

Agglomeration and Regional Labour Markets

Findings of an international DIW Berlin workshop, 11–13 April 2002

The current state of play regarding the interaction of labour market and regional economics, in particular the New Economic Geography, was discussed at an international workshop organised by the DIW Berlin (German Institute for Economic Research). New theoretical ideas and the more powerful sets of microdata available to scientists today signal an increasing significance of this area of research.

An important insight recognised at this workshop was that 'the labour market' does not exist. Individual labour markets develop in very different ways. Wage levels and employment opportunities depend on the regional concentration of these markets. Empirical studies show, for example, that those with higher qualifications in particular benefit from the strength of economic activity in a region. Theoretical studies have concluded that investment in human capital is worthwhile particularly in markets with a high degree of concentration. Labour market policy would be ill advised to rashly follow economic policy recommendations emphasising only regionally undifferentiated measures.

Spatial aspects have a long tradition in economic theory, given that location theory and regional science are long-standing and well-established subdisciplines within economics – particularly in German-speaking parts. It is therefore not surprising that opinions diverge as to whether 'space' had to be rediscovered for economic analysis, as suggested by the New Economic Geography recently established by the American economist Paul Krugman. Opinions on how original and revolutionary the contribution to research has been from this direction up to now are just as divided.¹ Even its critics cannot help but agree that this new approach has caused a stir, attracted a large number of researchers and students and, now, attained a certain level of maturity.²

It is hoped that the interplay of the New Economic Geography with industrial economics, labour market economics and the theory of foreign trade will, above all,

provide answers to urgent societal questions that could not – or only partially – be approached with the old set of theories. In particular, this concerns the functioning and interaction of regional labour markets: What consequences does the uneven distribution of economic activity in space have on wages and on the level of employment in the respective labour markets? Do these effects depend on the level of employees' professional qualifications? What incentives arise for human capital formation? How do changes in the external surroundings of regional labour markets feed back into these? These questions were discussed in depth by 18 economists from eight countries at the DIW Berlin's international workshop (cf. box 1).

What determines economic concentration in space?

Among the determining factors that do – or do not – make a location attractive for firms and industries are cost advantages or disadvantages associated with natural factors – such as the availability of resources, the climate, and access to waterways. For companies, similar incentives are conditions shaped by the local economy, such as tax levels and structures and available infrastructures. The quality of the local labour supply can also be influenced in the medium to long term through education and training.

A geographic concentration in one location can be rewarding for companies even if this location does not exhibit immediately discernible advantages over other locations: here it is vital that the local interaction between companies on the one hand and/or between companies and employees on the other can lead to advantages. These so-called endogenous advantages of economic concentration in space – described as early as 1890 by Alfred Marshall in his 'Principles of Economics' – are already contained in the ideas of traditional location theory, and are now also the points of reference for the New Economic Geography. These agglomeration advantages can be characterised as follows:

- *Pecuniary externalities – market size effects*: A local concentration of final and intermediate goods industries has reciprocal advantages: producers of final products benefit because they can, cost-effectively, avail themselves of specific intermediate goods and

¹ See Paul Krugman: *Geography and Trade*, MIT Press 1991, and, for a critical view, Ron Martin: 'The New 'Geographical Turn' in Economics: Some Critical Reflections. In: *Cambridge Journal of Economics*, 23/1999, pp. 65-91.

² This is documented also through the founding of a new journal, the *Journal of Economic Geography*, and by the monograph 'The Spatial Economy', by Masahisa Fujita, Paul Krugman, and Anthony Venables (MIT Press 1999), recently reviewed by Peter Neary (Of Hype and Hyperbolas: Introducing the New Economic Geography. In: *Journal of Economic Literature*, 39/2001, pp. 536-561).

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Thomas Rønde (University of Mannheim), Heiko A. Gerlach (CERAS and INSEAD) and Konrad O. Stahl (University of Mannheim): Firms come and go, labour stays: Regional clusters in high-tech industries

Eric Toulemonde (CREW FUNDP and University of Namur) and Pierre Picard (University of Manchester): Endogenous qualifications and firms' agglomeration

Joachim Möller (University of Regensburg) and Anette Haas (IAB Nuremberg): The agglomeration wage differential reconsidered

Kristof Dascher (Europa-University Viadrina, Frankfurt/Oder): Why larger cities suffer from higher welfare recipient numbers

Petri Böckerman (Labour Institute for Economic Research, Helsinki), Kari Hämäläinen (Government Institute for Economic Research, Helsinki), and Mika Maliranta (Statistics Finland): Explaining regional job and worker flows

Steven Brakman (University of Groningen), Harry Garretsen (University of Nijmegen) and Marc Schramm (University of

Groningen): Spatial distribution of wages and employment: Testing the Helpman-Hanson model for Germany

Gilles Duranton (London School of Economics), Pierre-Philippe Combes (CERAS and Boston University) and Laurent Gobillon (CREST-INSEE): Wage differences across French local labour markets: Endowments, skills and interactions

Javier Sanchez-Reaza (University of Texas and LSE) and Jacob Jordaan (LSE): Resource endowments, externalities, and transport costs: An exploration of alternative explanations of regional production structures in Mexico

Maryla Maliszewska (University of Sussex): Regional Employment in Poland: The role of agglomeration externalities

Céline Bignebat (University of Paris): Company towns and labour market transition in Russia

Nigel Driffield (University of Birmingham) and Karl Taylor (Leicester): Domestic wage determination: regional spillovers and inward investment

Names of participating authors are shown in italic. The presentations, which are listed above in the order in which they are mentioned in this report, can be downloaded from the following address: http://www.diw.de/deutsch/service/veranstaltungen/docs/ws-agglomeration_2002-04-11.html

services locally (cost effect). And for suppliers of specific intermediate goods and service providers it is beneficial because customers are already in place locally (demand effect). A local concentration is advantageous for suppliers and customers because transport and interaction costs can be reduced; this advantage increases with the size of the regional market.

- *Technological externalities*: If companies and employees are spatially concentrated, knowledge and experience of organisational and production processes can trickle from one company to the next. The learning effects and diffusion of knowledge thus render companies more productive and therefore also more profitable. The fact that certain collective goods, such as infrastructure, can be used by all implies additional advantages of concentration in space.
- *Pooling on the labour market*: For companies, the advantage of a regionally concentrated (or 'pooled') labour market is that they are able to find qualified and appropriately specialised employees more easily. In order to be able to recruit these quickly, if needed, and not to have to attract them away from other regional labour markets through high wages,

companies like to establish themselves in areas where prospective employees will have to give up only their old place of work – but not also their home. Employees, for their part, are interested in the keen demand for their specific qualifications. For them, the advantage of spatial company concentration consists in security against company-specific crises: average unemployment is lower and/or average remuneration is higher because a change from an unsuccessful to an expanding employer is easier to manage.

Of these three well-known arguments, the New Economic Geography has, in particular, taken up the argument of market-size effects and – in almost canonical fashion – developed this into a 'core-periphery model' with microeconomic rigour.³ Technological externalities also, which in traditional location theory models are often simply assumed to exist, should, according to the New Economic Geography, be explicitly backed up microeconomically. This – not undisputed – ideal

³ The model was developed by Paul Krugman: (Increasing Returns and Economic Geography. In: *Journal of Political Economy*, 99/1991, pp. 483-499). It is described in detail in Fujita, Krugman and Venables, op.cit. (chapters 3 and 4).

remains a tough obstacle.⁴ And transposition of the third argument – the pooling of the labour force – has been similarly regarded as analytically unwieldy.⁵ However, in this regard progress was made at the DIW workshop through two of the contributions presented there.

The first contribution designed a model from a company perspective. Thomas Rønde et al. demonstrated the model of two businesses, each able to sell at higher prices than previously due to – initially purely 'coincidental' – product innovation, thus raising their demand for employees. Whether it is more beneficial for these companies to choose the same location and to have a pooled labour market – which offers a greater labour 'density' and permits companies to pay lower wages – rather than to preside over their own 'separate' (but less dense) labour markets depends decisively on two factors. Firstly, the greater the anticipated increase in quality – and therefore also in profits – the greater the potential demand for additional employees, which would imply a denser, i.e., pooled, labour market. Secondly, however, there is also the probability of innovation. If this probability assumes medium values, the expectation of an asymmetrical situation is greatest – i.e., a situation in which only one company will have a successful innovation; this would also favour agglomeration and a pooled labour market. Rønde et al. demonstrated that this basic idea is fundamentally sound even when the restrictive assumptions of the basic model are loosened, such as when it is assumed that companies determine their research intensity and therefore the probability of innovation themselves.

A second model approach, presented by Eric Toulemonde, showed that an agglomeration of companies and a pooled labour market not only offers employees security against unemployment or the possibility of strong wage fluctuations, as described by Marshall, but also provides incentives to invest in human capital formation. The idea is as simple as the stringent mathematical formalisation is complex: an employee who makes a decision about his education and training will, especially if he is regionally immobile, make greater efforts to obtain higher qualifications if the probability of employment at desired wage levels increases, which is precisely the case in an agglomeration. On aggregate, the expansion of the qualified labour supply has tendential wage-reducing effects, while, inversely, the increased establishment of companies has the effect of increasing

⁴ In the era of the information revolution and the internet, one might ask what kind of geographical scope the diffusion of knowledge assumes.

⁵ A first formalisation can be found in Krugman: *Geography and Trade*, op. cit.

wages. In this theoretical model, varying patterns of company establishment are possible, such as a symmetrical company distribution, or a partial or even a complete clustering of companies in one of the two model regions.

Wages and employment: an empirical analysis of regional labour markets

From a theoretical viewpoint, the aspects that make the New Economic Geography models so attractive – namely the possibility of multiple equilibria and thus the role of coincidence in the choice of one of these equilibria – also make empirical testing and estimation more difficult. For this reason alone it is therefore hardly surprising that the empirical appraisal and review of the New Economic Geography models is only slowly coming to bear.⁶

The increasing availability of large microdata sets will undoubtedly act as a stimulus in answering the question about the contribution of the New Economic Geography theories to wage and employment structures. Two of the studies presented at the DIW workshop first of all attempted to derive 'stylised facts' on regional labour markets from such microdata sets. A data sample of German employees subject to social insurance contributions between 1984 and 1997, collected by the Federal Labour Office's Nuremberg-based Institute for Labour Market and Employment Research (IAB), formed the starting point for a study presented by Joachim Möller. The data contain information on 1.25 million full-time employed male workers (excluding civil servants) in the western federal states.

The statistical analysis shows up clear wage differentials: in a comparison of two regions, one of which is twice as densely populated as the other, it is, on the basis of Möller/Haas' econometric results, to be expected that, in the first (more densely populated) region, wages in manufacturing industry will be 3.3%, and in the services sector 1.8%, higher. In a comparison of urban and rural regions, the corresponding higher wage differentials range up to 25%; however, this depends not only on the sector but also (and especially in the services sec-

⁶ Initial stock-taking can be found in Marius Brühlhart: *Economic Geography, Industry Location and Trade: The Evidence*. In: *The World Economy*, 21/1998, pp. 775-801; Gordon H. Hanson: *Firms, Workers, and the Geographic Concentration of Economic Activity*. In: G.L. Clark, M.P. Feldman, and M.S. Gertler: *The Oxford Handbook of Economic Geography*. Oxford University Press 2000, pp. 477-494; and in H.G. Overman, S. Redding and A.J. Venables: *The Economic Geography of Trade Production and Income: A Survey of Empirics*, CEPR Discussion Paper 2978, September 2001.

tor) on the qualifications of the employees. For this reason, according to the Möller/Haas interpretation, the wage differentials would, at least for individual groups of employees, be higher than the difference in the cost of living. Kristof Dascher refers to Möller's finding of rising wage differentials with rising qualifications as a starting point for his theoretical study. This situation, in conjunction with housing subsidies for lower earners leads, in his model, to undesirable disincentives for this group as regards their labour supply in conurbations.

The influence of regional features is also illustrated in the study by Petri Böckerman et al. on the dynamics of Finnish labour markets in terms of the flow from employment into unemployment and vice versa. The study draws on a microdata set that includes more than 80% of Finland's employees in the 'nonfarming business sector'. Among the many results presented, the heterogeneity of the dynamics of regional labour markets becomes evident, although labour market institutions and legislation are determined at the national level and therefore identical for all regions. From a national viewpoint, Böckerman et al. come to a conclusion similar to that of a recently published study by Henry Overman and Diego Puga.⁷ Using completely different methods, Overman and Puga conclude that, in addition to a national element, unemployment in the EU member states also has a decidedly regional element. This would suggest the conclusion that national unemployment-reduction strategies are inadequate to eliminate the problem entirely.

So how can the New Economic Geography's models be evaluated empirically? Gordon Hanson provided a pioneer contribution on just this as early as 1998.⁸ He utilises a variant of the above-mentioned core-periphery model, which, in contrast to the original model, also permits partial agglomerations as stable equilibria, i.e., a regional distribution of industries that does not correspond to an even distribution or complete concentration in a single region.⁹ The theory suggests that wages in a region depend positively on the distance-weighted

incomes and prices in the neighbouring regions: the former increase purchasing power in the neighbouring regions and thus demand for goods of all regions; the latter influence the competitiveness of the observed location and therefore the ability of companies to pay high wages. The distance-weighted level of housing in neighbouring regions acts negatively (in a complex way). The estimate of the central wage equation for the United States provides coefficients which are significant and in conformance with the theory, and explains – in different estimate variants – 20% to 30% of the variation in wages.

A study by Steven Brakman, Harry Garretsen and Marc Schramm, also presented at the workshop, utilises the method developed by Hanson to explain wage and employment structures in Germany. The empirical examination is based on a selection of 151 local authorities ('kreisfreie Städte und Landkreise') in Germany. In contrast to Hanson, who estimates his model in differentials, Brakman et al. have carried out an estimate of the central wage equation in levels. They obtain significant parameter estimates and explain – surprisingly, in light of Hanson's results – 95% and more of the variation of wages.¹⁰ A particular significance of the contribution by Brakman et al. is the adjustment of a number of basic assumptions of Hanson's theoretical framework to German circumstances: thus, Brakman et al. also developed estimating equations based on the assumption of non-clearing labour markets and limited worker mobility. The estimates of these models consistently deliver significant parameter estimates that concur with the theory and, statistically speaking, are also more successful than other explanatory approaches – alternatively estimated by Brakman et al. – for wage and employment structures in Germany.

The work of Brakman et al. does, however, also come up against a fundamental empirical problem: regional wages are determined by a large number of – previously described – location factors. But how can the explanations of the various factors be discriminated? This is where the research is still in its infancy.¹¹ Gilles Duranton et al. are attempting to cut through this, by turning away from the New Economic Geography model context and instead developing a simple profit maximisation approach that permits empirical discrimination between alternative explanatory factors. For the – initial and still provisional – results of this study, the data of

⁷ H.G. Overman and D. Puga: Unemployment Clusters Across Europe's Regions and Countries. In: *Economic Policy*, 17(34), 2002, pp.117-147.

⁸ See Gordon H. Hanson: Market Potential, Increasing Returns, and Geographic Concentration. University of Michigan, mimeo 2000 (revised version of NBER Working Paper 6429 of the same title, February 1998).

⁹ The theoretical model on which this is based is described in: E. Helpman: The Size of Regions. In: D. Pines, E. Sadka, and I. Zilcha: *Topics in Public Economics. Theoretical and Applied Analysis*. Cambridge University Press 1998, pp. 33-54. An alternative framework, oriented more closely along the original core-periphery model, and which also explains partial agglomeration, can be found in: M. Pflüger: A Simple, Analytically Solvable Chamberlinian Agglomeration Model. IZA Discussion Paper, no. 359, September 2001.

¹⁰ The estimated results do show some problems, such as a theory inconsistent value for a budget parameter. This problem does not occur, however, if, instead of housing stock, the price of building land is used.

¹¹ In this context, see also: Peter Neary, op.cit., and G.H. Hanson, op.cit.

over 10 million employees in France were evaluated. The result: employees in the Paris region earn between 60% and 95% more than their counterparts in the poor rural French regions. Even disregarding these extreme regions, this still leaves a wage differential of about 25%. The authors explain these differences econometrically, using a series of characteristics of the respective industries and regions, whereby the relative contributions of the variables to the variation in wages can provide information on the weighting of the various influences for the wage differentials. This shows that natural resources, infrastructure, etc., have a statistically significant, although small, impact in the formation of wage differentials. In contrast, for average wages at the branch and regional level, employee qualifications are an important determinant,¹² as is the size of the regional labour market observed.

Foreign trade liberalisation, transformation and regional labour markets

If the geography of a given country cannot be varied for research purposes, then the opening-up of markets previously closed to other countries, as well as transformation processes, offer the opportunity for similarly meaningful case studies. For in this way border regions are able to attain an advantageous position – from one at the geographical edge of a national economy to one of close proximity to foreign trading partners.

The effects of Mexico's foreign trade liberalisation, which began when that country joined the GATT in 1986, were studied by Javier Sanchez-Reaza and Jacob Jordaan. As a result of the strategic shift away from import substitution and in favour of export orientation, certain segments of industrial production moved from Mexico City to the north of the country.¹³ The econometric analysis showed that the distance to the United States played a key role in explaining the regional structure of goods production; by contrast, initial equipment with capital and labour had no significant influence after 1986. The authors point out that this factor (i.e., transport costs), which has been given centre-stage by

the New Economic Geography, has a greater effect than the reasons put forward by the older foreign trade teachings on interregional specialisation.

It therefore seemed reasonable to anticipate similar observations for Poland, where, during the course of the transformation process, companies were able to freely choose their location and Germany became an increasingly significant trading partner. However, in the case of the Polish industries examined by Maryla Maliszewska, distance from the German border played no part in regional employment growth. A further surprising result is that, between 1994 and 1998 (the only period for which data are available), the specialisation of regions ('województwa') on specific sectors declined. This corresponds with the observation that the concentration of sectors on specific regions has declined. From a theoretical viewpoint, one would anticipate that the development of the industrial structure would be clearly influenced by the indicators for the pecuniary externalities discussed above.

The shock of transformation had different consequences on the Russian labour markets than on those of other planned economies, as Céline Bignebat showed in her contribution. While wages fell sharply, the fall in employment was comparatively small. Bignebat puts this down to the existence of virtually monopsonistic labour markets. In fact, 17% of Russians still live in 'mono-towns' (i.e., company towns) in which the largest company employs at least half of the town's inhabitants. Through empirical evidence, Bignebat seeks to support theoretical considerations according to which these employers have greater incentives and better opportunities to hold on to their employees during periods of a collapse in demand.

Regional labour markets in open market economies are possibly also shaped by foreign direct investment. Nigel Driffield followed up the question as to whether the wages paid by British companies depend on how much neighbouring (regional and sectoral) industries pay, differentiating between domestic and multinational employers. The latter typically pay 10% higher wages than domestic employers. The effects of this difference are relatively small, however (although statistically significant); for example, a (further) 10% wage increase by multinational employers in the same region would increase all other wages by a mere 0.02% to 0.03%; this effect would be greater, however, if there were more multinational companies. It is especially informative that – once again – a differentiation can be made for employee qualifications. Wages in alternative branches and regions are relevant for wage formation if employees are mobile and able to change jobs relatively easily; this becomes more likely with rising levels of qualification.

¹² The analysis of individual data by Duranton et al. remains to be completed, i.e., it is not yet clear whether an employee in an agglomeration earns more than to an employee with the same qualifications working on the periphery, and if so, how much more.

¹³ This has already been the subject of a study by Gordon H. Hanson: Regional Adjustment to Trade Liberalization. In: *Regional Science and Urban Economics*, 28/1998, pp. 419-444. Sanchez-Reaza/Jordaan will be able to shed light on a new aspect as soon as data on the effects of the NAFTA Agreement become available. This was not yet the case at the time of the DIW workshop.

Conclusion

There is no such thing as 'the labour market'. This term is usually used to describe a simplified combination of very different delimited markets, both regionally and in terms of employee qualifications. Different labour markets can develop quite differently. This insight was underlined by studies presented at the DIW Berlin workshop. Thus, the empirical studies are virtually unanimous in showing that those with higher qualifications benefit particularly from a concentration of economic activity. That investment in human capital is worthwhile particularly in regionally concentrated labour markets is, conversely, demonstrated by the theory.

The workshop presentations have, nevertheless, also led to a large number of new questions. For example, the basis of each of the various countries' experiences needs to be clarified. Among the most important tasks to be solved is undoubtedly also the quantification of the influence emanating from the different agglomeration factors.

Can economic policy lessons be learned from the workshop contributions? The heterogeneity of labour markets, as has become evident from the different presentations, suggests that labour market policy would be ill advised to rely solely on an overall observation of a labour market seen as an entity. In light of the questions raised, especially as a result of the empirical studies, it nevertheless seems premature to consider conclusions that go any further as anything more than hypotheses.

Björn Frank and Michael Pflüger