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**Conference Paper**

## Regional Unemployment Migration and Commuting - The Case of the German Lower Rhine-Area

39th Congress of the European Regional Science Association: "Regional Cohesion and Competitiveness in 21st Century Europe", August 23 - 27, 1999, Dublin, Ireland

**Provided in Cooperation with:**

European Regional Science Association (ERSA)

*Suggested Citation:* Wenke, Martin (1999) : Regional Unemployment Migration and Commuting - The Case of the German Lower Rhine-Area, 39th Congress of the European Regional Science Association: "Regional Cohesion and Competitiveness in 21st Century Europe", August 23 - 27, 1999, Dublin, Ireland, European Regional Science Association (ERSA), Louvain-la-Neuve

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# **Regional Unemployment, Migration Movements and Commuter Flows - The Case of the German Middle Lower Rhine-Area**

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*Paper presented at the  
ERSA 39th European Congress  
August 23-27 1999, Dublin, Ireland*

## **1. Aim and background**

Even though unemployment is the major problem of most of the European economies, its priority differs from country to country, but it differs from region to region within these countries, too. This paper focuses on the supply side of regional labour markets and analyses the relationships between regional unemployment, migration movements and commuter flows in the Middle Lower Rhine-Area of North Rhine-Westphalia, Germany. The aim of the paper is to quantify the influence of labour market condition and economic growth on migration movements and commuter flows. The analysis is based on a study prepared for the Chamber of Industry and Commerce of the Middle Lower Rhine-Area (IHK Mittlerer Niederrhein, following up the region is called „CC-district“). The aim of this first study within a three-step-analysis was to describe the changes of the socio-demographic structure of the population and their effects on the level and structure of labour supply within the Lower Rhine-Area. There - among others - the question about the role of a region's prosperity (measured by the growth rate of production) for the explanation of interregional migration movements has been examined (*Hamm/Wenke* 1998, pp. 18ff.). The second part will focus on the demand side of the regional labour market. In this part employment and unemployment levels and structures regarding educational and professional qualification and age as well as the corresponding structure of vacancies has to be analysed. This is related to the problem of regional „mismatch-unemployment“, as has been analysed by *Maziotta/Cozzi* (1997) for Italy and Europe. In a third part of our project - which will be done during spring 2000 - we have to discuss the opportunities of regional labour market policies with respect to the special situation at the Lower Rhine-Area. As an example we want to explore the possible chances of success of what is called „regional/local labour alliances“.

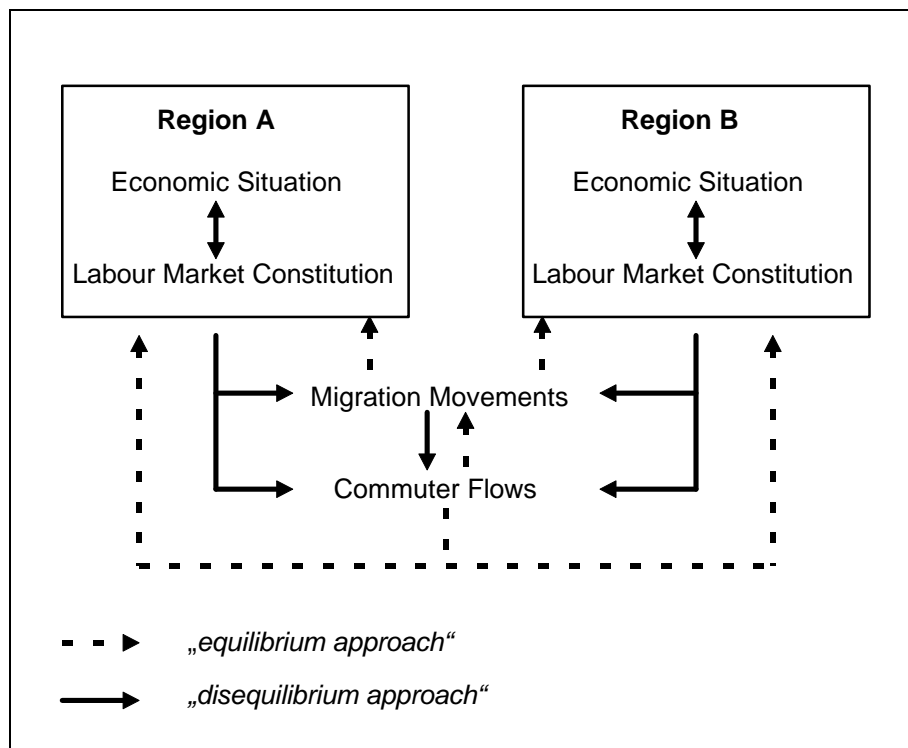
This paper follows the first part of the study mentioned above with the additional consideration of regional commuter flows and their relationships to regional growth, labour market condition and migration.



## 2. The relations between economic trends, migration, and commuter flows of small regions

Focusing on the supply side of labour markets numerous studies of the effects of socio-demographic changes on labour supply have been presented. After the fall of the „iron curtain“ on the one hand and with the dynamics of the European integration process on the other hand the role of migration movements across the borderlines have become an increasing importance regarding the supply side of labour markets. Regarding small regional districts internal migration processes have to be distinguished from external migration movements. But as Figure 1 shows, not only the causality of influences of migration on labour supply has to be considered, but also the effects of the labour market constitution and/or those of the overall economic situation of the region related to migration have to be taken into account.

**Figure 1:** Interactions between regional labour markets, migration movements, and commuter flows



This distinction is discussed in the context of the equilibrium/disequilibrium controversy (Hunt 1993). The disequilibrium approach supposes that migration (as well as commuting) can be specified as a function of spatial differences in real wages, employment or unemployment. The equilibrium approach on the contrary emphasises the arbitrary effects (or what we called „supply side effects“ above) of migration according to regional differences of labour market conditions. Most studies reviewed support the assumptions of the disequilibrium approach (Pehkonen/Tervo 1997).

Due to the disequilibrium approach the hypothesis in this context is that a relative good economic performance of a region induces migration as well as

commuter inflows. Indicators of the economic performance which are focused on here are the unemployment rate and the growth rate of total regional production. Looking at the migration and commuter balances, it can be expected to find positive balances - the population inflows are higher than the outflows - if growth rates are higher and unemployment rates are lower within the region than they are outside the respective region. Considering two regions A and B (Figure 1), we expect a positive migration and commuter balance of region A with region B, if the unemployment rate in A is lower and the growth rate is higher than in region B. This is known as the „macroeconomic aspect of migration efficiency“, in the sense that regional unemployment augments the likelihood of migration. Because of data constraints (we did not use individual panel or micro-census data) we could not check for the „micro-efficiency“ of migration if personal unemployment raises the probability of migration (*Tervo 1997, Herzog et al. 1993*).

Analysing regional migration movements, it seems to be interesting to separate migration of native and foreign people. The underlying hypothesis is that because of lower „emotional relationships“ of the foreigners with their residence in the host land (what can be interpreted as lower „psychic costs“ of migration (*Tervo 1997, p. 5*)) they might react more sensible to regional differences of economic indicators than native inhabitants do. That means that the influences of growth rate and unemployment differences on regional migration movements should be significantly higher with respect to foreign than to native people, or, in other words, the economically driven regional mobility of foreigners could be higher than the mobility of natives.

With respect to the relationships of migration and commuting and their common dependence on economic determinants both complementary and substitutionary relations can be assumed. In the case that economic developments are the main factors that determine the attractiveness of a region, immigration and commuter inflows increase if economic factors indicate a relatively high attraction of a region. Commuting and migration then are complementary variables and correlate positively. Another determinant of migration and of commuter flows is the supply of real estate. Often we find a significant rise of immigration in those regions, which offer sites for detached houses because of their rural structure and the resulting sufficient space for building land. This argument is a considerable one if we have a special settlement structure, where we find a middle- or upper centre-city with a high concentration of enterprises and administrative authorities etc. and a high concentration of jobs in the neighbourhood of a county region. Because of the high costs of living, especially the insufficient supply of low- or middle-priced real estates we often notice immigration in the rural outskirts or suburbia of a metropolis and as a result substitutionary commuter outflows into the urban centres. In that case commuting and migration correlate negatively.

The latter hypothesis indicates that the spatial allocation of jobs or vacancies, respectively, determines migration movements and commuter flows to a high extent. *Keane (1997)* additionally has pointed out the distinction between remote and compact areas or regions which yields different „optimal“ commuting

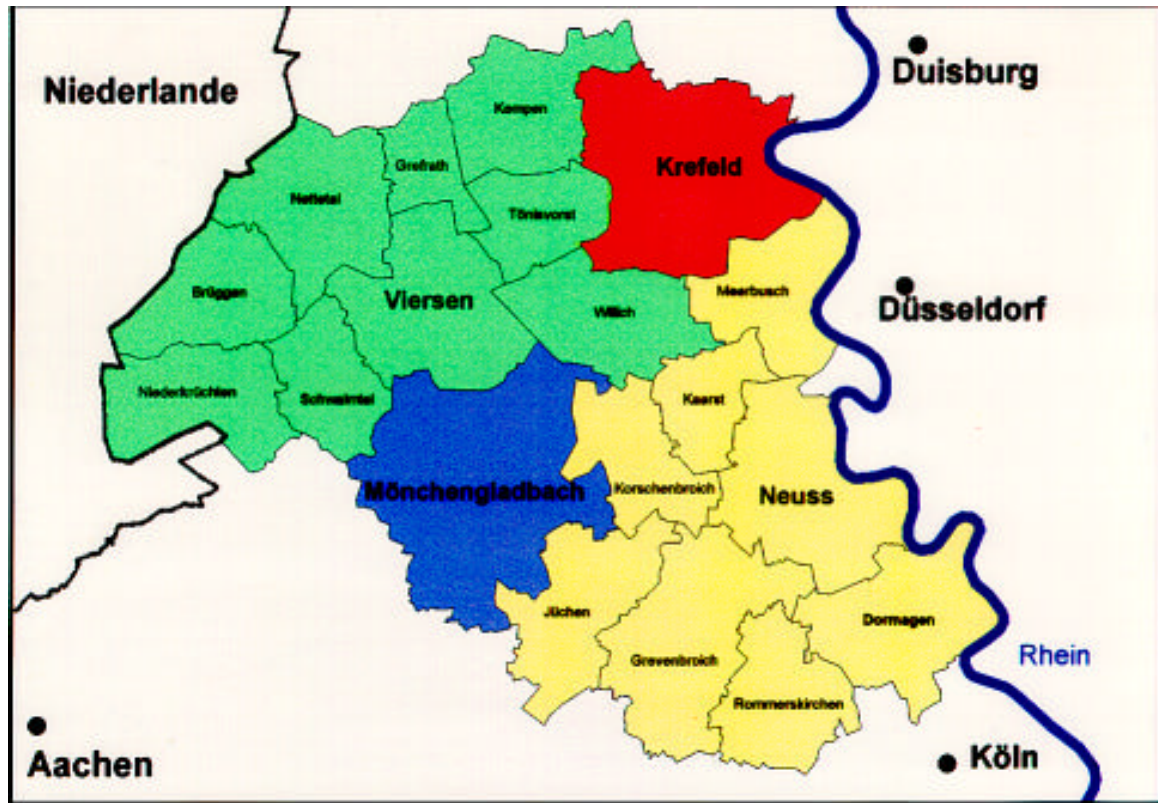
distances. Hence, a region with relatively high growth rates and increasing vacancies might be a region which becomes more compact. In that case immigration will increase and commuting balances will become positive, because of more net inflows and more intra-regional commuter flows and subsequent less commuter outflows.

### 3. Empirical findings on economic trends, migration and commuter flows in the Middle Lower Rhine-area

#### 3.1. Location and general economic characteristics of the Lower Rhine-Area

Our region of interest, the Middle Lower Rhine-Area, is located between the river Rhine near the two big cities Duisburg in the north-east and Duesseldorf as the capital of NRW in the middle-east, and in addition the district of Cologne in the south-east (Figure 2). The border in the west is identical with the national border between Germany and the Netherlands.

Figure 2: Location of the CC-District Middle Lower Rhine



The CC-district is separated into four sub-districts, which are the cities of Krefeld and Moenchengladbach (both locations of the University of Applied Sciences Niederrhein) on the one hand and the districts of Neuss and Viersen on the other hand. In 1997 the whole region had a population of about 1.25 Million people, which represents 6,7% of the total population of the state North Rhine-Westphalia (NRW). Most of them live in the district of Neuss (35%), followed by the district of Viersen (23%). The rest we find to equal parts (21%) in the cities of

Krefeld and Moenchengladbach. About 12% of the population of the CC-district are foreigners, the highest rate we find in Krefeld (16%), the lowest in Viersen (8%). As the counties of Viersen and Neuss are rurally structured districts with various smaller towns of some ten thousands of residents, Krefeld and Moenchengladbach can be characterised as upper-centre cities.

With regard to the economic situation, during the last decades the Lower Rhine had to deal with a dramatic structural change similarly to that we have had at the Ruhr (Siebe 1999). While the latter region was faced with the downturn of the coal, iron and steel industries, the Lower Rhine has been confronted with a significant drop of the textile and clothing industries. Even though textile and clothing are still playing some role, chemicals industries, electrical engineering industries and automobile subcontractors as well as energy industries and open cast mining are the dominant sectors. But the process of structural change has not finished yet, and we still find sub-regions of the CC-district like Krefeld and Moenchengladbach with a high share of traditionally structured industries. In 1998, in these sub-regions with 13,5% (Krefeld) and 13% (Moenchengladbach) we had significantly higher unemployment rates than in North Rhine Westphalia (12,2%) or in Western Germany (11%). The districts of Viersen and Neuss on the other hand show little lower (10% and 9%) unemployment rates compared to the state averages.

### 3.2. Migration movements and commuter flows

Looking at the migration movements at the Lower Rhine focusing on the CC-district as a whole (first picture of Fig. 3), a clearly cyclical behaviour of migration balances of native and foreign people can be seen. Net migration outflows (emigration) can be stated for both population groups during the recession after the second oil crisis in the early eighties. High immigration numbers can be found during the boom phase of 1989/90, which was related to the economic effects of German reunification. Very low immigrations are observed during the recession of 1993.

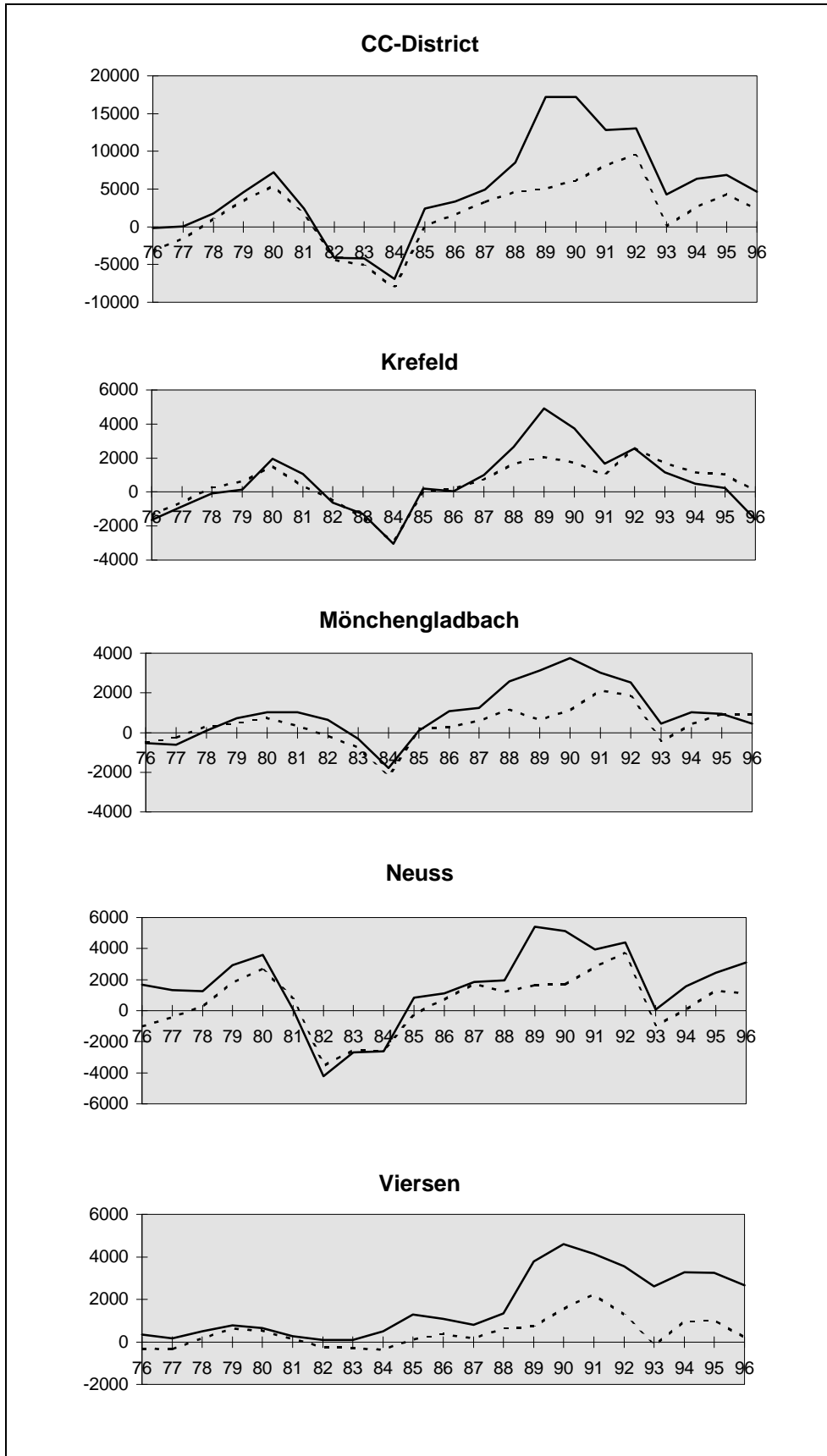
These developments seem to show significant impacts of economic determinants on migration movements. In contrast to Krefeld, Moenchengladbach and Neuss, a significant structural change of migration development in Viersen can be identified during the nineties. In opposite to the eighties with negligibly immigration numbers, the figures jumped to a mean of 3 000 persons per year in the nineties. In this case other determinants than unemployment or growth differentials - e.g. the rise of supply of sites and/or housing - might have caused the migration especially of the native population.

At least for the average of the nineties the Middle Lower-Rhine was an immigration region. The commuter flows in Figure 4 (upper picture) show net outflows of 26.000 people on the average during that period. The development of commuting for the CC-district as a whole in comparison to the migration in that region is that of a mirror image, but with a time lag (with respect to the turning points) of one or two years. Thus, the maximum of immigration can be defined

for 1989/90, the maximum of commuter outflows has been in 1992/93. We find the same with respect to the minimum of migration (1993) and commuter outflows (1995). Looking at the sub-districts we find a clear functional distribution between Krefeld and Moenchengladbach on the one hand and Neuss and Viersen on the other hand. In 1997 Krefeld shows net commuter inflows of about 14.000 persons, with a declining trend since 1990. Moenchengladbach has had significant net inflows of 2.700 persons in 1990/91, but later on the values dropped continuously to a (of course low) net outflow in 1997.

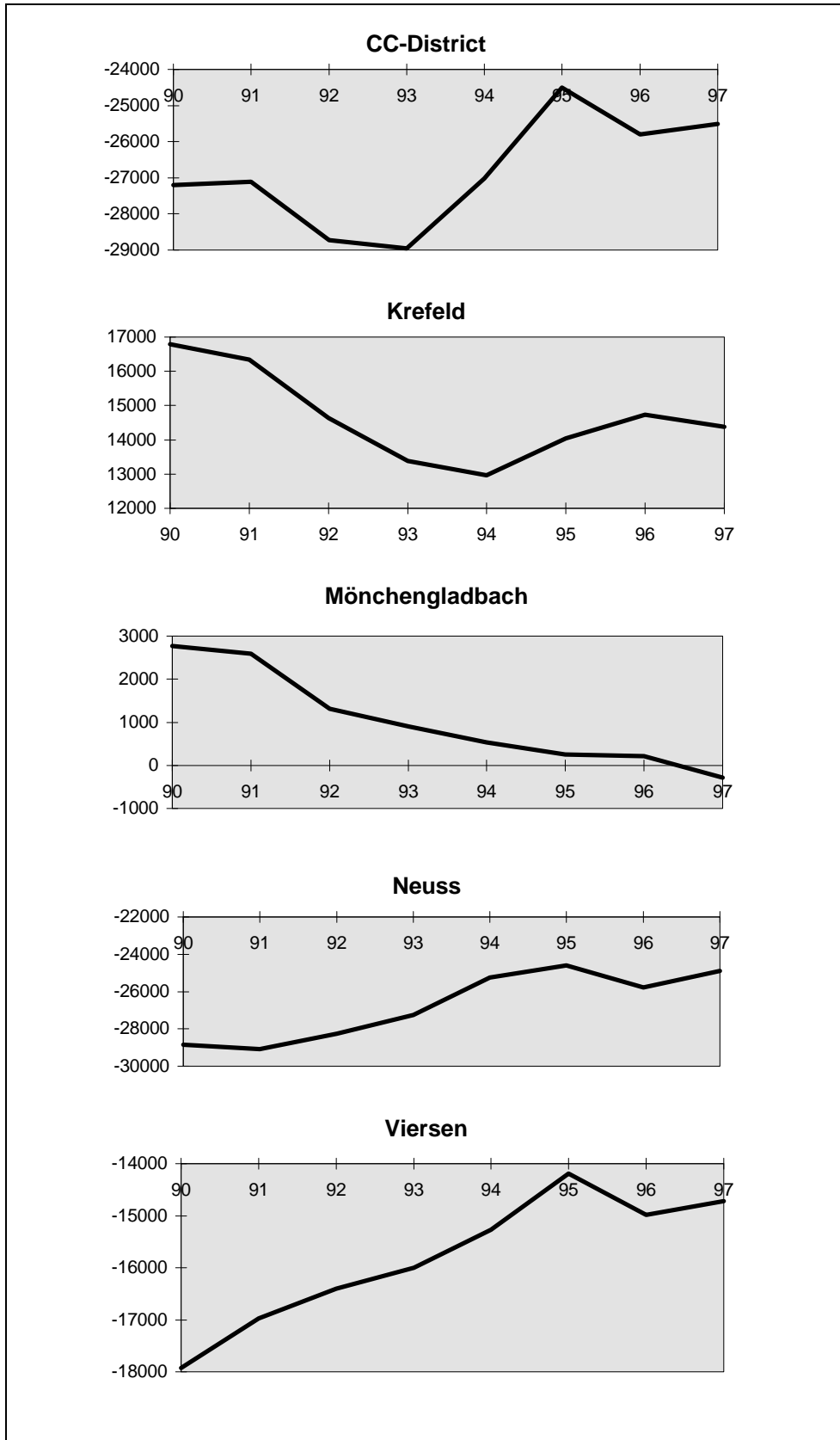


**Figure 3: Migration movements at Middle Lower Rhine  
Balances 1975 - 1996**



Source: Statistical Office of NRW

**Figure 4: Commuter flows at Middle Lower Rhine  
Balances 1990 - 1997**



Source: Statistical Office of NRW

It seems that Moenchengladbach is on the way to becoming a „dormitory region“ like Neuss and Viersen. Regarding these both regions the bottom pictures of Figure 4 show that the net outflows have dropped significantly from 29.000 (Neuss) and 18.000 (Viersen) respectively in 1990 to 25.000 and 15.000 persons. One reason for this development might be the increasing supply of trade and business areas on „the green belt“ at the outskirts of the city of Duesseldorf. This brought about an upturn of labour demand and as one consequence a better labour market condition than in Krefeld and Moenchengladbach.

### 3.3. Unemployment and growth at Middle Lower Rhine

Against the background of the general economic trends discussed above regarding the whole CC-district (Chap. 3.1.) we find different development patterns for the sub-districts as has been stated at the end of the previous section. Looking at unemployment rate and growth rate differences of the sub-regions of Middle Lower-Rhine in relation to the values of North Rhine-Westphalia at Table 1, on the average higher unemployment rates are shown for Krefeld (+2.26 per cent-points) and Moenchengladbach (+1.05) and lower rates can be identified regarding Neuss (-1.90) and Viersen (-1.01). Because there is some correlation between labour market constitution and economic growth, Table 1 generally shows the same ranking regarding regional growth rate differences with the exception, that Neuss and Viersen change their positions.

**Table 1: Unemployment rates and growth rates at Middle Lower Rhine**  
Percent point differences against NRW, 1980 - 1997

Region	1980-85	1986-90	1991-95	1996-97	1980-97
	Unemployment rate				
<b>CC-District</b>	0.57	0.02	-0.31	0.16	0.10
<b>Krefeld</b>	2.72	2.16	1.68	2.80	2.26
<b>Moenchengladbach</b>	1.48	1.18	0.44	1.20	1.05
<b>Neuss</b>	-1.62	-1.94	-2.00	-2.25	-1.90
<b>Viersen</b>	-0.30	-1.34	-1.34	-1.10	-1.01
	Growth rate				
<b>CC-District</b>	0.44	0.27	-0.21	0.20	0.17
<b>Krefeld</b>	0.52	-0.89	-1.30	-0.86	-0.90
<b>Moenchengladbach</b>	-0.34	0.88	-0.50	0.04	0.01
<b>Neuss</b>	1.52	-0.53	0.25	0.44	0.41
<b>Viersen</b>	0.45	2.14	1.18	1.29	1.26

Own calculations on the basis of data offered by the Statistical Office of NRW

## 4. The effects of unemployment and growth on migration and commuter flows

### 4.1. Model and estimation methods

Unemployment and growth rate differences in comparison to the average of the development in the state NRW have been discussed in section 2 as important determinants of migration and commuting. For the empirical analysis the causal structure of the underlying model has to be formulated. The basis of this model is a simple two-step-process, in which in a first step unemployment- and growth rate differences determine the balance of migration movements. In a second step the latter is considered as one of the driving forces of commuter flows. So the model can be written as follows:

$$(1) \quad M_{i,j,t} = a_0 + a_1 GRD_{i,t} + a_2 URD_{i,t} + u_t$$

$$(2) \quad C_{it} = a_3 + a_4 M_{it} + v_t$$

with

M: migration movement-balance, persons

C: commuter flow-balance, persons

GRD: growth rate differences, percent points

URD: unemployment rate differences, percent points

u,v: disturbance terms

i: regional index; i = CC-district, Krefeld, Moenchengladbach, Neuss, Viersen

j: nationality index; j = native, foreigner

From the estimation point of view there might be some problems to combine unemployment rate and growth rate differences as explanatory variables in equation (1), because of the correlation between both („multicollinearity“). But the following reasons can be stated, that this should not be a relevant estimation problem:

- changes of the level and the differences of unemployment rates can rather be interpreted as a result of long term structural change;
- changes of the level and differences of growth rates can be used as short term business cycle indicators.

The empirical correlation check of unemployment- and growth rate-differences proved no significant relationships for all regions.

With respect to an adequate estimation method a system estimation procedure like the Two-Stage-Least-Squares-method (TSLS) seems to be applicable. By using that procedure the common dependence of migration (directly) and commuter flows (indirectly) on unemployment and growth rate-differences can be integrated into the estimation of the coefficients of equations (1) and (2). The variables URD and GRD are exogenous and used as so called instruments

within the TSLS-procedure (*Pindyck/Rubinfeld 1991*). To prove whether or not these instruments have been commonly driven both endogenous, Ordinary-Least-Squares (OLS) estimations have been run additionally. Different estimation results of course could only be expected for the parameters of equation (2).

#### 4.2. Estimation results

The estimation results regarding the parameters of equation (1), separated into migration of natives and foreigners, are shown in Table 2. To make the results of both nationalities as well as for growth and unemployment comparable, average elasticities as the product of the estimated coefficients and the quotient of the means of growth/unemployment-differences and migration have been calculated. Looking at the results for the CC-district as a whole, we find the expected positive growth difference-elasticities and negative unemployment difference-elasticities. Regarding the statistics they indicate an overall fit of 50% and more variance-explanation (R2C) and significant parameter values (and elasticities respectively) for both explanatory variables.

**Table 2: Impact of growth- and unemployment-differences on migration**  
Results of TSLS-estimations; 1980 - 1996

Region	Nationality	Elasticities <sup>1</sup>		R2C <sup>2</sup>
		Growth	Unemployment	
CC-District	Native	0.07*	-0.22**	0.51
	Foreigner	0.13*	-0.42**	0.58
Krefeld	Native	0.30	-5.31**	0.48
	Foreigner	0.23	-5.15**	0.51
Moenchengladb.	Native	0.00	-0.76*	0.18
	Foreigner	0.00	-1.92*	0.16
Neuss	Native	-0.18	-1.91	0.09
	Foreigner	-0.33	-5.61	0.13
Viersen	Native	0.17*	-0.87**	0.63
	Foreigner	0.27*	-1.36**	0.40

Own calculations - <sup>1</sup>Average elasticities calculated as the product of the estimated coefficient and the quotient of the means of growth/unemployment and migration; \* significant on the 5%-level,

\*\* significant at the 1%-level - <sup>2</sup>Determination Coefficient (corrected).

The result that unemployment-elasticities are about three times higher (in absolute values) than growth elasticities is a plausible one, because migration itself induce long-term consequences for the people involved. Hence, it normally

is determined by long-term economic variations like unemployment changes. Somewhat surprising is the result of twice as high growth and unemployment-elasticities of foreigners in comparison to the natives. As has been pointed out in *Hamm/Wenke* (1998), these results can be interpreted as follows: The results indicate a higher economic-driven mobility of foreigners in comparison to their native counterparts within the host country. This higher mobility might be induced by weaker emotional roots of the foreign people regarding all the different regions of the host country. In other words for the foreigners it does not matter (as much) in which region they live. Thus, economic surrounding conditions - especially the supply of vacancies - are much more important for their settlement decisions than they are for the decisions of native people. Of course social networks especially within foreign nationality groups, e.g. the Turkish or the Polish, play an important role for their settlement decisions. In this case the results can be interpreted in that sense that changes of the relative economic performance of a region induce migration movements of the whole extended family of a foreign employee, while only the immediate family of the German employee resettles.

Comparable results to those for the CC-district as a whole can be found only with respect to Viersen, a significant single influence of the relative labour market position on migration is shown for Krefeld and Moenchengladbach. Regarding the former the estimated elasticities of over 5,0 illustrate the dominant role of structural change due to migration, they only explain about 50% of migration movements. Looking at Neuss comparable results of the elasticities can be found, but these are not significant estimations. In this case other than economic factors must have determined migration movements to a high extent, as has been discussed earlier.

**Table 3: Impact of migration on commuter flows**  
Results of TSLS and OLS-Estimations - 1990 - 1997

Region	TSLS <sup>1</sup>		OLS <sup>2</sup>	
	Elasticity <sup>3</sup>	R2C	Elasticity <sup>3</sup>	R2C
<b>CC-District</b>	0.07*	0.56	0.08**	0.64
<b>Krefeld</b>	0.03	0.08	0.04	0.10
<b>Moenchengladbach</b>	0.21	0.05	1.38*	0.39
<b>Neuss</b>	0.11*	0.39	0.08**	0.55
<b>Viersen</b>	0.71*	0.20	0.16	0.08

Own calculations - <sup>1</sup>Two Stage Least Squares-Estimation of equation (1) and (2) - <sup>2</sup>Ordinary Least Squares-Estimation of equation (2) - <sup>3</sup>See explanations of Table 2.

Table 3 illustrates the results of TSLS- and additionally OLS-estimations of equation (2). While the TSLS-procedure uses the values of migration movements which has been estimated on the basis of equation (1), OLS keeps the actual values of regional migration movements within the estimation

procedure. According to the overall CC-district results there are no elasticity estimation differences, both methods estimate a very weak but significant response of commuter flows on migration changes, however the explanation share is higher using OLS (64% against 56%). The results for the particular sub-districts suggest a common influence of unemployment and growth differentials on migration and commuter flows only for Viersen (but with an explanation share migration/commuter flow of only 20%), and to a lesser degree for Neuss. While the commuter flow-balances of Moenchengladbach are significantly correlated with actual migration movements, the relationships between commuter flows and estimated or actual migration data for Krefeld can be neglected.

The positive signs of the estimated elasticities have to be interpreted differently for the CC-district, Viersen and Neuss on the one hand and Moenchengladbach on the other hand (see Figures 3 and 4): The elasticities of the former regions indicate that an increase of net immigration (positive migration balance) leads to a lower net commuter outflow, and vice versa. In the case of Moenchengladbach declining immigration figures went along with declining numbers of commuter inflows. In both cases the results support the hypothesis, that on the basis of the above mentioned disequilibrium approach migration has been affected by unemployment differences and the relative economic performance of the region. The supply of vacancies has strengthened the attractiveness of Viersen and Neuss, has raised the immigration flows during the nineties and has dampened the commuter outflows. The simultaneously increase of real estates accordingly is a result of migration inflows, but not the main reason of them. Moenchengladbach had to accept a lack of attractiveness, accompanied by a downturn of both migration and commuter inflows, while Krefeld „only“ had to come to terms with an unemployment-driven decrease of net migration inflows.

The overall low elasticities of commuting with respect to migration indicate that in particular other variables have to be incorporated in the explanation of commuter flows. The utilisation of such potential determinants like commuting time, car ownerships, employee-characteristics by sectors etc. requires individual data of panels or census (see for example *Artis et al. 1997*, *Keane 1997*) and can hardly be done on the basis of aggregated time series data.

## **5. Summary and conclusions**

The hypothesis of a common influence of the relative labour market and growth position of regions on migration and commuter flows could be verified for the CC-district of the Middle Lower-Rhine and with respect to the sub-district of Viersen. The fact that this hypothesis could not be confirmed by the estimation results regarding the other sub-districts might be explained by the following reasons:

- The data have not been differentiated between the origin of migration and commuter inflows. Intra-regional movements within the CC-district could disturb the underlying relation structures.

- No focus has been put on the special effects of varying vacancy structures on the one hand and housing supply structures on the other hand in the metropolis of Duesseldorf, which potentially induce significant „radiation effects“ at the borderland regions.
- Potential infrastructure restrictions or opportunities respectively of a region which have been discussed in section 2 have not been taken into account in the analysis. Besides this „quantitative“ argument the development of real estate prices as well as the question about the existence of a high-quality personal transport infrastructure have to be incorporated into a more detailed analysis.

Additionally the results suggest that migration decisions on the basis of economic indicators are mainly made with respect to larger regions like the CC-district. What sub-region, city or town, respectively, an employee and his family will chose heavily depends on the other determinants mentioned above.

From the point of view of supply sides of regional labour markets the higher economic driven mobility of foreigners could generate a problem, if relatively lower unemployment rates cause immigration of foreign employees, who are mainly unskilled or low-skilled people. This can intensify the problem of „mismatch-unemployment“ within a region. If there are any options for migration and labour market policies at the regional or local level, these options have to take qualification requests of the immigrating people into account. In the Rhein-Sieg-area in the south of our former capital Bonn for example thousands of high-skilled vacancies in the EDP-industries still cannot be filled. This clarifies the problems of regional mismatch and shows some of the inability of regional policy to control migration with respect to labour market requirements.

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