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Article

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Local Labour Markets and Cultural Diversity[1]

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Introduction

Recent years have seen a tendency towards larger migration flows between many countries. Due to this development the population in the most developed countries in particular is growing increasingly diverse. People with very different cultural backgrounds are living and working together. The social, political and economic implications of this situation are far-reaching, complicated and not completely understood. This paper addresses an important aspect of these implications by looking at the effects of cultural diversity on the labour market. In principle, negative effects can arise from communication problems between people of different cultural backgrounds, from hidden discrimination and even from open clashes. On the other hand, positive effects are possible, since workers from different cultures and nations may possess complementary skills and problem-solving abilities. The intensive interaction of people from different backgrounds can generate ideas and solutions that would not have been developed in culturally homogeneous environments.

There has been extended research into the balance of the two opposing forces starting with seminal articles by Ottaviano and Peri (2005, 2006) and later, among others, in the so-called NORFACE research programme on migrant diversity (MIDIE-REDIE). Some of us have contributed to this research (Trax, Brunow and Südekum 2013, Südekum, Wolf and Blien 2008 and 2014, Brunow and Blien 2014) by looking at the case of Germany.

Our recent paper (Südekum, Wolf and Blien 2014) estimates the effects of this cultural diversity, as measured by the diversity of nationalities, on the labour market outcomes of native workers in Western Germany. More specifically, it uses a panel of 326 NUTS3 regions ("*Landkreise*" and "*kreisfreie Städte*") over the time period 1995–2006, and analyses the wage and employment effects for natives that are associated with the size and the diversification of the foreign workforce at this local level.

Theoretical background

Why should the diversity of the foreign workforce affect native employees at the level of small local labour markets? In order to address the possibilities that cultural diversity can affect locations, and the natives working therein, we use the seminal spatial equilibrium model by Roback (1982). Within this framework we recover the direction of the net impact of diversity, and the main channel through which it affects natives from wage and employment regressions. This paper merely outlines the construction of the approach. Its application to the problem at hand is treated in detail in Südekum, Wolf and Blien (2014).

Roback's multi-regional model uses two different kinds of properties of regions: production amenities increase the productive capacities of regions, while consumption amenities are liked by people who live there. This paper hypothesises that the cultural diversity of a region can be regarded as such a location characteristic, affecting both production and consumption amenities in a region.

As far as the productive amenity is concerned, there is the general aspect of complementarities and knowledge creation in production. Cultural diversity may raise the productivity of a region due to production externalities like knowledge spillovers, which are known to be strongly localised. Too much diversity, on the other hand, may lead to lower productivity because communication becomes too costly. This trade-off between diversity as a productive (dis-)amenity has been described

[1] This paper draws heavily on the author's previous writings, particularly on Südekum, Wolf and Blien (2014). Research support by the NORFACE Programme is gratefully acknowledged.
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in a formal model by Berliant and Fujita (2008), which bears the original title: "Knowledge creation as a square dance on the Hilbert cube". In this model, knowledge creation or innovation requires interaction between individuals with some non-overlapping prior knowledge, because people with an identical background cannot learn from each other. At the same time, the individuals also need some common stock of knowledge since they otherwise have no common basis for communication. The positive productivity effects of diversity are also often included directly in the production function. Here it is typically assumed that different ethnic or cultural groups represent complementary input factors combined in a production process that exhibits increasing returns to variety, see for example, Alesina and La Ferrara (2005) or Ottaviano and Peri (2005).

In general, an increase in the productive amenity of one region enables firms in that location to pay higher wages. Thanks to the wage advantage, workers will move to the region. At the same time, productivity advantages also attract other firms. Wages and employment in the region increase as a result.

Secondly, cultural diversity may affect a region's consumptive amenity and therefore, the quality of life that it offers at the local level. A tolerant native population may value diversity as an attractive location feature, for example, due to the greater variety of ethnic goods or more vibrant cultural atmosphere. Yet diversity may also be perceived as unattractive if natives fear that social conflicts between different foreign nationalities are imported to their own neighbourhood (Dustmann and Preston 2001). Therefore, we see that there are two forces operating in different directions with respect to the consumption amenity, meaning that it is unclear whether people associate a positive or negative value with the cultural diversity of a location.

However, an increase in a region's consumptive amenity means that a region is more attractive to workers, and in the Roback model, it is concluded that for any level of employment individuals are willing to work at lower wages. As a result, people would move to that region, leading to a higher employment level, but accept lower wages at the same time.

In short, cultural diversity may affect locations, and the natives working therein, both on the production (labour demand) and the consumption (labour supply) side, and the net effect on either side can be positive or negative. In our empirical model we use wage and employment regressions to recover the net effect of productive and consumptive amenities across regions.

A further major contribution of our work is to pay closer attention to the skill composition of the foreign workforce by separately studying the effects associated with the size and the diversification of the groups of high-skilled and low-skilled foreign workers, respectively. The rationale for this is directly related to the theoretical considerations above. High-skilled and low-skilled foreign workers affect regional productive and consumptive amenities very differently. A positive impact of diversity on productivity may require foreign workers to possess a certain skill level. When there are inter-cultural learning and knowledge spillovers, which possibly make heterogeneous locations more productive, it may require a certain skill level on the part of the foreigners in order for these production externalities to materialise. Similarly, the consumption value of a multicultural environment may also depend on how educated the group of foreigners is. High-skilled foreign workers are typically better integrated into the host country's society, so that diversity is likely to be valued by its natives. For low-skilled foreigners, by contrast, this issue seems to be more complex. On the one hand, many ethnic goods are provided by low-skilled foreigners, so that their diversity may also be valued by a country's natives. On the other hand, to the extent that integration with the host country is underdeveloped, diversity may also be considered as a negative location characteristic, since natives may fear social conflicts between groups of different nationalities.

Framework of empirical analyses

The theoretical framework outlined above suggests that wage and employment regressions for native German workers are well suited to sorting out the net effect of cultural diversity at the local level. We use the following specification for the empirical model:

$$\mathbf{ln}\,(wage_{r,t}) = \alpha_r^{wage} + \alpha_t^{wage} + \beta^{wage} \cdot div_{r,t} + \gamma^{wage} \cdot X_{r,t} + \varepsilon_{r,t}^{wage} \quad (1)$$

$$\mathbf{ln}\,(emp_{r,t}) = \alpha_r^{emp} + \alpha_t^{emp} + \beta^{emp} \cdot div_{r,t} + \gamma^{emp} \cdot X_{r,t} + \varepsilon_{r,t}^{emp}, \quad (2)$$

where $emp_{r,t}$ is employment and $wage_{r,t}$ is the average wage for native workers in region r and time t. $div_{r,t}$ measures cultural diversity and refers to the foreign workforce in region r at time t. The precise specification of $div_{r,t}$ for the empirical analysis is discussed below. $X_{r,t}$ are additional control variables, the α's are time and

region fixed effects, and the ε's are error terms. Due to the fixed effects specification, identification of our regression model rests on the changes in local diversity levels over time.

The central coefficients of interest are β^{wage} and β^{emp}. If diversity is a positive productive amenity, we should find positive wages and employment effects ($\beta^{wage} > 0$, $\beta^{emp} > 0$). A negative productive amenity would imply negative signs of both coefficients. If diversity is a positive consumptive amenity, we should find positive employment and negative wage effects ($\beta^{wage} < 0$, $\beta^{emp} > 0$). If it is a negative consumptive amenity, there must be a compensating wage differential ($\beta^{wage} > 0$) and negative employment effects ($\beta^{emp} < 0$).

In the estimations we include two variables related to foreign labour market participation to measure cultural diversity. Firstly, we control for foreign workers as a share of total area employment, i.e.

$$s_{r,t} = foreigners_{r,t} \,/\, emp_{r,t}\,. \quad (3)$$

This variable measures the size of the group of foreign individuals who work in region r at time t. The second variable then specifically measures the degree of diversification of the stock of foreigners into different nationalities. We use a fractionalisation index that is based on a standard Herfindahl-Hirschman index. It is defined in the following way:

$$frac_{r,t} = 1 - \sum_{k=1}^{K} \left(\frac{foreigners_{k,r,t}}{foreigners_{r,t}} \right)^2, \quad (4)$$

where group $k = 1,2,\ldots,K$ indexes the different foreign nationalities. This index takes on values between 0 and 1. If all foreigners in region r had the same nationality, we would have $frac_{r,t} = 0$, and the index then increases in the degree of diversity. The correlation between $s_{r,t}$ and $frac_{r,t}$ in the data turns out to be rather modest ($\rho \approx 0.2$), which allows us to control for both variables at the same time and, thus, to separate the fractionalisation and size effects of the foreign workforce.

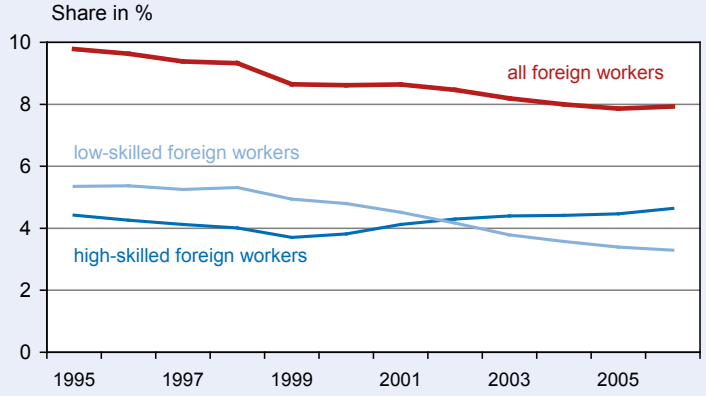
When we explicitly distinguish the group of foreign workers in region r by their skill level, we replace $s_{r,t}$ by high-skilled (low-skilled) foreign workers as a share of total regional high-skilled (low-skilled) employment. Furthermore, we then separately measure the index $frac_{r,t}$ for the sub-population of high-skilled (low-skilled) foreign workers in region r.

The empirical approach has to address one more problem: foreign workers may not causally affect regional productivity, but instead select into productive locations. Our estimations may therefore suffer from a problem of reverse causality. Moreover, the share of foreigners and the fractionalisation index may be quite noisy measures of the "true" degree of cultural diversity at the

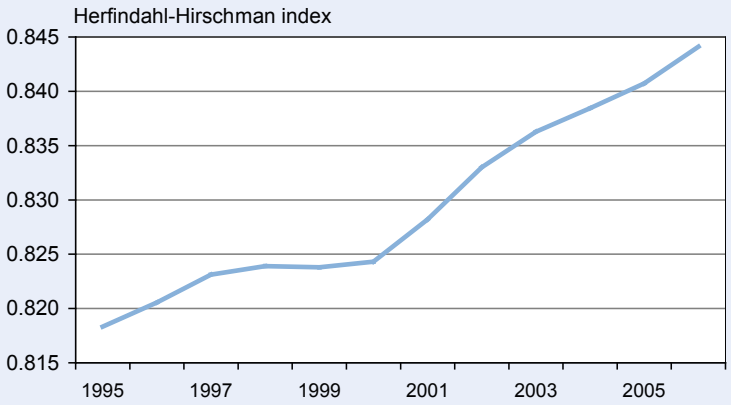
Figure 1

Foreign workers in the West German labour market, 1995–2006

a) Share of foreign workers in total full-time employment



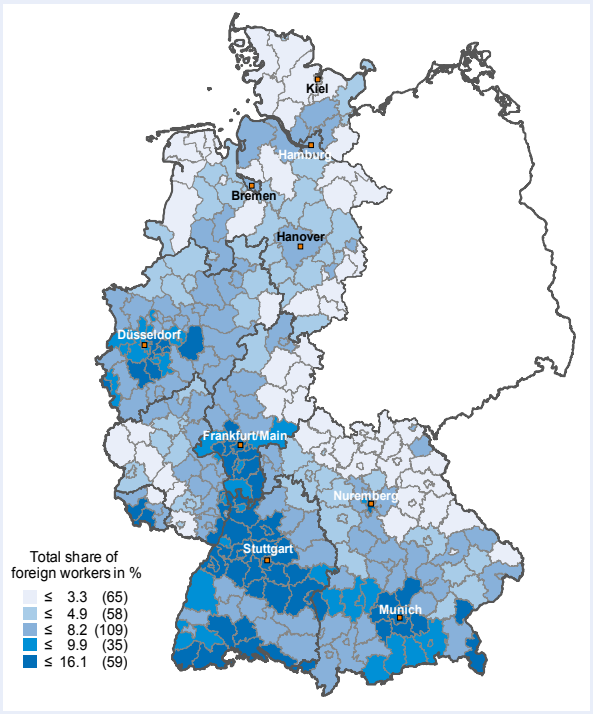
b) Diversity within the group of foreigners



Source: The authors.

Figure 2

Total share of foreign workers, 2006

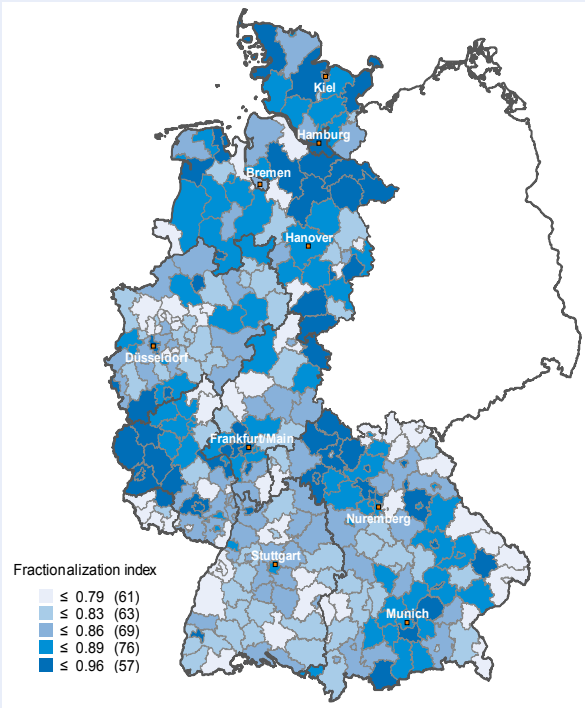


This map shows the shares of foreign workers in total regional full-time employment for the 326 Western German NUTS3-regions ("*Kreise*" and "*kreisfreie Städte*") for the year 2006.

Source: The authors.

Figure 3

Fractionalisation index, 2006



This map shows the fractionalisation index of total regional full-time foreign workforce for the 326 Western German NUTS3-regions ("*Kreise*" and "*kreisfreie Städte*") for the year 2006.

Source: The authors.

local level. Both problems – reverse causality and measurement error – can lead to biases in OLS estimations.

To address these concerns, we implement a so-called "instrumental variable approach", by using first-order time lags of the share of foreign workers and the respective lagged fractionalisation indices as instruments. In addition, we include three further instrumental variables: the "shift-share"-instrument popularised by Card (2005), the minimum regional distance to either an exterior border or to one of the five major German airports, interacted with time fixed effects and finally, the historical regional employment shares of classical guest worker industries (see Südekum, Wolf and Blien 2014 for details).

Data and descriptive overview

The data basis for this study is provided by the Institute for Employment Research (IAB). It includes the complete population of full-time employment relationships subject to social security (i.e. excluding civil servants

Table 1

Labour market participation of foreigners in selected urban areas, 2006

City	Total employment	Total share of foreign workers (%)		Diversity index, foreign employees	
	(native + foreign)	all	high-skilled	all	high-skilled
Hamburg	633,311	7.24	4.68	0.9160	0.9539
Munich	563,931	14.53	7.63	0.8913	0.9328
Frankfurt	396,702	13.85	7.00	0.9140	0.9545
Cologne	369,060	10.21	5.15	0.8243	0.9493
Duesseldorf	293,208	9.65	5.88	0.9137	0.9548
Stuttgart	286,546	13.49	5.96	0.8685	0.9476
Ø Western Germany		6.56	4.21	0.8370	0.9032

Sources: The authors.

and self-employed individuals), aggregated at the level of the 326 Western German NUTS3 districts for the years 1995–2006. The data is drawn from the individual data of official German Employment Statistics, which is used to calculate social security contributions and pensions, and therefore is highly reliable. As this official employment data does not include information on areas like language use or ethnic self-perception, we proxy culture with the recorded nationality of an individual.

This section offers a brief descriptive overview of the participation of foreign workers in the Western German labour market.

Table 2

All foreign workers

	Wages (1)	Employment (2)
Share of foreign workers	0.0178	-0.6467***
	(.044)	(.122)
Diversity foreign workers (fractionalisation index)	0.0331**	0.1119***
	(.014)	(.040)
Instruments	1st time lag diversity variables, shift-share, distance to border/airport, historical guest worker	1st time lag diversity variables, shift-share, distance to border/airport, historical guest worker
Controls / fixed effects	YES / YES	YES / YES

Notes: Dep. var. in the wage regression is the average daily wage (in €) of native employees in region r and year t. The dep. var. in the employment regression is the total employment level of native workers in region r and year t. All regressions include time and regional fixed effects and a set of control variables. We instrument the shares and the fractionalisation indices for all foreign workers. As instruments we use i) the respective regional variables with a time lag of one year, ii) the shift-share diversity index (see Ottaviano and Peri 2006), iii) the minimum distance of the region to either the closest exterior border of (Western) Germany or to one of the five major German airports and iv) the regional employment shares in mining, household-related services and building&construction for the years 1977-1988. Standard errors are reported in parentheses. Significance levels: *) 10%, **) 5%, ***) 1%.

Sources: The authors.

Figure 1a shows that about eight percent of all full-time regular employment relationships (i.e. all full-time employees subject to social security) involved workers of a foreign nationality in 2006. However, even though the size of the foreign workforce in the German labour market remained roughly stable over the time period 1995-2006, the group of foreign workers became more educated over time on average (Figure 1a). There was an increase in the share of foreign workers with completed tertiary education and a decline in non-university trained foreigners, particularly since 1998.

Another important compositional change is the aforementioned increase in the diversity of nationalities of the foreign workforce. Figure 1b depicts a fractionalisation of 180 different foreign nationalities in the total population of foreign workers with a regular employment relationship. This figure suggests that the German labour market has become more heterogeneous in terms of national and, thus, linguistic and cultural backgrounds.

Turning to the regional level, the maps in Figure 2 and Figure 3 illustrate the total shares of foreign employees in 2006 and the fractionalisation index in 2006, respectively. The largest shares are found in the metropolitan areas in Stuttgart, Frankfurt, Munich and in the Rhine-Ruhr area. The share of foreign workers is below one percent in several other, more rural areas in the North. Table 1 shows that all large urban areas have above-average total shares of foreign workers. Table 1 also suggests that the foreign workforces in large urban areas tend to be relatively highly skilled compared to the Western German average.

Finally, Table 1 reports the fractionalisation index of the foreign workforce indicating that the high-skilled foreign workforce is more diverse than the overall foreign workforce. This is due to the fact that foreigners of certain nationalities (particularly Western Europeans and North Americans) are likely to be high-skilled if they work in Germany. Furthermore, urban foreign workforces tend to be more diverse than rural ones, and this is also true when focusing only on the diversity of high-skilled foreigners.

Results

All foreign workers

Table 2 presents the results for the wage and employment regression when we do not distinguish between foreign workers by skill level.

For expositional purposes, we only report the results for our central explanatory variables, and omit the other estimated coefficients (see Südekum, Wolf and Blien 2014 for details). As column 1 of Table 2 shows, the share of foreign workers does not significantly affect the av-

erage wages of native workers. However, the fractionalisation index is positive and significant, indicating that cultural diversity positively affects the average wages of native workers. The relevant coefficients of the employment regression (column 2) are both significant and indicate that the share of foreign workers negatively affects employment, while cultural diversity has a positive impact.

What would be the literal interpretation of these results? Since the total share of foreign workers is negatively associated with native employment, the application of the Roback model would suggest that it is a negative regional amenity. These results should not be interpreted as evidence for strong displacement effects for native workers in the German labour market. Several authors have studied the labour market impacts of immigration on the German labour market and found little evidence for such displacement effects (for example, Glitz 2006). Our results do not contradict those findings, as we do not consider inflows of foreigners from outside Germany. Instead, we exploit the cross-sectional and time variation of foreign employment shares and diversity levels across regions that could stem from different sources, for example, from structural change and from the different employment profiles of natives and workers, who often do not compete for the same jobs in an economy. Anyway, since the wage effect is insignificant, this negative overall impact would be a mixture of one effect on the consumption (labour supply) and one effect on the production (labour demand) side.

As for the impact of the fractionalisation index, the model suggests that the overall effect of diversity is positive and is again derived from a combined labour demand and labour supply effect. However, this interpretation is derived from a regression model that does not divide the group of foreigners into high-skilled and low-skilled workers. The results are therefore likely to capture a net effect that masks more specific impacts of foreign workers with different skill levels. We now turn to this issue in a more detailed analysis.

Table 3

Foreign workers by qualification group

	Wages (1)	Employment (2)
Share of high-skilled foreign workers	0.1705***	0.6027***
	(.041)	(.114)
Fractionalisation index, high-skilled foreign workers	0.0313***	0.0588*
	(.011)	(.031)
Share of low-skilled foreign workers	-0.0706***	-0.3817***
	(.018)	(.050)
Fractionalisation index, low-skilled foreign workers	0.0219**	0.0582*
	(.011)	(.030)
Instruments	1st time lag diversity variables, shift-share, distance to border/airport, historical guest worker	1st time lag diversity variables, shift-share, distance to border/airport, historical guest worker
Controls / fixed effects	YES / YES	YES / YES

Notes: Dep. var. in the wage regression is the average daily wage (in €) per native employee in region r and year t. The dep. var. in the employment regression is the total employment level of native workers in region r and year t. All regressions include time and regional fixed effects and a set of control variables. We instrument the shares and the fractionalisation indices for high-skilled and low-skilled foreign workers. As instruments we use i) the respective regional variables with a time lag of one year, ii) the shift-share diversity index (see Ottaviano and Peri 2006), iii) the minimum distance of the region to either the closest exterior border of (Western) Germany or to one of the five major German airports and iv) the regional employment shares in mining, household-related services and building&construction for the years 1977-1988. Standard errors are reported in parentheses. Significance levels: *) 10%, **) 5%, ***) 1%.

Sources: The authors.

Foreign workers differentiated by skill level

Table 3 reports the results for the wage and employment regression for native workers when controlling separately for the share and the fractionalisation of high-skilled and low-skilled foreign workers. The estimations use the same control variables as above.

For the group of high-skilled foreign workers we find that their total share of regional high-skilled employment is associated with positive wage and employment effects for the native workers. This positive impact is reinforced if the high-skilled foreigners are heterogeneous in terms of nationalities.

With respect to low-skilled foreign workers, the regression results lead to a qualitatively different conclusion. The larger the number of low-skilled foreigners as a share of total low-skilled employment the lower the average wage and employment level of the natives. Hence, the size of this group can be interpreted as a negative productive amenity from a regional perspective. For given group sizes, we nevertheless find positive productivity effects associated with the degree of diversification. This means that a region with a large share of low-skilled foreign workers (call it "region 1") need not to be

less productive than an otherwise similar region with a smaller share ("region 2"), provided that the low-skilled foreign workers in region 1 are sufficiently more heterogeneous than in region 2.

To get an idea of the economic importance of these effects, we use the results of Table 3 and calculate the counterfactual effect on the average daily wage of a native worker if the share of high-skilled (low-skilled) foreign workers and the respective fractionalisation index for either group is increased by one standard deviation. As for the share of high-skilled foreign workers, this amounts to a ceteris paribus increase of two percentage points, which, in turn, leads to an expected increase of the average daily wage from EUR 89.68 to 89.97, that is, by roughly EUR 0.30 per day. Increasing the share of low-skilled foreign workers by one standard deviation (from 13 to 20 percent) leads to an expected decrease of the average daily wage by EUR 0.29, ceteris paribus. The counterfactual effects of the fractionalisation indices are somewhat smaller. The expected increase, ceteris paribus, is EUR 0.20 for high-skilled and EUR 0.18 for low-skilled foreigners. These are certainly not exorbitant, but still non-negligible amounts.

Conclusions

The results found in our paper extend our own previous research and do not contradict the findings of others for the labour markets of the US (Ottaviano and Peri 2005, 2006), the UK (Lee and Nathan 2010) and of other countries. The cultural diversity of the population has positive employment and wage effects for natives. In the case of Germany, some results are available that highlight the causal paths that are important in generating these results. Brunow and Blien (2014) and Trax, Brunow and Südekum (2013) show that basically the same results can be found at the level of individual establishments. Niebuhr (2010) finds that cultural diversity is connected with high regional levels of patents. Audretsch, Dohse and Niebuhr (2010) show that high degrees of regional cultural diversity have positive effects on the foundation rates of new firms. And finally, on the individual level, Bauer, Flake and Sinning (2013) find that immigration decreases the unemployment probability for high-skilled natives. Results for other countries confirm those for Germany.

Our results for different skill groups show more details about the processes going on. The high-skilled foreign workers affect native employees in regional labour markets quite differently than low-skilled foreign workers. The presence of high-skilled foreign workers can be regarded as a positive productive amenity from a regional perspective, especially if this group is diversified in terms of national and cultural backgrounds. For low-skilled foreign workers the results are different: the larger the size of this group the lower regional productivity levels. Yet, depending on the size of the low-skilled foreign workforce, we still find positive productivity effects associated with diversification. These findings have important implications for the policy debate over the principles of immigration to Germany. This debate has strongly focused on the skill composition of immigrants. It led to several attempts to target high-skilled foreign immigrants in specific industries where native specialists are in short supply (for example, in the IT business). The cultural diversity of the immigrants, that is, the composition of the group of immigrants in terms of foreign nationalities, has played a minor role in this debate to date. Our results suggest that there are returns to cultural diversity in regional labour markets, and that immigration policy can consequently be improved by taking these aspects into account. Moreover, our results suggest that multiculturalism has rather tangible effects. The effects do not appear to be mainly transmitted through "soft" location factors that shape perceptions about the quality of life in different locations, but the primary effects seem to be on regional productivity.

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