031 (0.080)	0.045 (0.018)	0.010 (0.045)
z-standardised	Primary sector share in GVA	0.249 (0.044)	0.229 (0.045)	-0.026 (0.010)	0.046 (0.025)
z-standardised	Secondary sector share in GVA	0.020 (0.062)	-0.014 (0.064)	-0.084 (0.015)	0.128 (0.036)
	R-Square	0.41	0.19	0.76	0.09

Notes: Explained effects in percent. Explanatory variables apart from 'Location east' are z-standardised. Standard errors in brackets

Source: Own calculation based on data from INKAR 2016 edited by the Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR), Bonn, and on data from the Federal Employment Agency on employment (within the scope of national insurance) for specified industry groups, Nuremberg 2017

Figure 5. OLS regression results on the relationship between shift share effects and economic fundamentals

- the unexplained deviations (Model 4) increase by 0.1 percentage points, which indicates that in regions with more academically trained employees, certain industries tend to show above-average employment development.

Figure 5 shows that with other influences controlled, employment development (Model 1) is specifically weak in the East, while "location east" contributes positively to the competitive share effect and the industry structure effect (Models 2 and 3). Only individual industries

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idiosyncratically exhibit weaker developments in Eastern districts according to the unexplained deviations and given the structural controls (Model 4). Likewise, the relationships between economic fundamentals and employment development (Model 1) are much more congruent with their relationships to the competitive share effects (Model 2) than with their relationships to the industry structure effects or the unexplained deviations (Models 3 and 4).

On closer inspection, it can be seen that regions with high employment shares in strong growing industries (Model 3):

- are located in densely populated regions;
- provide relatively few employment opportunities for unskilled people;
- provide many jobs in large firms;
- exhibit strong export orientation;
- are strong in business services;
- experience low productivity in terms of GVA per employee;
- demonstrate a high-income potential in terms of GDP per inhabitant; and
- have low GVA shares from the primary and specifically from the secondary sector.

Regions with high competitive share effects (Model 2), whose employment development systematically deviates positively from the mean development of their industries:

- are frequently located away from densely populated areas;
- provide jobs for relatively many high-skilled, but also relatively many low-skilled employees;
- have a relatively small employment share in large firms;
- show high productivity in terms of GVA per employee but not necessarily a high-income potential in terms of GDP per inhabitant; and
- have a high share in the primary sector (and no specifically low share in the secondary sector) GVA.

That the competitive share effect is rather weak in regions with a high population while the industry structure effect is higher in these densely populated regions comes as a surprise given that competitive share effects could reflect agglomeration advantages of urban locations. The observation supports the idea that peripheral locations with low population could benefit from certain location advantages as well.

Overall, the results indicate that those factors that characterize locations with high employment shares in fast-growing industries are not the same factors that characterize regions that experience above-average growth across industries. Specifically, while the secondary and the primary sector generally experience weak employment development, employment development in regions with a high share of the secondary or the primary sector is not necessarily weak as well (Models 1 and 2). Employment in regions with a high share of the primary sector might show above-average growth because of catch-up phenomena in other industries, while employment in regions with a high share of the secondary sector might show a relatively positive employment development because manufacturing firms in these production-oriented regions are specifically competitive. This interpretation is further supported by the observation that selected industries rather than all firms in a region benefit from a manufacturing focus as indicated by its positive impact on the unexplained deviations (Model 4).

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Finally, we use a generalized least square model that allows for the inclusion of interaction effects to control for potential between-location heterogeneity among the competitive share effect and the industry structure effect. For this purpose, economic fundamentals ($X_{j,z}$) interact with dummies for the four locations r while the location coefficients δ_r themselves are treated as intercepts to allow for the simultaneous estimation of all four "spatial location models." The model(s) then take the following form:

$$\psi_{i,r} = \sum_r \delta_r + \sum_r \sum_j \delta_r \beta_{r,j} X_{j,r} + \varepsilon \quad \text{für} \quad i \in \{\gamma, \zeta\} \tag{7}$$

The results in Figure 6 confirm significant differences between spatial locations in different respects. First, above-average growth across industries in regions of different spatial locations depends on different conditions. The competitive share effect tends to be high in the:

- rural East with many untrained employees;
- rural West with high shares of primary sector GVA, high-income potential (GDP per inhabitant) and high productivity;

		Competitive share effect				Industry structure effect				Unexplained deviations			
		Urban		Rural		Urban		Rural		Urban		Rural	
		West	East	West	East	West	East	West	East	West	East	West	East
		Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9	Column 10	Column 11	Column 12
	Intercept	0.227 (0.199)	-3.353 (11.891)	-0.088 (0.068)	2.196 (0.633)	0.246 (0.044)	-1.629 (2.639)	-0.059 (0.015)	0.465 (0.141)	-0.231 (0.132)	1.048 (7.864)	-0.211 (0.045)	-0.176 (0.419)
z-standardised	Share academically trained employees	0.144 (0.090)	0.904 (0.682)	0.003 (0.097)	0.360 (0.210)	0.053 (0.020)	0.041 (0.151)	0.078 (0.021)	-0.063 (0.047)	-0.184 (0.060)	0.088 (0.451)	0.076 (0.064)	0.013 (0.139)
z-standardised	Share untrained employees	0.038 (0.144)	-1.840 (3.686)	0.046 (0.085)	1.322 (0.349)	-0.172 (0.032)	-0.143 (0.818)	-0.043 (0.019)	0.112 (0.077)	-0.067 (0.095)	0.785 (2.438)	-0.057 (0.056)	-0.001 (0.231)
z-standardised	Industry concentration	0.139 (0.093)	-1.464 (1.710)	0.116 (0.046)	0.110 (0.122)	-0.026 (0.021)	-0.433 (0.380)	-0.025 (0.010)	-0.039 (0.027)	0.042 (0.062)	-0.142 (1.131)	0.021 (0.031)	-0.018 (0.081)
z-standardised	Share employees in large firms	-0.295 (0.106)	-0.447 (0.743)	-0.238 (0.069)	-0.212 (0.156)	0.064 (0.024)	0.110 (0.165)	-0.019 (0.015)	0.026 (0.035)	-0.082 (0.070)	0.010 (0.491)	0.060 (0.046)	-0.133 (0.103)
z-standardised	GDP per inhabitant	0.216 (0.110)	-1.966 (6.337)	0.191 (0.097)	0.883 (0.556)	0.039 (0.024)	0.396 (1.406)	0.072 (0.022)	0.178 (0.123)	0.063 (0.073)	0.754 (4.191)	-0.159 (0.064)	0.154 (0.368)
z-standardised	GVA per employee	0.069 (0.107)	0.606 (2.995)	0.266 (0.095)	0.598 (0.203)	-0.055 (0.024)	-0.274 (0.665)	-0.021 (0.021)	-0.070 (0.045)	0.067 (0.071)	-0.313 (1.980)	-0.061 (0.063)	-0.050 (0.134)
z-standardised	Primary sector share in GVA	0.288 (0.241)	4.003 (10.960)	0.349 (0.054)	0.049 (0.095)	-0.025 (0.054)	-0.989 (2.433)	-0.021 (0.012)	-0.029 (0.021)	-0.074 (0.160)	0.685 (7.248)	0.037 (0.036)	0.047 (0.063)
z-standardised	Secondary sector share in GVA	0.098 (0.067)	-2.300 (1.401)	0.087 (0.064)	0.077 (0.123)	-0.061 (0.015)	-0.308 (0.311)	-0.116 (0.014)	0.013 (0.027)	-0.109 (0.044)	-0.175 (0.926)	0.027 (0.042)	0.099 (0.081)
	R-Square				0.31				0.80				0.11

Notes: Explained effects in percent. Explanatory variables are z-standardised. Standard errors in brackets

Source: Own calculations based on data from INKAR 2016 edited by the Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR), Bonn, and on data from the Federal Employment Agency on employment (within the scope of national insurance) for specified industry groups, Nuremberg 2017

Figure 6. GLS regression results on the relationship between district-level economic fundamentals and competitive share and industry structure effects by location

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- urban East with low shares of secondary sector GVA; and
- urban West with low shares of employees in large firms, and high-income potentials.

Second, fast-growing industries' location depends on other conditions than those that are supportive of the competitive share effect. The industry structure effect is high in districts in the:

- rural East with a high share of untrained employees and low productivity;
- rural West with high shares of academically trained employees, low shares of untrained employees, high-income potentials and low shares of untrained employees, as well as of primary and secondary sector GVA;
- urban East with high industry diversity (low industry concentration) and low secondary sector share in GVA; and
- urban West with high shares of academically trained employees, low shares of untrained employees, and a low secondary sector share in GVA. These determinants are similar to those in the rural West, but in the urban West, the industry structure effect is also high with high shares of employees in large firms and low productivity (GVA per employee).

Optimal conditions for fast-growing industries are not identical to optimal conditions for general (across-industry) growth. Only in the rural east do low-wage conditions (high share of unskilled labor and low productivity) support a stronger contribution of fast-growing industries to local growth.

Finally, results for unexplained deviations show that the positive relationship of a manufacturing focus on employment development in selected industries holds for rural, but not so for urban districts in the East and the West (columns 11 and 12 in Figure 6). The results also suggest that the emergence of industry concentrations (also known as "clusters") and the establishment of large firms tend to have a positive impact on firms in the rural West but not in the rural East (ibid). However, the fact that a high-income potential has a decidedly negative impact on the development of selected industries in the rural West, but relates positively to selected industries' employment development in the rural East could indicate congestion or competition effects in the west that restrict further growth of certain industries. Generally, given relatively high standard errors, the unexplained deviations are difficult to explain. This supports the idea that they capture the effects of idiosyncratic, firm- or industry-specific competitive advantages that result from path-dependent developments.

4. Discussion and classification of the results

Here, we have used an extended concept of different "competitive development stages" (Porter, 1990) to hypothesize that a specific weakness of rural industries may contribute decisively to the persistent lack of convergence between East and West in Germany. Decades of missing opportunities to accumulate tacit knowledge and specific, complementary production capacities, as well as related competitive advantages in manufacturing, are particularly fatal for rural locations that do not benefit from agglomeration advantages and do not attract entrepreneurs or skilled labor from the West.

To corroborate our expectations, we have analyzed the differences in employment dynamics among German districts between 2007 and 2016 using extended, descriptive shift-share regressions in line with the methodological considerations summarized by Lahr and

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Ferreira (2020). Our results generally support the expectation that dynamic employment development in rural regions crucially depends on the experience and tacit knowledge that manufacturing firms and employees have accumulated there over decades. In the absence of this experience, rural areas cannot develop comparable dynamics and are then confined to a less stable, low-growth regime.

The high relevance of the manufacturing sector only becomes clear at a second glance as high industry structure effects are intimately linked to a high prevalence of fast-growing service industries. An initial indication of the importance of manufacturing comes from the finding that regions with high industry structure effects tend to be characterized by economic profiles that are almost opposite to the profiles of regions with high competitive share effects, i.e. with above-average growth across industries. Moreover, we find negative correlations between the industry structure effect and employment developments within districts. An industry's effect on regional employment development is therefore not necessarily determined by the industry's general employment trend and high employment shares of weakly growing (manufacturing) industries in a region do not regularly translate into weak regional employment development. Specifically, some regions with a high share of manufacturing, namely in the rural West, achieve higher growth rates than predicted by their industry structure. Given the lack of agglomeration effects in rural areas, this argues for firm- or location-specific competitive advantages that are not due to general advanced resources but to specialized advanced resources that have been accumulated locally over time. While location-specific effects are captured by the competitive share effects, firm- or industry-specific competitive advantages are captured by the unexplained deviations in the shift-share regression. Together, these effects can compensate for negative trends of structural change in the manufacturing sector.

We can identify three regional development regimes that can be matched with our conceptual frame as summarized in Table 1 and allocated to urban districts, Western rural districts and Eastern rural districts. The East-West divide in employment development applies specifically to rural districts while urban districts in the East and the West are relatively alike in terms of both structural characteristics and employment dynamics. Our explanation of the differences in employment development in rural but not urban districts in the East and the West is based on the following core results:

- Urban districts show more convergence in terms of employment development than rural districts.
- In contrast to rural districts, urban districts benefit from positive industry structure effects that are due to service sector employment growth.
- High secondary sector shares contribute positively to regional across-industry growth (competitive share effect) in the West but not so in the East.
- A high share of untrained employees and low-income potentials in terms of GDP per inhabitant relate positively to competitive share effect in the rural East, confirming the expectation that a low-wage regime prevails here.

The recognition that urban centers in the East, despite difficult starting conditions after reunification, can experience growth and convergence if they manage to exploit their agglomeration advantage and attract knowledge-intensive industries and high-skilled workers is in line with what we know from the literature so far. Overall, we conclude that both, Eastern and Western urban districts, can be located in the upper right quadrant of Table 1. The differences between rural districts in the East and West expressed by (c) and (d), in contrast, could indicate that successful rural districts follow a manufacturing-based

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high-productivity regime in the West but a low-cost regime in the East. The low-cost regime reflects an adaptation to the conditions described by the upper left quadrant of Table 1. Other than in urban regions, this East-West divide between rural districts has not been overcome by the attraction of skilled labor or competitive firms. This could be due to the relative immobility of those specialized advanced resources that support the competitive advantage of successful enterprises in locations that lack agglomeration advantages and general advanced resources. At least the most successful of the rural districts in the West could then be located in the bottom right quadrant of Table 1. We conclude that the rural East is still lagging in its economic development because it has not had sufficient opportunity to create those specialized advanced resources that are at the heart of firm- and location-specific competitive advantages. We thereby find that consideration of specialized advanced resources could be helpful and required to explain the strength of successful rural locations.

The practical implications of our findings are rather disillusioning, stating above all that autonomous development takes time. Companies in rural regions that benefit little from the immigration of entrepreneurs and skilled workers have little chance of catching up with their more experienced competitors as long as there are no technological disruptions that create a new level playing field for all. Knowing these limits, however, can prevent money from being invested in the wrong political measures. Beyond uncontrollable technological disruptions, stable conditions that favor the continuous development of industries and companies are of utmost importance for the development of competitive advantages in rural locations. In times of economic turbulence, stabilizing measures such as the payment of short-time allowances can therefore be of particular structural importance for disadvantaged rural regions. Awareness of the high relevance of long-term structural disadvantages can also protect against shifting the responsibility for the failure of development efforts solely onto local actors. And it promises the hope that each new round in the Schumpeterian process of creative destruction will open a window of opportunity for new locations.

5. Limitations and outlook

We recognize some caveats in our approach. First, we only apply a broad differentiation by East-West and Urban-Rural into four spatial locations. While an empirically guided stronger differentiation might be worthwhile, however, the restricted number of observations limits model complexity. This limitation is fundamental if one deals with evolutionary processes that result in a potentially unlimited number of local equilibria. Not all of the factors that cause these differences are observable. Specifically, knowledge-related factors tend to remain hidden behind artificial and rather broad (industry) classifications.

Although our regression analyses yielded interesting results, the limitations of this reduced form of empirical analysis are obvious. As historical events, path-dependence, contingencies and idiosyncratic influences are likely to affect regional economic development, no region is fully comparable with any other because of the endogenously developed complementary capacities and capabilities. The idiosyncrasies increase within the process of development. From a methodological perspective, this implies that statistical analyses alone cannot fully explain, why specific locations develop more favorably than others. We propose that in this case, the analytical statistical approach has to be complemented by case-based configurational approaches (Meyer *et al.*, 1993).

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Note

1. Due to the descriptive character of our analysis, and as we analyze the whole "population" of 401 districts and do not aim at an empirical extrapolation of our results, we refrain from presenting *p*-values and significance tests. They are neither required nor appropriate in this case, where the estimates serve only to summarize efficiently and concisely the information obtained from the data (Margarian 2022a). Because the data are a complete sample, the calculated unexplained variances provide a valid indication of the fit of the model as expressed by the point estimates for each observation, even though standard errors are not available.

References

Adegbesan, J.A. (2009), "On the origins of competitive advantage: strategic factor markets and heterogeneous resource complementarity", *Academy of Management Review*, Vol. 34 No. 3, pp. 463-475, doi: 10.5465/amr.2009.40632465.

Bárány, Z.L. and Siegel, C. (2018), "Job polarization and structural change", *In American Economic Journal: Macroeconomics*, Vol. 10 No. 1, pp. 57-89, doi: 10.1257/mac.20150258.

Barney, J. (1991), "Firm resources and sustained competitive advantage", *In Journal of Management*, Vol. 17 No. 1, pp. 99-120, doi: 10.1177/014920639101700108.

Bartkowska, M. and Riedl, A. (2012), "Regional convergence clubs in Europe: identification and conditioning factors", *In Economic Modelling*, Vol. 29 No. 1, pp. 22-31, doi: 10.1016/j.econmod.2011.01.013.

Belitz, H., Schiersch, A. and Stühmeier, T. (2019), "Produktivitätsentwicklung: Potenziale in stadt und land", *In Wirtschaftsdienst*, Vol. 99 No. 5, pp. 355-358, doi: 10.1007/s10273-019-2456-2.

Bharadwaj, S.G., Varadarajan, P.R. and Fahy, J. (1993), "Sustainable competitive advantage in service industries: a conceptual model and research propositions", *Journal of Marketing*, Vol. 57 No. 4, pp. 83-99, doi: 10.1177/002224299305700407.

Blien, U., Eigenhüller, Lutz, Promberger, M. and Schanne, N. (2014), "The shift-share regression. An application to regional employment development in Bavaria", in Karima, K. Peter, N.R.S. (Eds), *Applied Regional Growth and Innovation Models*, Vol. 40, Springer Berlin Heidelberg (Advances in Spatial Science), Berlin, Heidelberg, pp. 109-137.

Blien, U. and Wolf, K. (2002), "Regional development of employment in eastern Germany: an analysis with an econometric analogue to shift-share techniques", *Pap Reg Sci*, Vol. 81 No. 3, pp. 391-414, doi: 10.1111/j.1435-5597.2002.tb01240.x.

Boxall, P. (2003), "HR strategy and competitive advantage in the service sector", *In Human Resource Management Journal*, Vol. 13 No. 3, pp. 5-20, doi: 10.1111/j.1748-8583.2003.tb00095.x.

Brave, S.A. and Mattoon, R.H. (2020), "Explaining urban economic growth through cluster complementarity", *In Growth Change*, Vol. 51 No. 1, pp. 4-33, doi: 10.1111/grow.12340.

Dauth, W. and Suedekum, J. (2016), "Globalization and local profiles of economic growth and industrial change", *J Econ Geogr*, Vol. 16 No. 5, pp. 1007-1034, doi: 10.1093/jeg/lbv028.

Desmet, K. and Henderson, J.V. (2015), "Chapter 22 – the geography of development within countries", Vernon Henderson, G.D.J. and Strange, W. (Eds), *Handbook of Regional and Urban Economics*, Vol. 5, Elsevier, pp. 1457-1517, available at: www.sciencedirect.com/science/article/pii/B9780444595317000223

Dosi, G. and Tranchero, M. (2019), "The role of comparative advantage, endowments and technology in structural transformation", LEM Working Paper Series, Scuola Superiore Sant'Anna, Laboratory of Economics and Management, Pisa (2018/33).

Feldman, M.P. (1994), "Knowledge complementarity and innovation", *In Small Bus Econ*, Vol. 6 No. 5, pp. 363-372, doi: 10.1007/BF01065139.

Downloaded from http://ftp.nowpublishers.com/cr/article-pdf/33/7/1/542739/cr-09-2022-0130.pdf by guest on 18 June 2026

Hanson, G.H. (2001), "Scale economies and the geographic concentration of industry", *In Journal of Economic Geography*, Vol. 1 No. 3, pp. 255-276, doi: 10.1093/jeg/1.3.255.

Hullova, D., Trott, P. and Simms, C.D. (2016), "Uncovering the reciprocal complementarity between product and process innovation", *In Research Policy*, Vol. 45 No. 5, pp. 929-940, doi: 10.1016/j.respol.2016.01.012.

Jofre-Monseny, J., Sánchez-Vidal, M. and Viladecans-Marsal, E. (2018), "Big plant closures and local employment", *In Journal of Economic Geography*, Vol. 18 No. 1, pp. 163-186, doi: 10.1093/jeg/lbx026.

Jones, R.W. (1956), "Factor proportions and the Heckscher-Ohlin theorem", *The Review of Economic Studies*, Vol. 24 No. 1, p. 1, doi: 10.2307/2296232.

Klinger, S. and Wolf, K. (2008), "What explains changes in full-time and part-time employment in Western Germany? A new method on an old question", Nürnberg (IAB-Discussion Paper, 07/2008).

Krugman, P. (1998), "What's new about the new economic geography?", *Oxford Review of Economic Policy*, Vol. 14 No. 2, pp. 7-17, doi: 10.1093/oxrep/14.2.7.

Lahr, M.L. and Ferreira, J.P. (2020), "A reconnaissance through the history of shift-share analysis. With assistance of P. Batey", in Manfred M. Fischer, Peter Nijkamp (Eds), *Handbook of Regional Science, Forthcoming*, Springer, Berlin, Heidelberg.

Mack, E., Grubesic, T.H. and Kessler, E. (2007), "Indices of industrial diversity and regional economic composition", *Growth Change*, Vol. 38 No. 3, pp. 474-509, doi: 10.1111/j.1468-2257.2007.00380.x.

Marelli, E. (2004), "Evolution of employment structures and regional specialisation in the EU", *In Economic Systems*, Vol. 28 No. 1, pp. 35-59, doi: 10.1016/j.ecosys.2004.01.004.

Margarian, A. (2022a), "Beyond p-value-obsession: when are statistical hypothesis tests required and appropriate?", *German Journal of Agricultural Economics*, Vol. 71 No. 4, pp. 1-14, doi: 10.30430/gjae.2022.0283.

Margarian, A. (2022b), "The hidden strength of rural enterprises. Why peripheries can be more than a city centre's deficient complements. Chapter 2", in Birgit, L., Susanne, G. and Teemu, M. (Eds), *The Rural Enterprise Economy*, Routledge, London, pp. 19-34.

Margarian, A., Détang-Dessendre, C., Barczak, A. and Tanguy, C. (2022), "Endogenous rural dynamics: an analysis of labour markets, human resource practices and firm performance", *In SN Bus Econ*, Vol. 2 No. 8, pp. 1-33, doi: 10.1007/s43546-022-00256-9.

Margarian, A. and Hundt, C. (2019), "Location, industry structure and (the lack of) locally specific knowledge", On the diverging development of rural areas in Germany's East and West. Edited by Philipps University Marburg, Department of Geography (Working Papers on Innovation and Space, 4).

Meyer, A.D., Tsui, A.S. and Hinings, C.R. (1993), "Configurational approaches to organizational analysis", *In AMJ*, Vol. 36 No. 6, pp. 1175-1195, doi: 10.5465/256809.

Moretti, E. (2011), "Chapter 14 – Local labor markets", in David, C. and Orley, A. (Eds), *Handbook of Labor Economics*, Elsevier (3B), North Holland, Vol. 4, pp. 1237-1313, available at: www.sciencedirect.com/science/article/pii/S0169721811024129

Müller, S., Dettmann, E., Fackler, D., Neuschäffer, G., Slavtchev, V., Leber, U. and Schwengler, B. (2017), "Produktivitätsunterschiede zwischen west- und ostdeutschland und mögliche erklärungsfaktoren", Edited by Institut für Arbeitsmarkt- und Berufsforschung. Nürnberg (IAB Forschungsbericht, 16/2017).

Niebuhr, A. (2017), Die Entwicklung regionaler Disparitäten in Deutschland. Persistente Unterschiede zwischen Ost- und Westdeutschland, In Hans Hermann Eberstein, Helmut Karl, Gerhard Untiedt, Bastian Alm (Eds.), Handbuch der regionalen Wirtschaftsförderung. Lfg. 62.2013 – Köln: O. Schmidt.

Downloaded from http://ftp.nowpublishers.com/cr/article-pdf/33/7/1/542739/cr-09-2022-0130.pdf by guest on 18 June 2026

Patterson, M.G. (1991), "A note on the formulation of a full-analogue regression model of the shift-share method", *In Journal of Regional Science*, Vol. 31 No. 2, pp. 211-216, doi: 10.1111/j.1467-9787.1991.tb00143.x.

Porter, M.E. (1990), "The competitive advantage of nations", *Harvard Business Review (March/April)*, pp. 73-91, doi: 10.4324/9780429439087-1.

Rey, S.J. and Janikas, M.V. (2005), "Regional convergence, inequality, and space", *J Econ Geogr*, Vol. 5 No. 2, pp. 155-176, doi: 10.1093/jnlecg/lbh044.

Ricci, L.A. (1999), "Economic geography and comparative advantage", *In European Economic Review*, Vol. 43 No. 2, pp. 357-377, doi: 10.1016/S0014-2921(98)00065-8.

Schnabel, C. (2016), "United, yet apart? A note on persistent labour market differences between Western and Eastern Germany", *In Jahrbücher Für Nationalökonomie Und Statistik*, Vol. 236 No. 2, pp. 157-179, doi: 10.1515/jbnst-2015-1012.

Suedekum, J., Blien, U. and Ludsteck, J. (2006), "What has caused regional employment growth differences in Eastern Germany?", *In Jahrbuch Für Regionalwissenschaft*, Vol. 26 No. 1, pp. 51-73, doi: 10.1007/s10037-005-0077-2.

Tyler, B.B. (2001), "The complementarity of cooperative and technological competencies: a resource-based perspective", *In Journal of Engineering and Technology Management*, Vol. 18 No. 1, pp. 1-27, doi: 10.1016/S0923-4748(00)00031-X.

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