Homeownership, Mobility, and Unemployment: Evidence from Housing Privatization*

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Homeownership is believed to cause higher unemployment. This is because home-owners face higher mobility costs—limiting their job search to local labor markets. Empirical tests of this prediction have yielded mixed results so far. However, since homeownership in these studies is not randomly assigned, their interpretation is unclear. This paper documents that privatization of public dwellings in Central and Eastern Europe resulted in a quasi-experimental assignment of homeownership to individual households. This facilitates a new test of the effects of homeownership on mobility and unemployment. Using a 2010 micro data on privatizers and renters, we find only weak evidence that homeowners are less willing to move and no evidence of higher unemployment risks relative to renters.

JEL classification: J61, J64.

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1 Introduction

Previous research often finds that homeowners, all else equal, are less likely to move residence than renters (see Dietz and Haurin 2003; Van Ommeren and Van Leuvensteijn

2005, for overviews). In a seminal paper, Andrew Oswald (1996) argues that this should lead to higher unemployment risks, longer unemployment duration, and lower wages among homeowners, as lower mobility implies lower search effectiveness of homeowners compared to renters. Since the publication of this paper, a large number of contributions have tested various aspects of this "Oswald hypothesis."

The previous literature documents a number of channels linking homeownership to immobility. These include homeowners' higher moving and transaction costs (Dohmen 2005; Goodman 1995; Haurin and Chung 1998; Haurin and Gill 2002; Quigley 2002; Van Ommeren 2008; Winkler 2010), mortgage lock-in effects (Quigley 1987), lock-in effects related to transaction and capital gains taxes (Best and Kleven 2015; Lundborg and Skedinger 1998, 1999; O'Sullivan, Sexton, and Sheffrin 1995; Van Ommeren and Van Leuvensteijn 2005), homeowners' higher investments in local social capital (DiPasquale and Glaeser 1999), loss aversion (Engelhardt 2003), as well as mobility expectations and preferences (Lux and Sunega 2012; Rohe and Stewart 1996).[1]

At the same time, the empirical evidence on the effects of homeownership on unemployment remains mixed (see Havet and Penot 2010, for a review). Aggregate-level studies generally find a positive correlation between unemployment and the share of owner-occupied housing, within as well as across countries (Blanchflower and Oswald 2013; Green and Hendershott 2001; Isebaert, Heylen, and Smolders 2015; Oswald 1996). Individual-level studies, by contrast, tend to find that homeowners, if anything, do better on the job market than renters in terms of unemployment risk, its duration, as well as wages (Barceló 2006; Battu, Ma, and Phimister 2008; Coulson and Fisher 2002, 2009; Flatau, Forbes, and Hendershott 2003; Munch, Rosholm, and Svarer 2006, 2008; Rouwendal and Nijkamp 2010; Van Leuvensteijn and Koning 2004).

An important methodological issue faced by this literature is the endogeneity of homeownership status. It is not clear, for instance, whether individuals become immobile because they acquire homes or whether less mobile individuals self-select into homeownership by

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[1]See also Barceló (2006); Gardner, Pierre, and Oswald (2001); Helderman, Mulder, and Van Ham (2004); Hughes and McCormick (1981, 1987); Munch, Rosholm, and Svarer (2006, 2008).

being more likely to acquire homes. Previous literature has mostly relied on instrumental variable approaches to identify the causal effect of homeownership on unemployment risks. The instruments used in this literature include the regional homeownership rate (DiPasquale and Glaeser 1999; Munch, Rosholm, and Svarer 2006, 2008; Van Leuvensteijn and Koning 2004), regional price-to-rent ratios at the time of buying a house (Baert, Heylen, and Isebaert 2014), tax deductions of mortgage interest and same-sex siblings (Coulson and Fisher 2009), inheritance of money in young years (Gardner, Pierre, and Oswald 2001), dummies for US states (Green and Hendershott 2001), or parents' homeowner status and homeownership rate in subjects' region of birth (Munch, Rosholm, and Svarer 2008). All of these are, however, subject to criticism. Thus, for instance, the much used regional homeownership rate has been criticized on account of potentially having a direct impact on labor market outcomes and also potentially being correlated with neighborhood characteristics that are in turn correlated with individual level labor market outcomes (Blanchflower and Oswald 2013; Coulson and Fisher 2009; Laamanen 2013). Similarly, although the same-sex of first two siblings predicts the presence of a third sibling, and thus can be thought as an exogenous housing demand shifter, it also is likely to affect parents' labor market outcomes through different channels than homeownership, violating the exclusion restriction.

Only a small number of papers used quasi-experimental evidence to assess the impact of homeownership on economic behavior. Rohe and Stegman (1994) and Rohe and Basolo (1997) study the effects of a low-income homeownership program in Baltimore, focusing on the impacts on life satisfaction, self-esteem, individuals' control over their lives, and participation in neighborhood affairs. The closest paper to ours, however, is the very recent study by (Sodini, Van Nieuwerburg, Vestman, and von Lilienfeld-Toal 2016), who exploit privatization of social housing units in Sweden in order to assess the effects of homeownership of a number of outcomes, including mobility and labor income. They find that homeownership induces households to work harder, increasing their labor income and—in contrast to previous literature—that homeownership increases household mobility.

None of these studies focuses on unemployment, however. Another important aspect in which the present paper contributes to the literature is that our results are valid for a more representative sample of population. This is because the experiment we study, the housing privatization in Central and Eastern Europe, was not a social housing program, but rather a bulk transfer of homeownership to sitting tenants. Our results therefore speak to more general questions about the role of homeownership in the labor market.

The main contribution of this paper is that it documents how the privatization of publicly-owned housing in transition countries of Central and Eastern Europe (CEE) created a quasi-experiment that can be used to study the causal effects of homeownership on labor mobility and unemployment risks. Housing privatization in these countries was a result of a difficult to predict event: the fall of the Iron Curtain. It was part of the subsequent reforms and took the form of transfers of property rights to the sitting tenants at substantially discounted rates, relative to market prices, and was mostly organized at the central government level. This led to a situation where (i) upon moving in, renters of housing units that were later privatized could in no way anticipate privatization of their unit; (ii) the decisions which of the housing units will be privatized were beyond the direct control of individual tenants; and (iii) individuals had a high incentive to privatize and thus to comply with the treatment. As a consequence, housing privatization resulted in an as good as random assignment of homeownership to individuals. Noting that that housing markets were rather illiquid in the aftermath of housing privatization, this facilitates the empirical identification of the causal effects of homeownership.

A further contribution of the paper is that it estimates the effects homeownership on mobility and unemployment risks, using housing privatization as quasi-experimental source of variation in homeownership status. This provides a new test of the Oswald hypothesis. To this end, we use data on ten CEE countries and five Western European "comparator" countries from the Life in Transition Survey (LiTS). We therefore extend the evidence on the labor-market effects of homeownership, which has been primarily studied in mature

market economies of Western Europe and the United States, to post-socialist countries in Central and Eastern Europe.

Because our data is from 2010, the countries of Central and Eastern Europe were already normal market economies along most dimensions by the time we look at them (Shleifer and Treisman 2014). They had been the EU members for six years (except for Eastern Germany and Romania, which joined in 2007), the OECD members for at least three but often more than 15 years, and some have adopted the euro. However, housing markets in these transition countries differed from those of the countries analyzed in the literature so far. In particular, transaction costs for housing in these economies were substantially larger than in most developed market economies and, despite rather high homeownership rates, the share of mortgage finance is rather low (Bloze 2009; Dübel, Brzeski, and Hamilton 2006; Stephens, Lux, and Sunega 2015). These factors should amplify the negative effects of homeownership on mobility, suggesting that transition countries are particularly suited for testing the Oswald hypothesis.

2 Identifying the Effects of Homeownership

2.1 Estimation Issues and the Ideal Experiment

The starting point of our discussion is the standard cross-sectional equation used in studies testing the Oswald hypothesis, which will also be the central specification in the empirical part of this paper, that is

$$y_i = \beta_1 h_i + \boldsymbol{\beta}_2' \boldsymbol{x_i} + \boldsymbol{\gamma_d} + e_i, \tag{1}$$

where i is an individual, y_i is the outcome of interest, either an indicator of i's labor market status or a measure of her labor mobility, h_i is an indicator of homeownership status, which is equal to one if the person owns their home and zero otherwise, $\boldsymbol{x_i}$ is a vector of control variables, $\boldsymbol{\gamma_d}$ is the full set of country-district effects (including the intercept), and e_i is

the residual. Thus, regression (1) compares homeowners and renters within a district. District effects are included to capture the impact of any unobserved region-specific shocks that may be correlated with homeownership. This is also important for the empirical strategy advanced in this paper, as privatization decisions were sometimes delegated to municipalities (see the fourth column of Table 1) and therefore could have been affected by district characteristics.

The coefficient of interest in this regression is β_1, which captures the partial correlation between homeownership and the respective outcome variable. For the estimates of β_1 to have a causal interpretation—and be a test of the Oswald hypothesis—it has to be that, conditional on x_i and γ_d, homeownership is (as good as) randomly assigned. In normal circumstances this is unlikely to be true—people chose to become homeowners and this is one of the most substantial decisions in their lifetime. In all likelihood, homeownership is more attractive for individuals who do not plan to move. In addition, homeownership is more accessible for those who earn higher income and those who face low risk of unemployment.

These factors are typically unobserved to the econometrician. If this is the case, a negative correlation between the homeownership variable and an indicator of regional mobility could be due to the self-selection of individuals with a low propensity to migrate into homeownership (rather than due to homeownership leading to immobility). Similarly, a negative correlation between homeownership and unemployment, which is typically found in micro data, could suggest that the Oswald hypothesis is false. However, it may also be simply picking up the selection effects, since people with lower unemployment risks may be more likely to become homeowners.

At this point it is useful to think about an ideal, though impractical, experiment, which would allow us identify the causal effects of homeownership. A possible design would involve selecting a random sample from the sub-population of renters to be assigned to homeownership and to then look at labor market outcomes of these homeowners and renters. To isolate the effects of homeownership, the experiment would have to guarantee

that (i) individuals have no control over homeownership assignment; (ii) individuals who are allocated a home cannot refuse this offer; (ii) any wealth effects arising from the transfer of homeownership are compensated for;[2] and (iv) ensure that both homeowners and renters do not trade homes after the treatment, so as to prevent self-selection after the experiment.

2.2 Institutional Background

Our argument is that housing privatization is a close, albeit not perfect, approximation of such an experiment. To substantiate this claim, Table 1 summarizes the institutional details on the housing privatization processes in the CEE countries.[3] In these countries housing privatization was a direct consequence of the fall of the Iron Curtain and the ensuing economic and social reforms enacted after 1989 (in case of Baltic countries after 1991, following the dissolution of the Soviet Union). More specifically, housing privatization happened via two channels: restitution and privatization to sitting tenants. Restitution returned the ownership of housing estates and other assets to original owners, whose property was nationalized by the communist regimes mostly in late 1940s and 1950s, or their descendants. It, however, affected a much smaller part of the housing stock than privatization to new owners.[4] As a result, privatization to tenants has been the dominant method of housing privatization in these countries.

Four important facts stand out, suggesting that studying housing privatization in the CEE countries represents a quasi-experiment in homeownership and may thus yield new insights about its effects on mobility and labor market outcomes. The first of these is that it affected a large share of the public housing stock in these countries. In general

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[2]For example by reducing treated households' wealth by the net present value of the housing assigned, or by imposing *ad valorem* taxes equal to the income stream from the assigned wealth. Alternatively one would compensate renters by providing them additional wealth equal to the net present value of their rental home, or receive a permanent subsidy of the value of the income stream from that wealth. Irrespective of which compensation method is chosen it would have to account for the different liquidity of housing and other wealth.

[3]This table is based on the survey of the literature describing privatization processes by Smrčková (2017), which is available at https://ssrn.com/abstract=2899928.

[4]For instance Hegedüs, Tosics, and Mayo (1996) report that in transition countries one third of the public housing stock was privatized and 3 percent restituted during the first half of the 1990s; see also Lux, Cirman, and Sunega (forthcoming).

Table 1: Housing privatization in Central and Eastern European countries

	Period and Extent	Privatizers	Sale Price	Decision Level	Details
Czech Republic	·Since 1992. ·About half of public housing stock was privatized by 2002. ·Prior to the privatization 38% of the rental units were public, 18% were housing cooperatives.	· Sitting tenants. · Housing cooperatives.	· Various discounts from the market price usually granted by municipalities.	· Centrally given Right-to-Buy only for existing coop housing. · Municipalities decided on the privatization scale and terms of most public dwellings.	· Later, coops could mutate into owners' associations, with the owners gaining full property rights to their unit.
East Germany	·Since 1993, culminating between 1993 and 1999. ·Late 1990s and 2000s privatization to institutional investors.	·Sitting tenants and Members of cooperatives. ·Institutional investors.	·During the first wave, the sale prices were far below market prices. ·Federal sales to institutional investors for extremely low prices.	·Municipalities were centrally ordered to sell at least 15% of public rental housing and coops. ·Local-level decision for the remainder of the public housing stock.	·Initially higher involvement of tenants and coop members than in West Germany. ·Afterwards the approach to privatization similar to West Germany.
Estonia	·1993–2001. ·About 85-90% of the public housing stock was privatized. ·Prior to the privatization 60% of the rental units were public.	·Sitting tenants.	·Public capital vouchers (EVPs) distributed according to employment length. ·Price set as a difference between the respective unit and a "standard" panel unit. ·Other discounts applicable.	·Central government. ·Local authorities could restrict privatization – i.e. to select dwellings not available for privatization – but the pressure from both the central government and tenants was strong and this right was seldom used.	·EVP awarded for one working year was approximately equal to the price of 1 m². Consequently, a person working for 40 years could already buy a 2-room apartment. ·EVPs were tradable. ·Most privatizers could buy their units just for their EVPs with no additional payment.
Hungary	·Since 1993. ·About 80% of the public stock was privatized by 2003. ·Prior to the privatization 23% of the rental units were public.	·Sitting tenants.	·10–15% of the market price.	·Centrally granted Right-to-Buy for sitting tenants.	·Private housing had similar conditions for public financial assistance as other tenure forms since 1983. This made private ownership more popular than other tenure forms. Thus, the importance of the public rental sector decreased even before privatization.
Latvia	·Since 1995, peak around the year 2000. ·About 55% of the public housing stock was privatized until 2000. ·Prior to the privatization almost 70% of the rental units were public.	·Sitting tenants.	·Compensation vouchers distributed according to the length of residency/exile in Latvia during the period 1945–1992.	·The Central Housing Privatization Commission was responsible for the privatization process. ·Local governments appointed commissions for municipalities owned dwellings	·One voucher equals to 0.5 m² of the residential space. ·Vouchers were tradable.
Lithuania	·1991–1995. ·By July 1995 94% of possible flat privatization was accomplished. ·Fast and extensive privatization even in comparison with Estonia and Latvia.	·Sitting tenants.	·Privatization vouchers (Investicnis Cekis, IC) distributed according to the age of the recipient. ·Price set according to the construction characteristics, location etc.	·Prepared by the central government that encouraged extremely fast privatization due to simple administrability. ·Local commissions set the price of dwellings but had no incentive to hinder the process.	·Trading ICs was not allowed. ·Up to 80% of the selling price could be covered by ICs, rest had to be paid in cash. ·Signatures of family members in the unit, enough ICs, and cash sufficed to carry out the privatization.
Poland	·Since 1994. ·Most of the privatization took place before 2002. ·Prior to the privatization 35% of the rental units were public, 25% were housing cooperatives.	·Sitting tenants. ·Housing cooperatives.	· Discount of up to 95% of the market value.	·Municipalities decided about the privatization scale and terms of most public dwellings. ·Right-to-Buy only for tenants in cooperative housing.	·Majority privatized to tenants or coop members. ·Other investors could privatize under centrally specified conditions, but municipalities chose the dwellings to be privatized.
Romania	·1990s. ·Public stock almost completely privatized by 1999.	·Sitting tenants.	·'Symbolic price' depending on the construction year. ·Public financial assistance: 25-year loan with 4% interest rate.	·Entitled privatizers as well as contract conditions specified centrally.	·Privatization processed by specialized agencies. ·Dwelling cannot be resold before the mortgage has been repaid.
Slovakia	·1993–2008. ·Prior to privatization 25% of rental units were public, 20% were housing cooperatives.	·Sitting tenants. ·Housing cooperatives.	·Price derived from a comparable unit depending on the construction year. ·Discounts between 30 and 80%.	·Entitled privatizers as well as contract conditions specified centrally. ·Municipalities had to privatize a dwelling within two years if approved by more than half of the tenants.	· Free-of-charge transfer to the full ownership of cooperative members.
Slovenia	·1991–1993. ·Prior to the privatization 33% of the rental units were public.	Sitting tenants.	·Discount over 30%. ·Discount increased to 60%, if payment occurred within 60 days.	·Entitled privatizers as well as contract conditions specified centrally.	·Centrally specified conditions for selling restituted property to the siting tenants.

Note: Information sources for individual countries: Czech Republic: Lux (2003), Struyk (1996); Estonia: Kursis (1999), Lux (2003), Struyk (1996), Hungary: Hegedüs et al. (1996), Struyk (1996), Tosics (1987); Latvia: Kursis (1999), Tsenkova and Turner (2004); Lithuania: Kursis (1999), Milstead and Miles (2011); Poland: Lis and Zwierzchlewski (2015), Lux (2003), Struyk (1996), Tibaijuka (2013); Romania: Lux (2003); Slovakia: Lux (2003), Struyk (1996); Slovenia: Mandic and Clapham (1996), Sendi (1995), Struyk (1996).

governments privatized between 50 to 80 percent of the public housing stock in the first decade of transition (see Table 1 and references therein).[5] In Estonia, for instance, extensive privatization and restitution process decreased the share of public sector housing from 61 percent in 1992 to 6 percent in 2001. Using extremely favorable privatization opportunities, over 90 percent of previous public tenants had become the owners of their own homes (Lux 2003). This implies that in contrast to the quasi-experimental studies for Western Europe cited above, particularly Sodini et al. (2016), which focus on social housing privatization and thus low income groups, privatization in CEE countries affected a more representative group of residents.

Second, although the specific methods of privatization in individual countries somewhat differed (i.e. voucher systems in the Baltic countries and direct sale in most other countries, see Tsenkova and Turner 2004; Lux 2003), it is important to note the vast majority of privatized housing stock in the CEE countries went to sitting tenants (or co-operatives of tenants, see the second column of Table 1). This fact is important for the causal interpretation of our results. East Germany was the only country where institutional investors played a role; nevertheless, a substantial part of East German housing stock was still privatized to sitting tenants (see Cornelius and Rzeznik 2014; Měrková 2012).

The third important fact is that the decision which housing estates will be privatized was either taken by the central government, as in Hungary, Latvia, Lithuania, Romania, and Slovenia or, to a lesser extent, by the municipalities, as in the Czech Republic, East Germany, or Poland (see the fourth column of Table 1). In other words, eligibility to privatize was not the result of individual-level decisions of the renters (see also Lux 2003). The exceptions are Slovakia where municipalities had to privatize a housing estate within two years if more than 50 percent of the tenants of that unit agreed to this, and Estonia,

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[5]See Table 2 below for estimates of the share of households living in privatized dwellings across individual CEE countries as of 2010. Even during the communist period, however, a substantial part of the housing stock was privately owned. In the former Czechoslovakia, despite the fact that private property was officially being suppressed, a substantial share of dwellings (predominantly family houses) was in private hand: 43.5 percent in 1961 and almost 37 percent in 1990, according to census data (Czech Statistical Office 2003). Estimates of the share of public housing in the housing stock before 1989 range from 23 percent in Hungary (Tosics 1987) to two thirds in Slovenia (Mandic and Clapham 1996) and 70 percent in Latvia.

where all tenants who did not occupy restituted housing had the right to buy their rental dwelling (Lux 2003).

The last important fact is that the housing stock was privatized at a great discount. Again the details of this somewhat differ across countries (see the third column of Table 1). Yet, in most countries where estimates are available, discounts relative to market prices were between 30 percent in Slovenia to as much as 85 percent Hungary and 95 percent in Poland (Lux 2003; Mandic and Clapham 1996). Furthermore, these discounts were often increased through public loan support (in Romania), by more generous discounts for early payments (Slovenia), or generous allocations to certain population groups in countries using voucher privatizations (such as the older residents in Latvia or the persons with longer employment histories in Estonia). Thus individuals who received an offer for privatization had a strong incentive to privatize.

2.3 Privatization as a Quasi-Experiment

Based on this evidence Figure 1 presents a stylized time-line of potential homeownership status assignment in the CEE countries. During communism, people would naturally self-select to be homeowners or renters. While at this point the assignment of homeownership status was decision-based, it was independent of future developments related to the fall of the communist regime in 1989.[6] That is not a crucial assumption for us, however, because our experiment happens within renters: At the beginning, essentially all renters would be renters in publicly owned housing. After the reforms, some renters would find themselves in a house that was historically owned by a private person and was to be returned to her in the restitution. These renters would end up being renters in a privately owned house, with

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[6]One may even argue that it was independent of future labor market outcomes, as the nature of the economic system changed from centrally planned to standard market economies. Socialist economies were characterized by compressed income distributions and absence of (formal) unemployment. In fact, individuals in these countries were obliged to work and the government was responsible for assigning jobs to people. Skills that may have not generate substantial premiums during communism, such as language skills or entrepreneurial talent became highly valuable after the fall of the Iron Curtain. At the same time, things like communist party membership could become a disadvantage. On the other hand, there is anecdotal evidence that former communists often benefited from transition, exploiting their connections. None of these developments could have been foreseen by the individuals prior 1989, however.
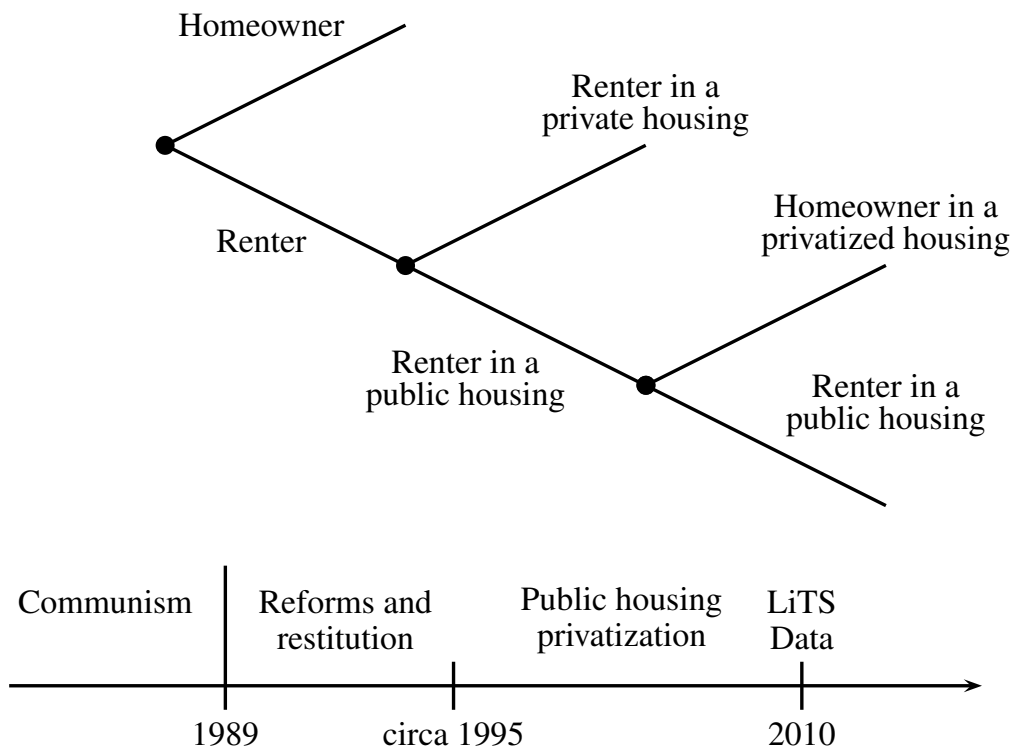
Figure 1: Timeline of potential homeownership status of an individual tenant in Central and Eastern Europe. Our argument is that while the initial sorting might have been an individual's choice, it could not have been influenced by unexpected fall of communism and ensuing reforms that included restitution and privatization of public housing. Therefore, the post 1989 nodes are not decision points, rather they can be thought of as exogenous assignment of respective statuses, conditional on not exiting into homeownership.

an option to become homeowners through standard channels. Of the remaining renters in public housing, some would later be able privatize, while the others would remain renters in public housing. This last step of the privatization process provides the randomization of homeownership that can be used to identify its effects on labor market outcomes.

Relative to the ideal experiment outlined above, there are two identification issues, one related to privatization and one to the data, that need to be addressed at this point. In particular, privatization in the transition economies was often associated with a substantial discount on the price paid for the privatized housing unit, relative to market prices. This has the advantage that it generated a high compliance rate among tenants that were offered privatization. However, it also has the disadvantage that the transfer of homeownership implied a transfer of wealth. As a consequence the effects of the transfer of homeownership cannot be separated from the wealth effect.

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This wealth effect, however, should go in the same direction as the expectations shaped by the Oswald hypothesis, as wealthier persons have been shown to be less mobile in a number of previous studies (e.g. Dustmann and Okatenko 2014) and can also be expected to search less intensively for a job when unemployed (see Rogerson, Shimer, and Wright 2005). Thus they are likely to have lower mobility and suffer higher unemployment risks, all else equal. In other words, if homeownership lowers mobility and increases unemployment, homeownership due to privatization should amplify these effects. Furthermore, as pointed out by Sodini et al. (2016), while the concurrency of the wealth effect and the effects of homeownership precludes identification of the pure homeownership effect, the impact of this may be a lesser concern if one is interested in the effects of policies promoting homeownership, as all such policies are associated with a redistribution of wealth from taxpayers to homeowners.

A second issue is related to the fact that our data is a cross-section from 2010, about a decade years since the main privatization episodes have taken place. This can be a problem as renters and homeowners had enough time to rearrange their homeownership status through standard market transactions (for example, individuals with a high propensity to migrate could have sold their privatized homes and renters with a high desire to settle down bought privatized or other homes). This caveat, however, is likely to be of a lesser concern in data from the CEE countries, relative to established market economies. Mortgage markets in these countries only started to develop in 2000s. To this day, housing market liquidity as well as the supply of housing loans in most of these countries remain relatively low, as evidenced by the low share of mortgage-financed housing in these countries (see Table 2 below).[7]

In addition, privatization often happened in two steps: In the Czech Republic, for instance, the tenants would first have to form a cooperative, which would privatize the housing estate and own all of the individual apartments therein. The tenants would be

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[7]See also "Key figures 2012," European Mortgage Federation, Online, at http://www.hypo.org/Content/default.asp?PageID=414 (last accessed on January 14, 2017) and Bloze (2009); Dübel, Brzeski, and Hamilton (2006); and Sunega and Lux (2007)

members of these coops, typically with voting rights proportional to the size of their unit. Although it was possible to sell the coop membership to someone else, provided the other members agreed by a vote, banks would not provide mortgages on coop-owned dwellings. As a result households faced increased transaction costs if they were to sell their privatized apartment on the market. Only in the second step coops could transform themselves into owner associations and transfer the property rights onto the individual tenants, a process that could take a year or more. In other cases, municipalities privatized directly to owners, but there were moratoria on the sale of privatized units that might last as long as five years. These factors that characterized housing markets in the CEE countries are likely to reduce the impact of sorting of homeowners and renters after privatization. They should also push results in the direction favorable for the Oswald hypothesis, for they increase the transaction costs.

3   Data and Summary Statistics

3.1   The 2010 Life in Transition Survey

To advance the analysis of homeownership using housing privatization in transition countries as a quasi-experiment in homeownership assignment, and test the Oswald hypothesis, we use data from the 2010 wave of the Life in Transition Survey (LiTS) conducted by the European Bank for Reconstruction and Development. The 2010 LiTS data has the advantage that it asks respondents questions about their mobility, employment, as well as homeownership. Most importantly for this paper, the survey asks the respondents whether they become homeowners through privatization.[8]

The survey was conducted in 28 transition countries in Central and Eastern Europe and the former Soviet Union, plus five West European comparator countries (Germany, France, Italy, Sweden, and the United Kingdom), as well as Mongolia and Turkey. For

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[8]The earlier wave of LiTS survey from 2006 neither contains questions about mobility nor about employment and thus was not suitable for this paper.

most countries, 50 Primary Sampling Units (PSUs) were randomly selected from the local electoral units, with the probability of selection proportional to PSU size. For Russia, Ukraine, Uzbekistan, Serbia, Poland, and the UK, the sample consists of 75 PSUs. Subsequently, 20 households were randomly chosen within each PSU for interviews. In sum, the database contains a sample of about 1000 or 1500 households from each country.

Interviewers had to visit each selected household at least three times before replacing it with another one. In 79 percent of cases, however, the interviews were completed on the first visit.[9] The questionnaire consists of two parts: a household roaster and expenses form, answered by the head of the household, and the main part answered by the principal respondent, a randomly selected member of the household above the age of 18. In 61 percent of the cases, the household head and the principal respondent were the same person, in the remainder two different interviews were conducted in the same household.

3.2 Estimation Sample and Summary Statistics

Our main focus is on ten CEE countries, the Czech Republic, Eastern Germany, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia, for which we have been able to collect enough information about their housing privatization process. In order to facilitate comparison with the existing literature, we also report results for four Western European comparator countries, Great Britain, Italy, Sweden, and West Germany.[10] Bulgaria and France are dropped from the data as housing privatization in these countries was too limited and the LiTS data does not contain any homeowners who privatized their dwellings. We restrict the sample to 18 to 65 years old respondents and drop households for which the homeownership variable is missing (2.2 percent of the observations). We do not restrict the data to individuals in the active labor force, since labor force status is

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[9]For more details see http://www.ebrd.com/news/publications/special-reports/life-in-transition-survey-ii.html (last accessed on December 30, 2016).

[10]We use the regional identifiers in the data to split Germany into East and West. In this separation Berlin was assigned to West Germany because the population of West Berlin in 1990 was almost twice the size of East Berlin. We note, and report below, that our results were unaffected when we dropped Berlin as a robustness check.

not exogenously assigned.[11] Our analysis dataset contains 7,544 individuals from the ten CEE countries and 3,333 from individuals the Western European comparator countries. Sampling weights are provided and we use them in our regressions.

Three variables are central to our analysis: (i) LiTS respondents were asked, in two separate questions, whether they would be willing to move elsewhere in the country or abroad for employment reasons. From these two questions we form our measure of labor mobility, an indicator equal to one if either answer is affirmative.[12] (ii) With regard to job market status, we define as unemployed those individuals who do not work and are actively looking for a job. (iii) Lastly, respondents were asked whether they are renters or homeowners. Homeowners were then asked how they acquired ownership of their dwelling, which could be through a purchase, with a mortgage or without, building a house themselves, via inheritance, as a co-operative, or through privatization.

Table 2 summarizes the homeownership structure in the CEE countries as well as the comparator countries in the LiTS data. In line with the literature on housing markets in transition countries cited above, the data shows that post-communist countries, except for East Germany and Latvia, have higher homeownership rates than any of the four comparator countries. Despite this, the shares of mortgage-financed housing in CEE countries, except for Hungary, are always substantially lower than in the Western European comparator countries.

Privatization does not seem to be the main factor behind this high incidence of homeownership, however. Rather, high ownership rates in CEE countries appear to be due to high share of households living in inherited houses and houses bought or built without mortgages. This is likely a result of the underdeveloped financial markets, particularly lacking mortgage markets, and in the relatively recent past and the limited rental as well as housing markets. Earlier, during the communist era, people in these countries often built

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[11]As reported below, results are unaffected if the sample is restricted to individuals active in the labor force.

[12]Our mobility indicator is therefore one of willingness to migrate rather than of actual migration. This, however, is likely to be are liable proxy for actual mobility although not all stated migration and return intentions can be expected to be realized, as such data has previously been shown to accurately capture the determinants of migration behavior (see Van Dalen and Henkens 2008)

Table 2: Homeownership structure by country (proportions)

	Rented	Privatized	Bought or Built		Cooperative	Inherited	Observations
			With Mortgage	Without Mortgage			
Central and Eastern Europe							
Czech Republic	0.21	0.05	0.15	0.24	0.12	0.24	897
East Germany	0.73	0.06	0.10	0.02	0.00	0.09	139
Estonia	0.16	0.31	0.15	0.24	0.01	0.13	661
Hungary	0.14	0.01	0.38	0.32	0.04	0.11	731
Latvia	0.33	0.45	0.05	0.09	0.02	0.07	689
Lithuania	0.10	0.27	0.10	0.27	0.02	0.24	667
Poland	0.12	0.10	0.12	0.32	0.13	0.21	1241
Romania	0.06	0.08	0.17	0.44	0.01	0.25	758
Slovakia	0.12	0.02	0.15	0.38	0.11	0.23	922
Slovenia	0.13	0.08	0.10	0.49	0.01	0.19	839
Western Europe							
Great Britain	0.43	0.03	0.48	0.05	0.00	0.01	1084
Italy	0.24	0.25	0.26	0.09	0.01	0.15	874
Sweden	0.31	0.14	0.48	0.05	0.00	0.02	676
West Germany	0.56	0.10	0.21	0.03	0.00	0.10	699

their homes by themselves, either as private individuals or members of cooperatives, as this was the most accessible way of becoming a homeowner (Stephens, Lux, and Sunega 2015).

Table 3 presents the descriptive statistics of individuals' willingness to move and unemployment as well as a number of demographic and household characteristics reported in the survey, split by the country groups and homeownership status. Consistent with the literature, and possibly with the high levels of homeownership, people in CEE countries are less willing to move than individuals living in Western Europe. At the same time, the share of unemployed is almost the same in both country groups. The data also suggests that renters in both country groups are significantly more willing to move relative to privatizers as well as relative to homeowners that did not privatize. On the other hand, the share of unemployed in the CEE countries is virtually the same among privatizers and renters, while homeowners non-privatizers exhibit about two percentage points lower unemployment rate. In Western European comparator countries, the homeowners non-privatizers have

Table 3: Summary statistics: Western and Eastern Europe (unweighted sample means)

| | Central and Eastern Europe | | | | | | Western Europe | | | | | |
| | Means | | | | t-tests (p-values) | | Means | | | | t-tests (p-values) | |
	All	Renters	Privatizers	Homeowners Non-Privatizers	Privatizers v. Renters	Homeowners Non-Privatizers v. Renters	All	Renters	Privatizers	Homeowners Non-Privatizers	Privatizers v. Renters	Homeowners Non-Privatizers v. Renters
Willing to move for job (=1)	0.37	0.53	0.37	0.33	< 0.01	< 0.01	0.46	0.52	0.40	0.42	< 0.01	< 0.01
Unemployed (=1)	0.10	0.12	0.12	0.10	0.76	0.01	0.09	0.14	0.08	0.05	< 0.01	< 0.01
Female (=1)	0.58	0.57	0.65	0.57			0.57	0.57	0.54	0.58		
Age	42.16	35.89	45.22	42.99			43.67	40.00	46.05	45.91		
Married (=1)	0.56	0.35	0.52	0.61			0.52	0.34	0.60	0.64		
Household size	2.69	2.24	2.55	2.82			2.46	2.21	2.53	2.63		
Number of children	0.53	0.51	0.41	0.56			0.51	0.49	0.38	0.56		
Years of education	13.21	13.25	13.42	13.16			13.48	13.12	13.62	13.72		
Willing to take risks (1–10)	4.79	5.17	4.64	4.74			4.99	5.07	4.96	4.93		
Communist before 1989 (=1)	0.04	0.02	0.06	0.05			0.01	0.01	0.01	0.01		
Parents were communists (=1)	0.11	0.10	0.11	0.11			0.02	0.03	0.03	0.01		
Foreign language speaker (=1)	0.05	0.05	0.13	0.04			0.01	0.01	0.02	0.01		
Observations	7544	1200	1017	5327			3333	1274	413	1646		

the lowest unemployment risk, by far, followed by privatizers, renters face the highest unemployment risk.

Taken at face value, these patterns are consistent with empirical results found in many of the previous micro studies, while being rather inconsistent with the idea that homeownership increases unemployment. However, the summary statistics in Table 3 also suggest that these subpopulations are not directly comparable: In the CEE countries, the share of females among privatizers is higher than the share of females among renters, but gender shares are very similar among homeowners non-privatizers and renters. Privatizers as well as other homeowners also tend to be older, more often married, and have larger households than renters in both country groups. The age difference between renters and privatizers amounts to almost ten years in the CEE countries. The number of children living in a household is lower among privatizers than renters, but higher among other homeowners in both country groups. Privatizers also tend to be more educated than renters in both country groups. Renters in the CEE countries are more willing to take risks than privatizers and other homeowners. Perhaps not surprisingly, as they are older, privatizers in CEE countries are significantly more likely to have been communist party members than renters. Finally, individuals speaking a foreign language at home seem to have been over-represented among privatizers relative to both other homeowners and renters in CEE countries; however, this difference is mainly driven by the Baltic countries with high privatization rates and large Russian minorities.

4 Results

4.1 Homeownership and Mobility

Table 4 reports alternative specifications of regression (1) for respondents' willingness to move, estimated separately for CEE and Western European comparator countries. To facilitate a comparison with the existing literature, we report results for the full sample of all homeowners and renters as our baseline estimates. Our preferred models, however,

are those estimated for CEE countries on the subsamples of renters and privatizers only.[13] As discussed in Section 2 above, β_1 estimated in the full sample may be biased due to endogeneity of homeownership, while the sample of renters and privatizers is likely to yield a more accurate portrayal of the causal effect of homeownership on the respective outcome.

For each subsample, we estimate a short and a long specification of equation (1) by OLS.[14] The short specification controls only for respondents' age and region effects. Controlling for age is necessary as individuals' job market experience, wealth, as well as preferences vary over the life cycle and older respondents are obviously more likely to have had the opportunity to privatize their home. Controlling for region effects, as we already discussed in Section 2, is necessary because privatization in some countries was implemented by municipalities and could have been affected by regions' characteristics and region-specific economic shocks. For the same reason, the reported standard errors are corrected to account for clustering at the regional level.

The long specifications control for all characteristics reported in Table 3 above, interacted with gender when relevant. Because most of these characteristics are not exogenously assigned, we are agnostic as to whether the estimates from the long or the short specification are preferable, leaving this judgment to the reader. Nonetheless, the long specifications can be considered as more conservative. All reported estimates use "federalist" survey weights, supplied in the LiTS data, which account for different sample sizes and populations of individual countries—that is all countries have equal weight in the results we report.[15]

Looking at our baseline full-sample estimates in columns (1), (2), (5), and (6) of Table 4, homeowners in the CEE countries as well as in the Western European comparator countries appear to be robustly less mobile than renters. This is consistent with the results of the

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[13]That is, we do not claim that privatization in the Western European comparator countries represents as good a quasi-experiment as in the case of CEE countries. For more details about the comparator countries see Smrčková (2017).

[14]We are estimating linear probability models because we are interested in marginal effects, not predictions. OLS is thus preferable for its simplicity (see Angrist and Pischke 2009, ch. 3.4.2).

[15]Because privatization rates differ widely country by country, we have corrected the weights for regressions estimated in the sample of privatizers and renters to maintain equal weight of all countries.

Table 4: Homeownership and mobility

Region:	Central and Eastern Europe				Western Europe			
Sample:	Homeowners & Renters		Privatizers & Renters		Homeowners & Renters		Privatizers & Renters	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Homeowner (=1)	−0.098*	−0.080*	−0.057	−0.034	−0.072*	−0.077*	−0.073*	−0.090*
	(0.017)	(0.018)	(0.030)	(0.033)	(0.018)	(0.019)	(0.027)	(0.029)
Age	−0.022*	−0.011*	−0.035*	−0.025*	−0.024*	−0.017*	−0.026*	−0.019+
	(0.003)	(0.003)	(0.007)	(0.007)	(0.005)	(0.004)	(0.008)	(0.007)
$Age^2/100$	0.014*	0.003	0.027*	0.018+	0.018*	0.012+	0.022+	0.016
	(0.004)	(0.003)	(0.008)	(0.008)	(0.006)	(0.005)	(0.010)	(0.009)
Willing to take risks (1–10)		0.040*		0.052*		0.044*		0.042*
		(0.003)		(0.005)		(0.005)		(0.006)
Years of education		0.009*		0.016+		0.032*		0.033*
		(0.003)		(0.008)		(0.006)		(0.008)
Female (=1)		−0.053		−0.155*		−0.0005		−0.026
		(0.033)		(0.052)		(0.037)		(0.061)
Married (=1)		−0.077*		−0.083+		−0.059+		−0.063
		(0.022)		(0.040)		(0.029)		(0.040)
Number of children		−0.032*		0.019		−0.028		−0.037
		(0.010)		(0.027)		(0.020)		(0.025)
Number of adults		−0.007		−0.044		0.029+		0.042
		(0.010)		(0.024)		(0.015)		(0.023)
Foreigner (=1)		−0.044		−0.069		−0.018		0.008
		(0.035)		(0.051)		(0.075)		(0.138)
Communist before 1989 (=1)		0.010		−0.084		0.062		0.183
		(0.032)		(0.061)		(0.100)		(0.117)
Parents were communists (=1)		0.022		0.011		−0.084		−0.197*
		(0.018)		(0.038)		(0.061)		(0.071)
Married × Female		−0.018		0.009		−0.034		−0.031
		(0.023)		(0.048)		(0.040)		(0.052)
Number of children × Female		−0.004		−0.075+		−0.005		0.009
		(0.011)		(0.035)		(0.023)		(0.029)
Number of adults × Female		0.016		0.061+		−0.025		−0.020
		(0.012)		(0.026)		(0.017)		(0.032)
Country-district dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,544	7,544	2,217	2,217	3,333	3,333	1,687	1,687
Adjusted R^2	0.135	0.187	0.157	0.237	0.099	0.170	0.109	0.179

Note: The outcome variable is an indicator coded as one if the respondent states he or she would be willing to move within home country or abroad for employment reasons. Individual models are estimated by OLS with observations weighted using 'federalist' sampling weights supplied with the LiTS data so that all countries have equal weight. Standard errors clustered at the country-district level are in parentheses: $^+p < 0.05$, $^*p < 0.01$.

empirical literature on developed market economies and suggests that these patterns are more general, extending to post-socialist countries. Furthermore, the magnitudes of the coefficients are also substantively significant; comparing the full-sample estimates in Table 4 with the sample averages in Table 3 suggest that, after controlling for regional effects and respondents age, homeowners' willingness to move is nearly one fifth lower than that of renters.

Shifting attention to our preferred models that compare renters and privatizers, we see that homeowners who privatized their home in the Western European countries also have lower willingness to move relative to renters. The coefficients in columns (7) and (8) of Table 4 are comparable in size to the full-sample estimates in columns (5) and (6). The willingness to move of privatizers in the CEE countries, reported columns (3) and (4) is estimated to be negative, however the coefficients are about one-half smaller than in full-sample estimates reported in columns (1) and (2), and are no longer statistically significant. We interpret these results as only weakly suggesting that homeowners are less mobile when mobility is measured as individuals' willingness to move for employment reasons.

4.2   Homeownership and Unemployment

Results for unemployment are reported Table 5. Looking again first at the full-sample estimates in columns (1) and (2) and comparing with columns (5) and (6), the result for CEE countries and Western European comparator countries differ. For Western European countries we obtain the standard result that homeowners are less likely to be unemployed. Comparing with the sample means in Table 3, the estimates are substantively significant suggesting that homeowners in these countries face about one half smaller unemployment risks than renters. Our estimates for CEE countries, on the other hand, suggest that homeowners therein face the same unemployment risk as renters.

Shifting attention to results comparing privatizers and renters in the Western European comparator countries, reported in columns (7) and (8), we see that privatizers still appear

21

Table 5: Homeownership and unemployment

Region:	Central and Eastern Europe				Western Europe			
Sample:	Homeowners & Renters		Privatizers & Renters		Homeowners & Renters		Privatizers & Renters	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Homeowner (=1)	0.003	0.011	0.004	0.003	-0.061^*	-0.052^*	-0.021	-0.017
	(0.013)	(0.013)	(0.018)	(0.019)	(0.016)	(0.016)	(0.024)	(0.024)
Age	0.001	0.006^+	0.001	0.003	-0.001	0.0004	-0.0002	0.001
	(0.002)	(0.002)	(0.004)	(0.005)	(0.003)	(0.003)	(0.004)	(0.004)
$Age^2/100$	-0.004	-0.009^*	-0.004	-0.006	-0.001	-0.003	-0.002	-0.003
	(0.002)	(0.003)	(0.005)	(0.006)	(0.003)	(0.003)	(0.004)	(0.004)
Willing to take risks (1–10)		-0.0004		0.001		0.001		-0.002
		(0.002)		(0.003)		(0.002)		(0.003)
Years of education		-0.014^*		-0.011^+		-0.006^+		-0.007
		(0.002)		(0.005)		(0.003)		(0.005)
Female (=1)		-0.031		-0.013		-0.049		-0.042
		(0.019)		(0.047)		(0.030)		(0.045)
Married (=1)		-0.071^*		-0.069^+		-0.066^*		-0.095^*
		(0.015)		(0.027)		(0.018)		(0.025)
Number of children		-0.004		-0.020		0.003		0.018
		(0.008)		(0.019)		(0.010)		(0.015)
Number of adults		0.001		0.008		-0.001		0.002
		(0.006)		(0.017)		(0.011)		(0.017)
Foreigner (=1)		0.018		0.030		0.019		0.160
		(0.026)		(0.051)		(0.056)		(0.100)
Communist before 1989 (=1)		-0.029		-0.107		0.031		-0.027
		(0.020)		(0.061)		(0.056)		(0.063)
Parents were communists (=1)		0.012		-0.045		0.036		0.065
		(0.014)		(0.026)		(0.043)		(0.060)
Married × Female		0.023		0.021		0.058^+		0.096^+
		(0.018)		(0.033)		(0.029)		(0.041)
Number of children × Female		0.010		0.050^+		0.005		-0.001
		(0.010)		(0.024)		(0.012)		(0.019)
Number of adults × Female		0.006		-0.003		0.007		0.001
		(0.008)		(0.021)		(0.017)		(0.027)
Country-district dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,544	7,544	2,217	2,217	3,333	3,333	1,687	1,687
Adjusted R^2	0.041	0.054	0.060	0.074	0.048	0.052	0.047	0.054

Note: The outcome variable is an indicator coded as one if the respondent does not work and states he or she is actively looking for a job. Individual models are estimated by OLS with observations weighted using 'federalist' sampling weights supplied with the LiTS data so that all countries have equal weight. Standard errors clustered at the country-district level are in parentheses: $^+p < 0.05$, $^*p < 0.01$.

to have lower unemployment than renters. However the estimates are about one third of those in the corresponding full-sample models in columns (5) and (6) and are no longer statistically significant. We are cautious when interpreting these results. Noting, that under the assumption that privatization in Western European countries resulted in a closer-to-random assignment of homeownership than self-selection, than these results do not reveal that homeownership increases unemployment.

When looking at the results comparing privatizers and renters in CEE countries reported in columns (3) and (4), we obtain virtually identical coefficients as for the full-sample estimates in columns (1) and (2). This finding is different from our expectations of higher coefficients on homeownership in the sample of privatizers and renters, compared to full-sample estimates, if homeowners who did not privatize are positively self-selected. That is we expected a similar pattern of results for the CEE countries as we have obtained for Western European countries.

A possible explanation may lie in the nature of housing and financial markets, together with the historical developments of these countries outlined in Section 2. Because housing markets and rental markets in these countries practically did not exist before 1989, a substantial part of homeowners in CEE countries are individual who inherited their house and remained there or built it on their own, resulting in high levels of homeownership (see Table 2 above). Together with the fact that a substantial part of 2010 housing stock had been built before 1989, this may suggest that homeowners in CEE countries may be less selected than their counterparts in Western Europe where individuals and housing markets have been naturally interacting for decades.

We however stress that to the extent the housing markets, the nature of privatization, and the less developed mortgage markets in transition countries appear to increase homeowners' transaction cost, we would expect the possibly detrimental effects of homeownership on labor mobility and unemployment to be amplified when we are looking at the CEE transition economies. We find the opposite and therefore interpret our results as suggesting that homeownership has only limited impact on mobility and no causal impact on unemployment.

In addition, the results suggest that housing privatization as a policy does not have substantial detrimental effects on the labor markets, as far as individual outcomes are concerned.

4.3   Robustness Checks

To check the robustness of our results for renters and privatizers, we first examine whether they may be driven, or excessively influenced, by an individual country. We therefore re-estimate our preferred regressions from Tables 4 and 5 dropping individual countries, one at a time. The results, reported in Table 6, are remarkably stable, particularly for the CEE countries. The coefficients are always within one standard error from the corresponding estimates in Tables 4 and 5. Note also that the estimates on the willingness to move, although almost never statistically significant in the CEE sample, are always negative. These results increase our confidence in the baseline estimates.

Table 7 presents alternative specifications of our preferred estimates from Tables 4 and 5. First, because of their lower mobility, the Oswald hypothesis also implies that homeowners should face longer unemployment spells. We therefore replace the unemployment indicator in our regressions with long-term unemployment indicator. This variable is equal to one if the respondent did not have any job, was actively looking for one, and was without job for more than one year at the time of the interview. The results are statistically equivalent to our main estimates for the standard definition of unemployment. Privatizers thus did not face longer unemployment spells than renters, neither the CEE countries nor in the Western European comparator countries.

Next, to illustrate the potential influence of selection into homeownership, we restrict the samples to individuals older than 40 years. These are people whose first decisions about homeownership have been plausibly dated before 1989. Taken at face value, homeownership seems to reduce unemployment and in the case of Western Europe it is also statistically significant. While this result is again in the opposite direction than the Oswald hypothesis would predict, we are cautious with this interpretation. The renters in this subsample are likely to be negatively selected: If individuals prefer to own a home and more productive

Table 6: Robustness checks: Dropping in individual countries, Privatizers & Renters

Outcome:	Willing to Move (=1)		Unemployed (=1)	
	(1)	(2)	(3)	(4)
Central and Eastern Europe				
Czech Republic	−0.066⁺	−0.033	0.001	0.0004
	(0.033)	(0.037)	(0.020)	(0.021)
East Germany	−0.050	−0.030	0.009	0.004
	(0.031)	(0.034)	(0.020)	(0.020)
Estonia	−0.062	−0.033	−0.009	−0.004
	(0.034)	(0.037)	(0.019)	(0.020)
Hungary	−0.053	−0.038	0.009	0.008
	(0.030)	(0.034)	(0.019)	(0.020)
Latvia	−0.060	−0.039	0.013	0.011
	(0.034)	(0.037)	(0.021)	(0.022)
Lithuania	−0.045	−0.023	−0.008	−0.008
	(0.031)	(0.035)	(0.019)	(0.020)
Poland	−0.051	−0.027	0.011	0.009
	(0.032)	(0.036)	(0.019)	(0.020)
Romania	−0.050	−0.037	0.009	0.011
	(0.028)	(0.034)	(0.017)	(0.017)
Slovakia	−0.063⁺	−0.043	0.005	0.005
	(0.031)	(0.035)	(0.019)	(0.020)
Slovenia	−0.066⁺	−0.040	0.003	−0.001
	(0.031)	(0.031)	(0.021)	(0.022)
Western Europe				
Great Britain	−0.076*	−0.095*	−0.015	−0.013
	(0.028)	(0.031)	(0.025)	(0.026)
Italy	−0.102*	−0.112*	−0.036	−0.029
	(0.035)	(0.037)	(0.034)	(0.034)
Sweden	−0.053	−0.071⁺	−0.047	−0.042
	(0.029)	(0.036)	(0.026)	(0.025)
West Germany	−0.067⁺	−0.084⁺	0.008	0.012
	(0.031)	(0.034)	(0.026)	(0.026)

Note: Reported estimates are the coefficients on homeownership variable estimated in subsample of privatizers and renters. Regressions correspond to models (3), (4), (7), and (8) reported in Tables 4 and 5. Individual models are estimated by OLS with observations weighted using 'federalist' sampling weights supplied with the LiTS data so that all countries have equal weight. Standard errors clustered at the country-district level are in parentheses: ⁺$p < 0.05$, *$p < 0.01$.

Table 7: Robustness checks: Alternative specifications, Privatizers & Renters

Region:	Central and Eastern Europe				Western Europe			
Outcome:	Willing to Move (=1)		Unemployed (=1)		Willing to Move (=1)		Unemployed (=1)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Outcome: Unemployed > year			0.008 (0.015)	0.006 (0.016)			−0.016 (0.019)	−0.010 (0.020)
Only subjects 40-plus old	−0.010 (0.046)	0.013 (0.047)	−0.039 (0.023)	−0.035 (0.027)	−0.117* (0.037)	−0.145* (0.037)	−0.067* (0.020)	−0.066* (0.024)
Only HHs living in apartments	−0.013 (0.035)	0.006 (0.035)	0.005 (0.022)	−0.001 (0.023)	−0.092+ (0.038)	−0.105* (0.039)	−0.014 (0.029)	−0.023 (0.032)
Labor force subsample	−0.072+ (0.035)	−0.048 (0.038)	−0.003 (0.026)	−0.001 (0.024)	−0.050 (0.036)	−0.056 (0.037)	−0.016 (0.030)	−0.008 (0.031)
Berlin dropped					−0.074* (0.027)	−0.091* (0.029)	−0.020 (0.024)	−0.016 (0.024)
Baltic states dropped	−0.054 (0.045)	−0.023 (0.047)	−0.021 (0.024)	−0.014 (0.024)				
Unweighted regressions	−0.057+ (0.028)	−0.043 (0.034)	−0.002 (0.019)	−0.00000 (0.019)	−0.066* (0.025)	−0.082* (0.029)	−0.028 (0.024)	−0.021 (0.023)

Note: Reported estimates are the coefficients on homeownership variable estimated in subsample of privatizers and renters. Regressions correspond to models (3), (4), (7), and (8) reported in Tables 4 and 5. Individual models are estimated by OLS with observations weighted using 'federalist' sampling weights supplied with the LiTS data so that all countries have equal weight. Standard errors clustered at the country-district level are in parentheses: $^+p < 0.05$, $^*p < 0.01$.

individuals are more likely to afford one and become homeowners, they drop out of the sample of renters as time progresses. Because all subsequent cohorts of renters are dropped from this subsample, the sample of renters becomes negatively selected. This result thus highlights the role of selection bias as a potential explanation of the finding of negative correlation between homeownership and unemployment in previous micro studies.

Then we look only at households living in apartments, as households of renters and privatizers in this subsample possibly live in more homogeneous housing arrangements, however we find the same results as before. In the next robustness check, we restrict our sample to individuals active in the labor force, and again obtain quantitatively very similar results to our main regressions. Then we drop Berlin from the sample of Western European comparator countries with no effect on the results. We also drop all three Baltic countries, as they may be different from other Central European countries, particularly due to their belonging to Soviet Union, but also due to somewhat different privatization methods (see Table 1) and high privatization rates (see Table 2). As a result, the coefficients homeownership increase in their absolute value, in the negative direction, but are never statistically significant. As a last robustness check, we re-estimate our regressions without sample weights and the results do not change. In summary, our findings of limited negative effects of homeownership on mobility and no effects of homeownership on unemployment are highly consistent.

Because LiTS data also contains information about transition countries in the regions of the Balkans and the former Soviet Union, we have re-estimated our regressions in these samples in order to check whether our results hold in these countries too. The results, reported in Tables A.8 and A.9 in the Appendix, are very similar to our finding for CEE countries. We again find weak evidence of negative effect of homeownership on mobility, but no relationship between unemployment and homeownership, neither in full-sample estimates, nor in estimates on restricted samples renters and privatizers. Although our knowledge about housing privatization in these countries is more limited (see Smrčková

27

2017), this finding suggest that the results in this paper may be more general, extending to other post-socialist countries in the Balkans and the Former Soviet Union.

5   Conclusion

This paper argues that housing privatization in Central and Eastern European countries created a quasi-experiment in homeownership that may be used to learn about its causal effects on the individual level mobility and risk of unemployment. In particular, we take advantage of the fact that housing privatization in CEE countries took the form of privatization to sitting tenants at substantially discounted rates, sometimes even as giveaways. Furthermore, housing privatizations were the result of the fall of the Iron Curtain, an event that could not have been anticipated by individuals. This led to a situation when (i) upon moving in, renters could not anticipate whether they would later become entitled to privatize their home, or not; (ii) the decision which of the housing unit was to be privatized was beyond the control of individual tenants; and (iii) individuals who received an offer for privatization had a high incentive to accept. We exploit the randomization provided by these properties of housing privatization in the CEE countries, to obtain new estimates of the effects of homeownership on individual mobility and unemployment risks.

Previous research as well as the nature housing and financial markets and some aspects of housing privatization in transition countries suggest that homeowners in these countries faced relatively high transaction costs, compared to established market economies. Yet we find no evidence that homeownership has detrimental impact on individuals' unemployment risks and only weak evidence that homeownership limits people's mobility. We interpret our results as inconsistent with the Oswald hypothesis. Homeownership is unlikely to be a major force that would generate unemployment. In addition, our preferred estimates of the effects of homeownership on unemployment in CEE countries, are consistently around zero, suggesting that the standard negative relationship between unemployment

and homeownership found in micro studies may be due to endogeneity of homeownership status.

We perform a number of robustness checks and find these results to be very stable. Our findings are further corroborated when we re-estimate our models in data for the Balkans as well as the former Soviet Union countries. A future research studying housing privatization processes in these regions and their labor-market effects may yield further insights about the role homeownership.

From the policy perspective our findings suggest that housing privatization, which further increased the already high levels of homeownership in transition economies, probably did not cause the relatively higher unemployment rates found in some of these countries. As a corollary, our results also suggest that policies promoting homeownership have neither detrimental nor beneficial effects on labor markets.

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30

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Appendix

Table A.8: Homeownership and mobility: The Balkans and the former Soviet Union

Region:	The Balkans				Former Soviet Union (except Baltic countries)			
Sample:	Homeowners & Renters		Privatizers & Renters		Homeowners & Renters		Privatizers & Renters	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Homeowner (=1)	−0.095*	−0.093*	−0.042	−0.038	−0.081*	−0.078*	−0.076[+]	−0.064[+]
	(0.024)	(0.024)	(0.039)	(0.042)	(0.022)	(0.021)	(0.030)	(0.028)
Age	−0.006	0.001	−0.003	0.006	−0.003	0.002	−0.004	0.0002
	(0.003)	(0.003)	(0.009)	(0.008)	(0.002)	(0.002)	(0.003)	(0.004)
Age^2/100	−0.005	−0.011*	−0.007	−0.017	−0.006[+]	−0.011*	−0.004	−0.008
	(0.004)	(0.004)	(0.011)	(0.010)	(0.003)	(0.003)	(0.004)	(0.004)
Willing to take risks (1–10)		0.029*		0.031*		0.025*		0.022*
		(0.004)		(0.006)		(0.003)		(0.005)
Years of education		0.013*		0.014		0.016*		0.024*
		(0.004)		(0.013)		(0.004)		(0.006)
Female (=1)		−0.009		0.002		−0.035		−0.026
		(0.038)		(0.078)		(0.026)		(0.050)
Married (=1)		−0.033		−0.011		−0.074*		−0.069
		(0.019)		(0.053)		(0.017)		(0.039)
Number of children		−0.004		−0.086*		0.014		0.014
		(0.009)		(0.030)		(0.009)		(0.014)
Number of adults		0.006		−0.010		0.011		0.001
		(0.009)		(0.026)		(0.007)		(0.009)
Foreigner (=1)		−0.021		0.012		0.040		−0.006
		(0.041)		(0.071)		(0.029)		(0.044)
Communist before 1989 (=1)		0.094*		0.128		0.003		0.050
		(0.035)		(0.072)		(0.026)		(0.043)
Parents were communists (=1)		0.042		0.030		0.030		−0.028
		(0.025)		(0.040)		(0.017)		(0.023)
Married × Female		−0.018		−0.013		0.012		0.038
		(0.025)		(0.073)		(0.022)		(0.055)
Number of children × Female		−0.016		0.051		−0.034*		−0.036[+]
		(0.010)		(0.044)		(0.010)		(0.018)
Number of adults × Female		−0.008		−0.017		−0.012		−0.015
		(0.012)		(0.033)		(0.007)		(0.010)
Country-district dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,587	6,587	1,200	1,200	9,930	9,930	3,823	3,823
Adjusted R^2	0.122	0.158	0.139	0.179	0.105	0.145	0.144	0.175

Note: The outcome variable is an indicator coded as one if the respondent does not work and states he or she is actively looking for a job. Balkan countries in the data: Albania, Bosnia and Herzegovina, Croatia, Kosovo, Macedonia, Montenegro, Serbia. FSU countries in the data: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Ukraine, and Uzbekistan. Individual models are estimated by OLS with observations weighted using 'federalist' sampling weights supplied with the LiTS data so that all countries have equal weight. Standard errors clustered at the country-district level are in parentheses: $^{+}p < 0.05$, $^{*}p < 0.01$.

Table A.9: Homeownership and unemployment: The Balkans and the former Soviet Union

Region:	The Balkans				Former Soviet Union (except Baltic countries)			
Sample:	Homeowners & Renters		Privatizers & Renters		Homeowners & Renters		Privatizers & Renters	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Homeowner (=1)	0.008	0.007	−0.004	−0.010	−0.009	−0.016	−0.018	−0.034
	(0.018)	(0.018)	(0.042)	(0.049)	(0.017)	(0.018)	(0.022)	(0.023)
Age	0.0001	0.003	0.006	0.008	0.002	0.007*	0.002	0.009+
	(0.002)	(0.003)	(0.005)	(0.006)	(0.002)	(0.003)	(0.004)	(0.004)
Age^2/100	−0.006+	−0.010*	−0.011	−0.013	−0.006+	−0.011*	−0.005	−0.013*
	(0.003)	(0.003)	(0.006)	(0.007)	(0.003)	(0.003)	(0.005)	(0.005)
Willing to take risks (1–10)		−0.003		−0.002		0.003		0.004
		(0.004)		(0.007)		(0.002)		(0.003)
Years of education		−0.007		−0.016		−0.012*		−0.014+
		(0.004)		(0.009)		(0.004)		(0.006)
Female (=1)		−0.007		−0.109		−0.035		0.004
		(0.036)		(0.081)		(0.022)		(0.034)
Married (=1)		−0.036		−0.062		−0.076*		−0.099*
		(0.019)		(0.050)		(0.016)		(0.025)
Number of children		−0.009		−0.025		0.013+		0.023
		(0.007)		(0.018)		(0.006)		(0.014)
Number of adults		0.004		0.011		0.019*		0.030*
		(0.007)		(0.029)		(0.006)		(0.010)
Foreigner (=1)		−0.001		0.042		0.006		0.026
		(0.028)		(0.054)		(0.020)		(0.032)
Communist before 1989 (=1)		−0.002		−0.049		0.001		0.001
		(0.020)		(0.049)		(0.020)		(0.035)
Parents were communists (=1)		0.018		0.045		0.018		−0.007
		(0.015)		(0.039)		(0.011)		(0.018)
Married × Female		0.035		0.096		0.054*		0.057+
		(0.020)		(0.068)		(0.020)		(0.029)
Number of children × Female		−0.005		0.014		−0.014+		−0.022
		(0.011)		(0.033)		(0.007)		(0.015)
Number of adults × Female		−0.002		0.017		−0.011		−0.019
		(0.010)		(0.038)		(0.007)		(0.010)
Country-district dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,587	6,587	1,200	1,200	9,930	9,930	3,823	3,823
Adjusted R^2	0.060	0.062	0.032	0.038	0.102	0.112	0.117	0.130

Note: The outcome variable is an indicator coded as one if the respondent does not work and states he or she is actively looking for a job. Balkan countries in the data: Albania, Bosnia and Herzegovina, Croatia, Kosovo, Macedonia, Montenegro, Serbia. FSU countries in the data: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Ukraine, and Uzbekistan. Individual models are estimated by OLS with observations weighted using 'federalist' sampling weights supplied with the LiTS data so that all countries have equal weight. Standard errors clustered at the country-district level are in parentheses: $^+p < 0.05$, $^*p < 0.01$.