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Labour Mobility and Housing: The Impact of Housing Tenure and Housing Affordability on Labour Migration in the Czech Republic

Martin Lux and Petr Sunega

Abstract

This article examines whether housing tenure and regional differences in housing affordability have an impact on labour mobility. This relationship is important for understanding the sources of structural unemployment and impediments to economic growth. Using two sample surveys from the Czech Republic, this research reveals that at the individual level housing tenure is the most powerful factor determining willingness to change residence for employment reasons. A time-series regression analysis reveals that the impact of housing affordability on observed interregional migration patterns is relatively weak and that this effect is concentrated among the highly educated seeking employment in the capital, Prague. These results demonstrate that housing tenure has a significant impact on labour migration plans in case of unemployment and that the dynamic impact of regional differences in housing affordability on labour mobility is concentrated within the most highly skilled segment of the labour force.

1. Introduction

One of the central features of an effective market economy is labour mobility: workers must be both willing and able to relocate where employment opportunities exist. Successful national economies are consequently defined in terms of the degree to which the local labour force is able to migrate across both industries and regions so that the supply and demand for labour reach a rapid equilibrium. Within this admittedly simple model of a free market economy, unemployment rises only when there is a weak demand for labour, as occurs in a recession or depression. In reality, rising GDP does not always lead to a fall in unemployment as predicted by Okun's law (Okun, 1962) and increases in

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job vacancies do not always presage increases in employment in accordance with the logic of the Beveridge curve (Beveridge, 1944).

The presence of persistent high unemployment and strong economic growth is seen to be evidence of 'structural' unemployment. The failure of the supply of labour to match the demands of economic growth may arise for a number of structural reasons. In this article, the focus will be on how housing conditions, measured in terms of housing tenure and housing affordability, impact on labour mobility and hence structural unemployment. Previous work demonstrates that specific housing conditions such as regional differences in house prices, rents and appreciation rates, high homeownership rates and negative equity are known to increase labour market rigidities (Gardner *et al.*, 2001; Ford and Burrows, 2000; Böheim and Taylor, 2002).

To keep this research within reasonable bounds, the Czech Republic will be used as a pertinent case study. This strategy has the key advantage of demonstrating the effect of housing-based rigidities on labour mobility in a national economy that has a very low rate of internal migration.[1] Unwillingness to move has occured in the face of relatively large differences in regional GDP and unemployment rates. Moreover, despite several specific features of the post-communist economic transformation such as unstable markets, an increase in regional disparities and a rapidly growing homeownership rate, there has been to date no empirical research studying the impact of housing conditions on labour migration in post-communist states.

In this article, it will be argued that the structure of the Czech housing market is crucial to understanding labour migration patterns and structural unemployment. Consequently, this article will address two central questions. First, is homeownership a barrier to labour migration and hence a determinant of unemployment in the Czech

Republic? Secondly, do regional differences in housing affordability shape observed migration patterns? In order to answer the first question, we employ a new methodology, called the counterfactual approach, which facilitates dealing with the problem of endogeneity of tenure and migration decisions.

The argument presented in this article will be structured as follows. The first section outlines the key findings from previous research on housing patterns and employment rates. The following section presents the data and methodology underpinning the evidence to be presented. This is followed by an analysis of how housing tenure influences individual willingness to migrate to secure employment opportunities, using data from two national surveys undertaken in 2001 and 2006. The penultimate section demonstrates how changes in interregional housing affordability influence observed interregional migration patterns. In the final section, there are some concluding remarks.

2. Migration, Housing and Unemployment

Existing studies of (internal) migration in the Czech Republic have focused mainly on its geographical and demographic aspects. Studies by Čermák (2001) and Hampl *et al.* (1999) conclude that one may identify two long-term migration trends in the Czech Republic: decline in the migration rate during the 1990s; and, persistent concentration of migration flows at the district level—i.e. local or short-distance movements. Between the 1950s and the 1980s, the rate of internal migration decreased in the Czech Republic. In the first half of the 1990s, this trend increased sharply. According to Čermák (2001), this fact could be partially explained in terms of specific features of the housing market, but this conclusion was not based on a systematic empirical analysis.

The international literature on this topic provides numerous empirical studies dealing exclusively with the relationship between the labour and the housing markets from various perspectives (note, Gardner *et al.*, 2001). A majority of studies deal with the impacts of housing tenure on labour migration. Van Leuvensteijn and Köning (2004) highlight two key themes in the literature on this subject: relationships evident on the micro and macro levels.

Arguably, the most frequently cited work among the macro-level studies is Oswald (1996). Using ordinary least squares (OLS) regression and the correlation between unemployment and share of owner-occupied housing data from selected OECD countries, Oswald concluded that existing differences in the share of owner-occupied housing go some way towards explaining the differences in the unemployment rates.[2] Partridge and Rickman (1997) examined the factors likely to determine differences in unemployment levels across the states of the US. Despite having included a large range of control variables reflecting the demographic composition of populations, market and institutional effects, these authors came to a similar conclusion as Oswald. Nickell (1998) analysed the relationship between the share of owner-occupied housing and the level of unemployment across 20 OECD countries during the 1989–94 period. Nickell's study also claimed a statistically significant positive correlation. The main results of macro-level studies on the relationship between housing tenure and unemployment across regions or states reveal that a high proportion of owner-occupied housing contributes to higher national unemployment rates and greater inter-regional differences (Dietz and Haurin, 2003; Partridge and Rickman, 1997; Nickell, 1998; Pehkonen, 1999; Green and Hendershott, 2001; and Dohmen, 2005).

Micro-level studies of the interaction between the labour and housing markets are more rigorous in employing the 'life career' concept and the use of individual-level migrant data (Kendig, 1990; Mulder and Hooimeijer, 1999). Some of the main conclusions from this literature show that there are lower migration rates among homeowners than those living in households of other tenure types. However, a majority of these studies assert that lower homeowner mobility does not support the thesis that people living in owner-occupied housing face greater or longer periods of unemployment when compared with people living in rental housing (Böheim and Taylor, 2002; Millington, 1994; Gardner *et al.*, 2001; Ford and Burrows 2000; McGregor *et al.*, 1992; Cameron and Muellbauer, 1998; Strassmann, 2001; Kan, 2002, Coulson and Fisher, 2002; and Helderman *et al.*, 2004).

It seems reasonable to conclude that a majority of studies at both the micro and macro levels find that housing tenure exhibits a statistically significant influence over employment and migration levels. At the macro level, the studies reviewed suggest that an increase in the share of owner-occupied housing is positively correlated with the level of unemployment. The results of studies at the micro level are, however, less definite on this point. In general, it can be concluded that, for a majority of advanced European economies (with the exception of the UK in the 1980s, which suffered the negative effects of 'frozen' municipal rental housing; see Hughes and McCormick, 1987), homeowners are less mobile when compared with people living in other housing tenures. However, homeowners' lower mobility is not connected with an increased likelihood of becoming unemployed or experiencing longer periods of joblessness when compared with tenants.

3. Methodology and Data

The first research question explored in this article concerns the influence of housing

tenure on level of labour migration in the Czech Republic. Unfortunately, the official migration statistics provided by the Czech Statistical Office do not include information on housing tenure (CZSO, 2004a, 2004b, 2005). More importantly, housing tenure choice is, in the context of migration decisions, endogenous; and therefore it may be methodologically inappropriate to include it as an explanatory variable when analysing migration data. People who are more mobile tend to select tenancy (especially private renting) rather than homeownership. In this respect, mobility plans influence housing tenure choice. To overcome this endogeneity problem, panel data (to enable unobserved characteristics to be taken into account using fixed or random effects estimation) or previous migration histories (identifying people who tend to be more or less mobile) are often applied. However, neither panel data nor migration histories are available in the Czech Republic.

One solution to this endogeneity problem and data constraint is to employ a counterfactual approach where the migration plans of individuals are estimated from cross-sectional data available in representative national sample surveys. Here, individuals' 'propensity to move' are measured using an intention to migrate survey question when some hypothetical employment situation is defined to exist. The goal here is to see how respondents with different socio-demographic and housing tenure characteristics would react if faced with the prospect of long-term unemployment at their current domicile. More specifically, the objective is to model respondents' differential willingness to move from their current residence if there were better employment prospects elsewhere. This counterfactual approach only considers a subset of all labour migration flows—i.e. those based on strong economic incentive—to avoid long-term unemployment.

The counterfactual approach assumes that individuals with a propensity towards moving are more likely to opt for private renting, while people who do not expect to move in the near future are more likely to opt for owner-occupied housing. Crucially, the hypothetical situation presented in the survey interview where a respondent faces the sudden prospect of long-term unemployment is not a product of their own personal experience, values or expectations that are known to be endogenous to past housing tenure choice. Within the survey interview, the sudden unemployment scenario represents an exogenous intervention effect resulting from an immediate, unexpected, random shock in their professional career. This exogenous shock is the same for all respondents in all housing tenures; and, within the framework of the survey interview, those interviewed had to decide if they would be willing to move in order to improve their employment prospects.

Admittedly, this counterfactual approach only measures what economists would call 'expressed' rather than 'revealed' preferences. Therefore, the survey-based counterfactual approach presented here does not make inferences about what has actually happened (i.e. revealed preferences), but only what might happen if the reality of secure employment were to vanish. Notwithstanding this important limitation, the counterfactual approach has the distinct merit of dealing in a straightforward manner with the serious problem of endogeneity that is known to limit any causal inferences that might be made about housing tenure and migration using real migration data. More generally, this simple approach may prove to be a useful research strategy in exploring housing tenure and migration where there is limited or no access to panel data and migration history information, as is the case in the Czech Republic and elsewhere.

To test for the relationship between the housing tenure and intended labour migration plans in case of unemployment, we also

applied a combination of quantitative and qualitative sociological methods. Specifically, we used data from two national-sample questionnaire surveys: 'Housing Attitudes 2001' and the Centre for Public Opinion Research Survey 2006 (hereafter, CVVM 2006). In addition, we also gathered information regarding attitudes towards migration for work reasons from a set of focus groups conducted among unemployed people living in the town of Opava[3] and among labour migrants to the capital of the Czech Republic, Prague. A total of 39 participants took part in the focus group component of our research. The application of qualitative methods substantially increased our understanding of how labour migration plans are formed. The merits of integrating qualitative insights into quantitative analysis were evident in the improvement in the level of total explained variation in the models estimated using survey questions designed in 2001 and 2006.

The 'Housing Attitudes 2001' survey implemented a standard interview with a representative national sample of 3564 respondents aged 18 years or more. Respondents were selected using a standard quota sampling methodology based on sex, age, completed education, size of place of residence and housing tenure. This survey was specifically designed to examine the housing conditions and housing attitudes of the Czech population. The CVVM 2006 survey was conducted on a national sample of 1002 respondents aged 15 years or more. It was also a quota-sample survey based on sex, age, completed education and region of residence. This survey forms part of a standard omnibus monthly series into which questions related to labour migration and factors influencing it were added.

Aggregate-level data are used to examine the second research question addressed in this article: did regional differences in housing affordability (and change in affordability across time) have any effect on the level of interregional migration evident in official migration data (i.e. migration between NUTS 3 regions recorded by the Czech Statistical Office) for the 2000–2007 period? In order to measure regional differences in the affordability of rental housing the average regional rent-to-income ratios are used in this research. For owner-occupied housing, average regional price-to-income ratios were estimated annually between 2000 and 2007. Average after-tax household incomes were computed from regional income statistics provided by the Czech Statistical Office, while average regional house prices/rents were computed from house price/rent data gathered by the Institute for Regional Development which has unique expertise in the monitoring of prices and rents in the Czech Republic. To control for other factors influencing inter-regional migration, use is made of regional economic and demographic statistics provided by the Czech Statistical Office.[4]

Due to the limited number of cases (i.e. 14 NUTS 3 regions) available for regression modelling, it was decided to construct the data matrix to be analysed as follows. Interregional differences for all possible combination of regions ($n = 182$) were computed for all dependent and independent variables. This procedure was undertaken for each of the seven years examined—i.e. 2000–07, resulting in an interregional time-series of year-to-year differences for all variables. Within the regression models estimated, the dependent variable is year-to-year change in migration rates between all possible pairs of regions. The set of independent variables examined are year-to-year changes in differences in factors that are known from previous research to influence interregional migration rates, including differences in housing affordability.[5] Within the models estimated, it is assumed that people are moving from regions with higher to lower unemployment rates. Here, the minimum unemployment rate difference is assumed to be two percentage

points. Migration flows between neighbouring regions have been excluded in order to remove from consideration short-distance moves that may not be connected with change in employment.

4. Housing Tenure and Intended Labour Migration

The relationship between housing tenure and labour migration is analysed here using a counterfactual approach—i.e. intention to migrate because of unemployment. As already stated, the main reasons for using a counterfactual approach stem from the lack of information concerning housing tenure in official migration statistics and the endogeneity of tenure and mobility choices. The 'Housing Attitudes 2001' survey included a question about whether the respondent would move, regardless of the existing situation, if faced with long-term unemployment at their current domicile. Simple frequency counts of responses to likely behaviour in counterfactual situations may be unreliable and estimates could differ substantially between surveys. On the other hand, the correlations between the variables of interest are likely to exhibit higher levels of stability across surveys (Lux *et al.*, 2006). This article aims to analyse these relationships between variables to assess the net influence of housing tenure on intentions to migrate for employment reasons.

A cross-tabulation of the two key variables of interest—i.e. type of housing tenure and propensity to move—is presented in Table 1. Respondents without a direct tenure title to their place of residence (i.e. ownership or tenancy) were classified separately. In other words, persons living in the household of a homeowner or tenant were classified as 'household members'. Table 1 shows that willingness to move for work in case of long-term unemployment is clearly lower among homeowners (and detached house owners in particular) compared with tenants (especially those living in private rented housing).[6]

A logit regression model was used for the purposes of determining the impact of housing tenure on the willingness to move for work in the case of unemployment. Here, the dependent variable, willingness to move

Table 1. Willingness to move in the case of becoming unemployed, according to housing tenure of respondent (percentages)

Type of housing tenure	Willingness to move for work reasons			
	Definitely yes	Rather yes	Rather no	Definitely no
Owner, co-owner of a family home	7	19	41	34
Owner, co-owner of a flat	14	30	40	16
Member of a housing co-operative	10	34	38	18
Tenant in a municipal flat	15	40	36	9
Tenant in a private rented flat	27	40	25	8
Member of a homeowner household or a housing co-operative	19	40	28	13
Member of a tenant household	20	44	26	11

Notes: N = 2310. Sample restricted to economically active respondents. The survey data reported in this table are based on the following question: 'Regardless of your current situation, would you move from your current flat/house if you became long-term unemployed?'. The response options are: (1) definitely yes, (2) rather yes, (3) rather no, (4) definitely no, and (5) don't know. Rows sum to 100 per cent subject to rounding error. 'Don't know' responses have been excluded from analysis. *Source*: Housing Attitudes 2001 survey.

to improve employment prospects, was measured using a Likert-type four-point scale ranging from 'certainly not' to 'certainly yes'. The negative responses were coded as zero or unwilling to move and positive answers were coded as one indicating a propensity to move. It should be noted that the sample was evenly divided between those willing to move and those who were not. The results of logit model are shown in Table 2.

The estimates presented in Table 2 reveal statistically significant effects for various types of housing tenure, along with age, gender, marital status, education and scales assessing the accessibility of services and quality of the local environment in the place of main residence. The latter two scales were derived from a principal components analysis (PCA, also called factor analysis) of a battery of indicators.[7] Finally,

a set of regional dummies were included to account for region-specific differences that might be present. Other variables, such as number of household members, economic activity and profession of the household head, household income, income of the head of household, number of dependent children in the household and many other variables were included in earlier versions of the model, but they were not statistically significant and are therefore not reported in Table 2. The model reported in this table is a reasonable fit to the data (Nagelkerke R^2 = 0.21) where two-thirds (predictive accuracy is 67 per cent) of all cases are correctly classified. As expected, housing tenure proved to be the most powerful single variable influencing intended migration for work. Nonetheless, the model fit statistics reveal a considerable level of

Table 2. Logit model of willingness to move in the case of becoming unemployed in Czech Republic, 2001

Independent (explanatory) variables	B	Exp (B)	Significance
Housing tenure			
Living in temporary accommodation	1.025	2.787	0.001
Tenant in private rented housing	0.689	1.991	0.008
Tenant in municipal housing	0.338	1.402	0.025
Owner/co-owner of family home	−0.756	0.470	<0.001
Standard of living			
Quality of environment scale	−0.140	1.150	0.005
Access to local amenities scale	−0.131	1.140	0.006
Socio-demographics			
Age	−0.036	0.964	<0.001
Sex (male = 1, female = 2)	−0.397	0.672	<0.001
University education	0.472	1.603	0.002
Married	−0.476	0.621	<0.001
Living in Zlín region	−0.447	0.640	0.039
Living in South-Moravia region	−0.453	0.636	0.005
Constant	2.214	9.149	<0.001
Model fit statistics			
Nagelkerke R^2	0.21		
Percentage correctly classified	67		

Notes: N = 2310 and refers to economically active respondents. The dependent variable is willing to move if faced with sudden unemployment. The original Likert type scale was re-coded to a dummy variable where '1' indicates the respondent is willing to move and conversely '0' denotes an unwillingness to migrate to seek alternative employment.
Source: Housing Attitudes 2001 survey.

unexplained variance. To uncover other potentially important explanatory variables influencing labour migration, decisions and to cross-validate the key impact of housing tenure on labour migration, a qualitative research strategy was adopted through use of four focus groups. This qualitative research revealed that participants of focus groups who moved to Prague to find work did so for the following main reasons

—To realise ambitions, to find a creative job, learn new skills, make a mark in life, obtain specialised work experience and promote one's career. This was the most important reason given.
—Fear of unemployment.
—Previous experience with moving due to pursuing a university education.
—Desire to have an independent life, no restrictions imposed by homeownership.

Conversely, the focus group discussions also revealed the key reasons underpinning decisions not to move in search of employment. Here, the evidence came primarily from two focus groups composed of unemployed residents in the town of Opava. The main motivations were the following

—Adoption of a risk-averse strategy where the advantages of the *status quo* were stressed in terms of preserving family links and existing housing arrangements.
—Sense of responsibility for the broader family rather than emphasising the responsibility for securing personal financial independence.
—Adherence to a pessimistic outlook where a critical rather than positive approach to problem solving is adopted. Here, external causes were blamed for relative economic deprivation and high levels of local unemployment.
—Living in a family house or own flat where there is a relatively high standard of living. In such situations, housing is often viewed as a lifetime investment and such sunk costs are difficult to abandon.

The findings from the focus groups contributed to a wider range of questions being implemented in the second national sample questionnaire survey, CVVM 2006. Specifically, the survey included items exploring the psychological profile of respondents. During the CVVM 2006 survey interview, respondents were asked if they would move a considerable distance, defined as 300 km or more from their current place of their residence, to secure new employment if the household faced financial hardship due to the respondent or their spouse being unemployed. Approximately 40 per cent of respondents expressed some willingness to move under such circumstances. A logit regression model was estimated and the results are presented in Table 3. The value of Nagelkerke R^2 (0.33) estimated from the CVVM 2006 dataset is considerably higher than the model fit for the logit model estimates derived from the Housing Attitudes 2001 survey dataset. The most influential predictor of propensity to move for employment reasons is level of satisfaction with current housing. The results also reveal that the psychological orientation of respondents is also important in understanding willingness to migrate as having a liberal orientation,[8] being flexible in employment matters and possessing the desire to find a creative and interesting job were all positively associated with a propensity to move.

Table 3 shows that the odds ratio (exp(B)) of respondents moving to a distant location should they suddenly become unemployed is roughly 10 times smaller (i.e. exp(B) = $0.10 \approx 1/10$) for respondents who were definitely satisfied with their current housing as opposed to those who were dissatisfied. In the model reported in Table 3, none of the 'objective' variables such as age, housing tenure, occupation, size of household, etc. exhibited significant effects ($p \leq 0.05$). However, it may be argued that the set of attitudes examined here are strongly influenced by the respondents' 'objective' characteristics.

Table 3.   Logit model of willingness to move in the case of becoming unemployed in Czech Republic, 2006

Explanatory variables	B	Exp (B)	Significance
Satisfaction with housing			
Definitely yes	−2.270	0.103	<0.001
Rather yes	−0.852	0.427	0.053
Rather no	−0.224	0.799	0.646
Liberal–conservative scale	0.438	1.550	0.001
General flexibility in employment matters			
Would definitely take the offer of a new job	1.062	2.892	0.061
Would probably take job offer	1.497	4.468	<0.001
Would probably not take job offer	0.802	2.230	0.051
Would definitely not take job offer	0.706	2.026	0.140
It is important to have interesting intellectual activity, to be creative, seek for new experiences			
Definitely yes	1.614	5.023	0.008
Rather yes	0.746	2.109	0.171
Rather not	0.770	2.160	0.171
Model fit statistics			
Nagelkerke R^2	0.33		
Percentage correctly classified	71		

Notes: N = 623 and refers to economically active respondents. The dependent variable is willing to move if faced with sudden unemployment. The exact question is: 'Would you move a greater distance, i.e. 300 km or more from your current place of residence, if your household was facing financial hardship due to loss of employment by yourself or your spouse where the distant place offered employment for either your or your spouse?'. Response options were (1) certainly yes, (2) rather yes, (3) rather no, (4) certainly not, and (5) don't know. This model was estimated using a binary logit procedure. The original Likert type scale was recoded to a dummy variable where '1' indicates the respondent is willing to move and '0' denotes an unwillingness to migrate to seek alternative employment. The excluded response options for the explanatory variables were used as the reference categories: satisfaction with housing—category 'definitely no'; general flexibility in employment matters—category 'wouldn't even consider the offer'; and importance described to success in profession, career—category 'unimportant aspect'.
Source: CVVM 2006 survey dataset.

An analysis of the structure of individual attitudes towards migration for economic reasons using a technique such as structural equation modelling is beyond the scope of this research. A comprehensive analysis of factors influencing housing satisfaction presented by Lux (2005) reveals that size of flat is the most important factor influencing housing satisfaction where other considerations such as quality of housing, quality of environment and housing tenure also exhibit important effects. Significantly greater satisfaction levels were recorded among homeowners, especially owners of detached houses. In summary, inclusion of a range of attitude variables in order to estimate more properly specified models confirms the central importance of housing tenure on individuals' decision to migrate for work reasons in the event of unemployment.

5. Regional Differences in Housing Affordability and Labour Migration

In this section, we will explore whether regional differences in housing affordability (as opposed to housing tenure examined

in the previous section) create significant barriers to inter-regional migration. We will concentrate especially on regional differences in market-transacted housing—i.e. market rents and house prices. The data examined in this section are composed of aggregated regional migration statistics reported by the Czech Statistical Office. Use will be made of OLS regression analysis for all NUTS 3 regions, to test if year-to-year changes in housing affordability among each pair of regions have a significant influence on year-to-year changes in the level of migration observed among each pair of regions. Here, control is made for other factors that are known to influence inter-regional migration rates. Two central questions are examined here

—Are changes in regional differences in housing affordability associated with variations in observed migration rates?
—Is the effect of regional differences in housing affordability on the level of migration stronger for migrants with higher education compared with all others?

It is assumed that individuals who search for employment move from regions with higher to lower unemployment rates.[9] Moreover, it is assumed that the minimum unemployment rate spread between any pair of regions is two percentage points. We tested to see if there is a significant correlation between year-to-year changes in regional differences in housing affordability, using rent-to-income ratio and price-to-income ratio, and year-to-year changes in regional differences in the number of immigrants per 1000 inhabitants. The results of these analyses did not uncover any statistically significant relationships. In a second step, we computed correlations for all interregional migrations to Prague—the most economically active zone within the Czech Republic. Again, we found no significant correlations. A series of multiple regression models also did not unearth any significant

relationship between year-to-year changes in regional differences in housing affordability and year-to-year changes in regional differences in the number of immigrants per 1000 inhabitants.

Finally, we tested for a significant relationship between variations in regional differences in housing affordability and the regional sources of immigrants to Prague on the basis of level of education. This strategy makes sense as the economics literature based on the Heckscher–Ohlin theory suggests that labour mobility should be strongly related to differences in skills among workers, where richer areas characterised by more capital-intensive 'high-technology' enterprises will attract highly skilled labour. This analysis revealed a statistically significant correlation for migrants with university degrees. It is interesting to note that this relationship was stronger for the house price-to-income ratio than for the rent-to-income ratio. An examination of partial correlation coefficients confirmed the statistical significance of this relationship where control was made for other potentially important confounding variables: interregional differences in per capita GDP, per capita disposable income, key demographic differences, unemployment rate and average salary.

Table 4 presents the results of an OLS regression model where the dependent variable is year-to-year change in inter-regional migration to Prague for those with a university education. The focus on this aspect of labour migration makes sense because it represents a key dynamic within the transition to a free market economy and accession to the European Union (in 2004) for two reasons. First, this high-skill component of total observed labour migration should exhibit most sensitivity to any 'trade-offs' between employment opportunities and differences in housing affordability. Secondly, this young highly skilled segment of the Czech labour market should exhibit the clearest relationship between housing affordability and migration to the country's richest

economic zone, whereas all other workers are likely to exhibit less clear economic motivations due to more constrained employment opportunities. The model parameters shown in Table 4 reveal that, if interregional differences in house price-to-income increased between 2000 and 2007, then the level of migration to Prague declined, after controlling for other factors. The fit statistics for the OLS model indicate that most of the observed variance remains unexplained. The limited fit of the model is likely to stem in part from collinearity as there is correlation between the price-to-income ratio (P/I) and mean income variables. However, the collinearity statistics (VIF) shown in the final column of Table 4 indicate the presence of a more complex pattern of correlations among the explanatory variables. Overall, the central finding is that change in regional differences in housing affordability does not significantly influence the overall interregional labour migration rate. This effect does, however, have a greater positive impact on a subset of migrants—those with a university level of education moving to Prague.

Table 4. OLS regression model of year-to-year changes in inter-regional differences in number of immigrants to Prague with a university education, Czech Republic, 2000–07

	Unstandardised coefficients		Standardised coefficients			Collinearity statistic
	B	S.E.	Beta	T-ratio	Significance	VIF
Year-to-year change in inter-regional differences in price-to-income ratio	−0.026	0.010	−0.381	−2.622	0.012	1.216
Year-to-year change in inter-regional differences in the share of inhabitants aged 20 to 34 years	−0.030	0.012	−0.368	−2.401	0.021	1.358
One-year lag for year-to-year change in inter-regional differences in the mean income for people with a university education	0.129	0.075	0.280	1.712	0.094	1.544
Constant	−0.021	0.026		−0.813	0.421	
F	5.24	(p = 0.004)				
R^2	0.27					
Adjusted R^2	0.22					
Durbin–Watson statistic	2.05					

Notes: Total number of cases in this ordinary least squares (OLS) model is 46 where each case represents inter-regional migration directed toward Prague. Prague represents the wealthiest economic region of the Czech Republic and has the lowest unemployment rate. Consequently, the dependent variable specified in this model focuses on the economic logic of migration for the most skilled segment of the workforce and how well housing affordability compares with the logic of the labour market and a demographic-mobility-based explanation. Migration between adjacent regions and movement stemming from suburbanisation in Prague were excluded from analysis in order to simplify model specification. Moreover, inter-regional differences in unemployment rate were set to a minimum value of 2 per cent. The non-significant Durbin–Watson statistic suggests no problems with serial correlation.
Source: Czech Statistical Office (see text for details).

6. Conclusions

A central concern among governments and economists is ensuring that economic growth is not hindered by structural constraints. In the aftermath of the financial collapse of late 2008 and subsequent economic crisis, there is currently considerable fear regarding rigidities that keep unemployment rates persistently high in the face of modest but sustained growth. Such contemporary concerns among policy-makers combined with an extensive long-standing literature demonstrating the link between housing and employment patterns underscore the substantive importance of the research results reported.

The failure of the supply of labour to match the demands of economic growth may arise for a number of structural reasons: generous unemployment benefits may discourage workers from actively seeking work; workers' skills may not match the demands of employers and a period of retraining may be required to facilitate intersectoral mobility; two-income households have greater transaction costs in moving to areas of employment abundance if two careers are under consideration; and, employees' investment in their homes may be a barrier to geographical mobility where fears about sunk costs or negative equity result in risk-averse thinking and behaviour. The presence of these four factors is seen to underpin the structural component ($\approx$ 7 per cent) of the currently (2009) high level of unemployment in the US ($\approx$ 10 per cent). A recent IMF report revealed that each of these four factors magnifies the impact of the others, yielding powerful structural unemployment effects (Dowling *et al.*, 2010, pp. 4–15).

This article, in exploring the relationship between housing conditions and labour migration, and hence a key component of structural unemployment as evident in labour mobility, has examined two key questions. First, is homeownership a barrier to labour migration and hence a determinant of unemployment in the Czech Republic?

Secondly, do regional differences in housing affordability shape observed migration patterns? Using mass survey data and a 'counterfactual approach', the evidence presented here demonstrates that housing tenure is the most powerful predictor of intention to migrate for work-related reasons in the event of unemployment. Therefore, the answer to the first question is that homeownership is a barrier to labour migration and a likely source of structural unemployment. However, it is important to stress that these results are based on 'expressed preferences' reflecting likely behaviour in a hypothetical situation of sudden unemployment.

In addressing the second question, actual migration data were used to examine the 'revealed preferences' evident among Czech workers during the 2000–07 period. The data analysis presented reveals that regional differences in housing affordability have in contrast only a limited impact on observed migration patterns. However, this 'housing effect' should be explored in greater detail with a longer time-series in the future. Overall, empirical models of the relationship between housing effects and labour migration reveal that housing tenure is likely to be an important component of structural unemployment in the Czech Republic. For this reason, it is important that decision-makers consider housing policy as an integral feature of overall economic policy.

In the US, the UK, Spain and Ireland, the impact of property crashes has been the focus of numerous analyses that have attempted to measure *direct* economic effects. The Czech case is interesting from an international perspective because there has been no recent property crash and so the effects of housing on key economic indicators such as unemployment are *indirect*, but no less real or important. The central lesson from the post-communist Czech experience is that the structure of the housing market, as measured through housing tenure and partially regionally based differences in affordability, does

influence how workers evaluate participation in the labour market. And this in turn has a decisive effect on the level of structural unemployment observed.

A key implication here is that if governments pursue a policy of increasing homeownership, this may have the unintended consequence of making specific labour segments less mobile. Within the Czech Republic, the post-socialist policy of public housing privatisation and encouraging householders to purchase their residence has been associated with persistent regional disparities. Here, some homeowners appear to be willing to suffer the opportunity costs of underemployment or unemployment in order to maintain occupancy of their current residence. Similar patterns in previous research work have referred to this situation as a form of 'satisfaction paradox' where homeownership increases life satisfaction regardless of the actual level of poverty (Rohe and Stegman, 1994; Watson and Webb, 2010, p. 1795). This source of risk-averse individual-level decision-making has the potential, if left unchecked, to result in a national economy characterised by persistent high unemployment and economic growth operating in tandem with strong regional disparities.

Such economic and spatial patterning is undesirable as it undermines social cohesion and weakens the system of political representation because growing regional disparities leading to greater inequality may be evaluated as policy failure. For these reasons, governments in post-socialist states need to consider carefully the optimum mix of housing tenures (with a significant private rental housing share) in order to avoid structural rigidities that could undermine national economic performance.

Acknowledgement

Notes

1. Internal migration is defined as people's movements across the geographical regions (administrative units) of a given state (i.e. it does not take into account immigration from abroad or emigration from other countries). We will focus in this article only on internal migration in the Czech Republic. According to data from the Czech Statistical Office, the total number of internal migration in the Czech Republic in 2009 consisted of 233 262 moves. The ratio of migration between regions was 39.4 per cent. Migration between counties in the same region amounted to 19.3 per cent and the remaining 41.3 per cent were moves within counties. Migration at the level of areas (NUTS 2), a unit of analysis usually cited in international comparisons, was 0.80 (gross rate) and 0.11 (net rate). The collection of data for international comparisons needs to overcome a wide range of problems regarding the definition of migration, its measurement and data collection. A reliable international comparison is currently impossible. However, a sample comparison made by Huber (2005) shows that the level of internal (interregional) migration in the Czech Republic is much lower than that observed in the older member-states of the EU. The total extent of internal migration in the Czech Republic significantly decreased after 1990; the most significant decrease took place in the period 1990–96. The unemployment rate as estimated by the ILO for the Czech Republic oscillated between 4 and 5 per cent between 1993 and 1997, and then increased to 6.5 per cent in 1998 and 8.7 per cent in 1999. Between 2000 and 2006—i.e. during a period of strong economic growth—the unemployment rate persisted at high levels of around 7–8 per cent. The unemployment rate decreased to 5.3 per cent in 2007 and to 4.4 per cent in 2008. However, this decrease was temporary as the jobless increased once again in 2009, to 6.7 per cent. Regional differences in the unemployment rate increased until 2003; the difference between the region with lowest unemployment rate (Prague) and the region with highest unemployment rate (the Ustecky region) amounted to 13.5 percentage points in that year. Regional differences in unemployment

rates since 2004 have declined slightly, but have remained at high levels. In 2009, the maximal inter-regional difference in unemployment rate was still 9.4 percentage points.

2. Oswald did not publish his influential study in any peer-reviewed scientific journal because he did not unambiguously demonstrate a causal relationship between housing tenure and unemployment by controlling for other factors influencing the unemployment rate. Nonetheless, a majority of other scholars working on the link between housing tenure and unemployment cite Oswald (1996) as the first work in this specific field of research.

3. The town is located in the Moravian–Silesian region. Opava is a town with one of the highest unemployment rates in the Czech Republic and, simultaneously, one of the lowest rates of internal emigration to other Czech regions.

4. The statistics included the following variables and their lagged values: share of owner-occupied housing, share of households with both parents and children, per capita GDP, per capita net disposable income, unemployment rates, per capita fixed capital formation (i.e. investments), number of finished flats per 1000 inhabitants, number of started flats per 1000 inhabitants, share of inhabitants aged 20–34 years, share of inhabitants aged 20–39 years, share of inhabitants older than 65 years, average age, share of inhabitants older than 65 years to inhabitants up to 14 years old, share of municipalities with less than 5000 inhabitants, number (share) of inhabitants with completed university education, number of registered economic subjects per capita, number (share) of employees with highest occupational status (ISCO-88 1;—i.e. managers), and number (share) of employees with lowest occupational status (ISCO-88 9;—i.e. elementary occupations).

5. We should note that such data treatment is not illegitimate (for example, by creating spurious inflation in the number of degrees of freedom). The number of migrants from one region to all other 13 regions is unique and a data recoding therefore does not duplicate existing information in the dataset. Moreover, the migration flows that do not meet theoretical assumptions on direction of labour migration (movement from regions with higher unemployment rate to regions with lower unemployment rate) were excluded from the original dataset. The main hypothesis tested on the recoded dataset was whether changes in regional differences in housing affordability will lead to a change in the level of inter-regional migration.

6. The meaning of particular housing tenures may largely vary between countries. It is even more the case for post-communist states with substantial changes in tenure structure after 1990. Detailed information about housing system change in the Czech Republic can be found in Lux *et al.* (2009) or Lux and Sunega (2010). In brief, soon after 1990, former state housing began to be partially restituted to former private owners (thus creating the segment of private renting), partially transferred to municipalities and, later, partially privatised to the ownership of tenants. Rents were gradually deregulated and since 1993 free market rents could be charged for vacant (new) flats. The mortgage market practically took off in 2000 and, by our estimate, in 2007, about 20 per cent of homeowners owned mortgaged properties. It is very difficult to describe all the details of housing system change here. However, it can be concluded that, while the meaning of homeownership does not deviate fundamentally from its meaning in most Western countries (and the homeownership rate increased from 47 per cent in 1991 to an estimated 61 per cent in 2007), half of private rental housing (forming, by estimate, 13–15 per cent of housing stock in 2007) and a major part of municipal rental housing (forming, by estimate, 11 per cent of housing stock in 2007) are operating under the regime of rent control and strong tenant protection (with gradually increasing rents to attain market values in 2012) and the rest of rental housing operates under free market conditions. The majority of owner-occupied houses (about 70 per cent) are detached family homes. The housing co-operative segment (forming, by estimate, 13–15 per cent of total housing stock in 2007) has rather the character of homeownership tenure (due to the disposal rights of co-operative members), although it cannot be mortgaged as private property.

7. Factors were used instead of a set of simple dummies since factors are better for controlling purposes (the aim was to test whether housing tenure remains a significant factor even after control for the influence of other explanatory variables). Including a set of regional dummies (instead of factors) would substantially increase the number of degrees of freedom.

8. Factor was built on answers to the following question: 'How would you characterise (or evaluate) yourself?'. The following list of 11 statements was then presented to the respondent. (a) I am a person who does not worry about the future; (b) I am a conservative, entrenched person, who likes safety; (c) I am a person who tries to live life 'to the full' taking all that the life brings; (d) I am a person who is trying to be better than everyone else; (e) I am a person for whom it is important to have an interesting, creative job, where intellectual effort is needed; one must be creative, find new solutions, ideas; (f) I am a person who believes in only doing the work one must; (g) I am a person keeping ahead of technological advancement; (h) I am a person whose feet are standing firmly on the ground and relying on proved methods for advancement; (i) I am a person who has already achieved my life's balance and maintains this life's balance; (j) I am a person who appreciates order and following laws and rules; (k) I am a person who continuously seeks new experiences. The response options for each statement were: (1) definitely yes, (2) rather yes, (3) rather no, (4) definitely no, and (5) don't know. Using a principal component analysis this factor had the strongest loadings on items (b), (h), (i) and (j).

9. Naturally, migration flows are not homogeneous. For migrants with specific occupations and levels of education, it would be rational to move from regions with lower unemployment to regions with higher unemployment. However, such labour movements, which are generally less numerous than other migration patterns, were excluded from our analysis in order to focus on the key patterns of interest in this research.

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