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Introduction

Recent years, the integrated rental system has been under pressure. EU-competition policy and the latest financial crisis have led to cuts in spending and a marketization of the public housing sector (Elsinga and Lind 2013; Van Der Heijden 2013; Christophers 2013). The purpose of this study is to link tenure types to housing deprivation in Europe. The central question examined is to what extent the rental sector can account for between-country differences in housing deprivation. The distribution of tenure types may create housing market dynamics which are likely to produce different levels of housing deprivation across countries. It is hypothesized that the integrated rental sector are more likely to be successful in reducing housing deprivation rates. Three mechanisms on why the integrated rental system is more successful are proposed. First, countries with an integrated rental sector have a lower home-ownership rate encompassing a higher share of middle- and high income earners who are able to maintain their owner-occupied housing. Furthermore, the competition between private and public landlords may lead to an overall better quality of the rental sector. Lastly, a mechanism influenced by comparative welfare state literature is suggested; social security programmes which have the aim of making middle-class standards universal by pooling risks and resources across broader income groups are more successful in alleviating poverty (Marx, Salanauskaite, and Verbiest 2012; Korpi and Palme 1998; Van Oorschot 2002).

Only two comparative studies have systematically analysed the relationship between tenure systems and varying housing standards across Europe (Norris and Shiels 2007; Mandic and Cirman 2012). These previous studies have supported the view that tenure systems can explain between-country differences in housing standards. However, both studies use aggregate level data, leaving out the potential influence of individual confounders. Furthermore, these previous studies do not account for the diversity within rental sectors across countries.
With the availability of extensive comparative data at the individual level as provided in the European Union Survey on Income and Living Conditions (EU-SILC), many of the weaknesses found in the previous research can be addressed. As the organization of the housing market may influence individual risks differently across countries, applying a multilevel framework to 26 European countries allows us to simultaneously consider and isolate individual level risk factors and contextual country level effects. Accounting for the size and the organization of the rental sector, as well as economic development and other contextual country factors, increases the possibilities of explaining between-country differences in housing deprivation.

This paper is organized as follows. The next section focuses on previous research on tenure types and housing deprivation. Thereafter, the hypothesis and the link between rental systems and housing deprivation are outlined. Subsequently, I discuss data and methods, followed by a presentation of the empirical results and analysis. The study concludes with a discussion.

**Earlier research and concepts**

*Housing deprivation*

Housing deprivation is often assumed to be an accumulation of insufficiencies in basic housing conditions. Historically, three dimensions of housing deprivation have been in focus: inadequate construction, inadequate amenities and insufficient space in relation to the number of users (Townsend 1979). Other relevant domains are the spatial and economic dimensions, such as neighbourhood security and the household’s financial burden of housing costs. Some of the indicators of housing deprivation are recurring, but there is a great deal of variety in how decent housing conditions are defined and measured.

In a previous study examining varying housing conditions in Europe, Norris and Shiels (2007) focused on three aspects; housing quality, accessibility and affordability. Based on the housing quality Norris and Shiels (2007) rated 25 EU countries according to their
housing conditions. Good housing conditions were observed in the Nordic countries. Intermediate housing conditions were found in the Southern European Countries, whereas poor housing conditions were observed in many of the new Central and Eastern European EU-member states. Mandic and Cirman (2012) used indicators mostly concerned with the physical attributes of dwellings. They included five components of housing standards: perceived lack of space, presence of rot in windows, doors and floors, damp and leaks and lack of indoor flushing toilet. In addition, they also included characteristics of the environment indicated by the extent to which households complained about noise, safety and lack of open areas in their neighbourhood.

Explanations for varying housing conditions are sought at different levels. Norris and Shiels (2007) and Mandic and Cirman (2012) noted various institutional factors. Besides the home-ownership rate, Mandic and Cirman (2012) analysed the role of economic development and the influence of two separate housing models, the first found in Central and Eastern European countries which experienced a transition of the economy, and the second found in the strong reliability of kinship in housing provision in the Southern European countries. An OLS regression on 26 European countries found support for a decisive role of economic development in the prevalence of poor housing conditions; countries with higher GDP had fewer problems in terms of inadequate housing conditions.

Norris and Shiels (2007) examined the role of the rental sector more cautiously for varying housing conditions across countries, as they applied the typology of a dual and unitary rental system elaborated by Kemeny (1995). The authors hypothesized that larger social rental sectors were associated with higher housing standards since a key incentive behind the expansion of this sector was to eliminate poor housing conditions by rehousing the tenants of slum dwellings (see also Harloe 1995). The gap in housing conditions between the new and older EU member states is often explained by the experience of an Eastern European
Housing Model (see also Hegedüs, Tosics, and Mayo 1996). On the basis of the descriptive typology ranking housing conditions among EU member states it is concluded that the rental systems and other institutional factors mentioned have had a significant impact on the variation in housing conditions, and levels of GDP alone cannot account for these variations.

**Tenure types**
A great deal of research on comparative housing policy has a clear tenure-oriented focus. Three tenure types have generally been distinguished: the owner occupied sector, the private rental sector; and the social rental sector. As has been demonstrated, such general classification of tenure types is problematic in comparative research as the same tenure type may have a different meaning across countries and there are various sub sectors within each particular tenure type (Ruonavaara 1993; Harloe et al. 1988; Barlow and Duncan 1988). For example, the rental sector can consist of dwellings that are owned privately for the purpose of making a profit, and dwellings owned by local authorities and non-profit organizations. The use of tenure types for cross-national studies has been criticized as the concept of tenure has been used too abstractly and too widely (Barlow and Duncan 1988). Nonetheless, housing tenures is an important concept in housing policy research as they “define the formal position of residents in their capacities as owners, co-owners and users of their dwellings, and thus set up the rules of the games between actors in the housing market” (Bengtsson 2009:9).

Kemeny (1995) has developed a typology of rental systems in affluent countries. Rental systems may be either unitary or dual, according to the role of the non-profit rental sector.

The rental sector within a dualist rental system consists of an unregulated, generally small private rental sector and a tightly controlled state regulated rental sector often referred to as social housing targeted at the poor. Social housing is organized separately from the profit rental market and does not depend upon competition, nor does it constitute a market
itself. The objective for the social housing sector is not to make a profit, but to create accommodation for specific target groups unable to participate in the general housing market. The rents are usually free or greatly reduced and the standard of social housing is typically set to a minimum. In these systems, governments support home-ownership via subsidies and favourable legal treatment. Thus, the housing market in countries with a dualist rental system is typically dominated by owner occupation (Kemeny 1995).

In the rental sector within a unitary system, the state/local authority-provided rental sector is extensive and established in a unitary market where the non-profit rental sector competes on the same terms as the profit rental sector, possibly by, for example, rent regulation, forcing private landlords to adjust rent levels to match those of the non-profit rental sector. The rent regulation also leads to below-market rents in the private rental sector, enabling also poorer people to acquire reasonable housing in the same unified rental sector. The objective of the unitary rental sector is to minimize differences in prices and quality between dwellings in profit-oriented and non-profit rental sectors. The governments are tenure neutral, which means each tenure type is afforded similar levels of government support (Kemeny 1995; Kemeny, Kersloot, and Thalmann 2005).

The long-term viability of these rental systems is continuously discussed. Van Der Heijden (2013) outlines a future where the integrated rental market accedes to some of the features of the dual rental system. In this near future, it is suggested that allocation based on need and on market price may be separated, but neither public nor private suppliers will have a special social responsibility. Elsinga and Lind (2013) described the pathways taken by The Netherlands and Sweden where The Netherlands have moved towards a dual system while Sweden is facing an increased marketization of the public rental sector (see also Christophers 2013).
Linking tenure types to housing deprivation

It is hypothesized that the tenure-based structure of the housing stock as seen within the dual and integrated rental system inherently produces different housing market dynamics which are likely to affect levels of housing deprivation. To be more specific, it is hypothesized that integrated rental systems are more successful in reducing housing deprivation than dual rental systems. Three mechanisms are proposed; first, an integrated rental system promotes lower home-owning rates (Voigtländer 2009). Consequently, the home-owning sector is to a larger extent occupied by middle- and high income earners who may be able to maintain their housing (Mandic and Cirman 2012; Norris and Shiels 2007). A second suggested mechanisms found in the literature is that the competition between the private and the public landlords may lead to better quality housing in the integrated rental system (Kemeny, Kersloot, and Thalmann 2005). A third mechanism, influenced by comparative welfare state research on poverty alleviation, claims that universal welfare systems better reduces income poverty by pooling risks and resources (Korpi and Palme 1998; Van Oorschot 2002; Marx, Salanauskaite, and Verbist 2012). In the following, these mechanisms are discussed in detail.

It is sometimes assumed that home-ownership increases incentives for maintaining or even improving housing quality, as it protects home-owners’ investment costs (Linneman and Megbolugbe 1992). At the individual level, it has correspondingly been found that, on average, home-owners enjoy better housing conditions than tenants (Dekker, Musterd, and van Kempen 2007; Elsinga and Hoekstra 2005; Iwata and Yamaga 2008; Kurz and Blossfeld 2004; Boehm and Schlottmann 2006). At the same time however, higher home ownership rates are associated at the country level with poorer housing standards (Norris and Shiels 2007; Mandic and Cirman 2012). In countries with an integrated rental sector, home-owning households are to larger extent middle-and high income earners, while the low-income households are found within the universal rental sector (see for example Magnusson and
Turner 2008 on Sweden). In dual rental systems on the other hand, the home-owning sector is the dominating tenure type as the rental sector ‘pushes’ households into home-ownership (Ronald 2004). It is thus believed that home-owning societies may show a larger share of low-income families within the owner-occupied sector failing to maintain their housing.

In countries with an integrated rental system, the public and the private landlords share objectives and are thus competing over the same market segments. A high quality public housing sector within the integrated rental system means that the private landlords have to match the standards of the public housing sector, which may further improve the housing stock for middle-class and lower income groups (Lennartz, Haffner, and Oxley 2012; Kemeny, Kersloot, and Thalmann 2005).

A key aspect of the integrated rental system is the universal aims, where the public rental sector is not designated to certain income groups. The universal welfare state aims at making “universalism of middle-class standards” (Esping-Andersen 1990:69). There is a long research tradition on comparative welfare state organization and poverty alleviation discussing how social policy best should be organized; targeted or universal (see for example Kenworthy 1999; Titmuss 1974; Marx, Salanauskaite, and Verbst 2012; Korpi and Palme 1998). Selective policy efforts within welfare states are continuously contested among scholars (Van Oorschot 2002; Marx, Salanauskaite, and Verbst 2012). This line of research has generally ignored the policy domain of housing.

However, in this paper it is argued that the arguments on how the universal welfare state better reduce poverty can also be applied in the policy domain of housing. Targeted welfare systems tend to increase the homogeneity among recipients of social insurances, that is, they encompass only the poor households which have similar levels of risks and resources.

Universal welfare systems tend to pool risks and resources by encompassing broader income
groups (Korpi and Palme 1998). By including those in the middle-classes who can afford welfare services on market terms in public programs, popular support for public intervention in market principles and redistributive policies is strengthened. This ensures a higher quality of transfers and services compared to programs that only target poor people (Korpi and Palme 1998). One could therefore expect also housing conditions to improve when risks and resources are pooled within an integrated system of rental housing. Kemeny (1995) argued that social housing within dual rental systems tends to be residualised. Low income households may therefore lack affordable alternatives and are forced to accept market solutions where they do have to balance their budget by taking lower-quality housing provided by the market. Furthermore, since social housing provides shelter for people excluded from the regular housing market, the suppliers of social housing may have weak incentives for improving the housing stock available to poor people. Moreover, it is also believed that the private rental sector is generally kept at a minimum in dual rental systems as households face high market rents and limited tenant protection. Limited regulation and limited government support are likely to affect the readiness to maintain housing quality. The private rental sector within dual rental systems is therefore likely to be minimal and may foster the housing deprivation at the individual level. Households not able to compete at the regular housing market in countries with a dual rental system, i.e. households lacking assets to enable home-ownership or to afford market rents in the private rental sector, are therefore relegated to the small and selective social housing sector.
Data and method

The paper analyses micro level data from the 2007 EU Survey on Income and Living Conditions (EU-SILC) to which contextual country level variables from Eurostat have been added. The EU-SILC is an annual and cross-sectional survey which provides comparable individual and household level data on a wide range of social issues including income, poverty, social exclusion and living conditions. The unit of analysis in this paper is the individual, however in cases where the variable of interest is measured at the household level; each individual is assigned the household value. The data are based on national representative probability sampling of populations residing in private households. The achieved sample size for 2007 varies from under 4000 households in Iceland, Cyprus and Luxembourg to nearly 45000 in Italy. Non-response rates vary somewhat between countries, ranging from eight percent in Cyprus to around 40 percent in Denmark (Eurostat 2010). The total sample in this study consists of 399,486 individuals distributed across the following 26 European countries: Austria (AU), Belgium (BE), Cyprus (CY), the Czech Republic (CZ), Germany (DE), Denmark (DK), Estonia (EE), Spain (ES), Finland (FI), France (FR), Greece (GR), Hungary (HU), Ireland (IE), Iceland (IS), Italy (IT), Lithuania (LT), Luxembourg (LU), Latvia (LV), the Netherlands (NL), Norway (NO), Poland (PL), Portugal (PT), Sweden (SE), Slovenia (SI), Slovakia (SK), the United Kingdom (UK).

Initially, the relationship between the organization of the rental sector and the prevalence of housing deprivation is studied at the aggregated level. Further analysis is conducted through a series of multilevel regression models. Multilevel regression analysis is applied to cope with the fact that individual observations cluster according to countries and this creates dependency between the country level and the individual level. If the hierarchical structure of the data were ignored, the standard errors of the regression coefficients would be systematically underestimated while the effect of the country level variables would be
overestimated. Furthermore, since the dependent variable is dichotomous and bounded to values 0 and 1, a logistic multilevel regression is preferred. To ensure that the estimates are not biased due to unobserved heterogeneity, all models have also been fitted with linear multilevel regression techniques (Mood 2010). The results from these models (not shown) do not invalidate the interpretations of the variables across countries. All of the multilevel models in this study are compiled using STATA and are estimated using the xtmelogit command, which fits mixed-effects models for binary outcomes.

**Measures**

*Dependent variable and individual characteristics*

In previous research linking policy strategies to outcomes of housing standards, aspects relating to both individual confounders and cross-national variations in socio-demographic characteristics are generally ignored (Mandic and Cirman 2012; Norris and Shiels 2007). Therefore, an important contribution of the following study is that it enables assessment of the extent to which compositional effects matters for cross-national variation in housing deprivation. The starting point for this study is to use the definition of severe housing deprivation agreed by the EU member states. In this definition, housing deprivation is mainly about the physical standard of the dwelling. Some studies suggests that it is necessary to extend the boundaries of housing deprivation so that it considers aspects related to for example the economic burden, risks and security of housing (Palvarini and Pavolini 2010).

The measurement of housing deprivation entails identifying a dwelling’s basic or minimum acceptable standard. To be able to separate on the one hand lack of items due to preferences or choice and lacking items due to scarce resources on the other, the concept of “enforced lack” is used. Enforced lack of deficiencies in basic housing conditions refers to situations where people would like to possess/access particular items but cannot afford them for financial reasons. In EU-SILC, the questions regarding durable goods rely on this concept. To
be able to identify the relevance of included items in the EU-SILC, an EU wide
Eurobarometer survey on the perception of poverty and social exclusion was carried out in
2007. From this cross-national survey, a list of basic facilities was established. Regarding the
indicators of housing deprivation; leaking roof, damp walls/floor, a dwelling considered too
dark, to have an indoor flushing toilet and a bath/shower and to have enough space, the
Eurobarometer survey confirms that the items available measuring housing deprivation in EU-
SILC can be socially validated. All of the items measuring housing deprivation are considered
to be absolute necessarily in order to live a life of decent quality and dignity (Guio, Fusco,
and Marlier 2009). Table 1 presents both the dependent variable and individual
characteristics often identified in the literature as having an impact on the risk of experiencing
depression more generally (Nelson 2012).

[Table 1 about here]

Country level variables

The main independent variable is the organization of the rental sector. In EU-SILC the
variable tenure status makes it possible to divide the rental sector into three constituent parts;
tenants or subtenants paying rent at the prevailing or market price, accommodation rented at a
reduced rate (lower price than the market price) and accommodation that is provided for free.
The key distinguishing issue is thus the functioning of the market in deciding rent levels. The
variable tenure status is an individual level variable that has been aggregated and thus
expresses the proportion of each rental tenure type in the total housing stock. It is also
recognized that each rental tenure type is measured at a continuous/interval scale, indicating
that size may function as a proxy for rental systems.

Countries with an integrated rental system where no distinction is made between the
profit rental sector and the non-profit rental sector typically have a large proportion of tenants
paying at prevailing or market prices. The term ‘prevailing’ is here of the utmost importance.
A common characteristic among countries with an integrated rental system is that rent regulation imposes non-profit rent levels on the private sector (Kemeny, Kersloot, and Thalmann 2005). The market principles in integrated rental systems are therefore reduced. Tenants living in countries dominated by an integrated rental system are commonly categorized as paying prevailing rents according to EU-SILC.

Countries with a dual rental system where social housing is organized separately from the regular housing market more often have a relatively large number of tenants renting at reduced prices. At the same time, the proportion of tenants renting at market or prevailing prices will be kept at a minimum in countries with a dual rental system as the private rental sector usually charges high rents and offers no tenant protection; therefore most households have rather weak incentives to rent and prefer to rely on private home ownership (Ronald 2004). Accommodation that is provided for free typically refers to the situation when housing is provided by the employer.

Consequently, the variables integrated rental market; social housing and rental for free are constructed from the categories above. The integrated rental market represents the integrated rental system and proportion of social housing represents the dual rental system. The reference category throughout the empirical analysis is private home ownership. Table 1 presents all of the country level variables, including the organization of the rental sector and other contextual variables that are used to control for factors beyond rental systems that can be linked to varying levels of housing deprivation.

A common criticism of comparable welfare state research is the use of typologies. Dual or integrated rental systems, housing models or housing regimes are based on assumptions of characteristics of housing markets and the wider functioning of the welfare state. Typologies seriously reduce the between-country variation, and a way to reveal the descriptive information often hidden within this type of model-building is the use of
contextual variables on a continuous/interval scale. Furthermore, not all societies can easily be categorized to either of the above rental systems. For example, Kemeny’s (1995) division between integrated and dual rental systems is based on developments in the longstanding industrialized democracies of the United Kingdom, Australia and New Zealand as dual rental systems, while Sweden, Germany, Switzerland and the Netherlands are held to belong to the integrated rental system. In later work, Kemeny also included Belgium, Finland, Iceland, Italy and Norway as belonging to the dual rental system (Kemeny 2006; Kemeny, Kersloot, and Thalmann 2005).

In countries experiencing transitions to a market economy, different perspectives and legacies of a particular Eastern European housing system are present. Before the transition, the Eastern European countries’ housing policy model was characterized by an extensive state-controlled housing sector in which the central planning of macroeconomics was embedded (Hegedus, Tosics, and Turner 1992).

The concept of transition-to-the-market assumes both that the period of communism was homogenous and most importantly that the experiences from communism to post-communism were similar in all Central and Eastern European countries, a standpoint that has been criticized by Lowe (1994), arguing that the transition countries displayed important differences in terms of the organization of housing policy and markets. For example, it has been argued that owner-occupation was a principal form of housing throughout the authoritarian regime in Hungary (Kemeny and Lowe 1998). Therefore, I will not employ a particular Eastern European Housing Model for the Central and Eastern European countries as has been proposed by previous research (Mandic and Cirman 2012; Norris and Shiels 2007).

Results

First, I present a descriptive overview of the association between the tenure types and the prevalence of housing deprivation at the aggregate level. The analysis continues with a series
of random intercept multilevel logistic regressions of housing tenure types on housing deprivation. Third, I analyse the components constituting housing deprivation separately. Fourth, the effects of further contextual variables are presented.

*Housing deprivation in Europe*

There is a negative association between the total rental sector and prevalence of housing deprivation at the macro level. **Figure 1** presents the relationship between both the total rental sector and the two different types of rental systems, and the prevalence of housing deprivation. In this figure we first note that the relative size of the rental sector varies extensively across Europe. The largest rental sector is found in Germany, accounting for about 45 percent of the total housing stock compared to the small rental sectors of about 10 to 15 percent of the total housing stock found in a cluster of Central and Eastern European countries and Iceland. In many countries, the prevalence of housing deprivation is below 2 percent, with the lowest rates found in Nordic countries and Continental European countries including Netherlands, Germany, Belgium and France. Housing deprivation tends to be at highest levels in the Central and Eastern European countries, particularly in Lithuania, Estonia, Hungary, Latvia and Slovenia, where deprivation levels are near 10 percent. The Central and Eastern European countries influence the negative slightly curvilinear association found between the size of the overall rental sector and housing deprivation at the macro level. Excluding the Central and Eastern European countries from the analysis drastically weakens the negative association between the rental sector and the prevalence of housing deprivation but does not overturn the negative association, although it is not statistically significant.

**[Figure 1 about here]**

From the relationship between the total rental sector and prevalence of housing deprivation we cannot, however, distinguish the role of rental tenure types. Therefore, the two subsequent figures present scatterplots for the integrated rental sector and social housing
rental sector and the relationship with housing deprivation in 25 European countries. It is only the integrated rental market which shows a significant negative association, demonstrating less prevalence of housing deprivation in countries with a rental system where the non-profit and profit rental sectors are integrated. When it comes to the dual rental system with a large proportion of social housing targeted towards low income households, there is a negligible and non-significant negative association.

In comparative welfare state research on poverty, deprivation and social exclusion it has not been shown how the Central and Eastern European countries can be expected to perform. Ferrarini and Sjöberg (2010) provide examples concerning the link between social policy and poverty outcomes in Central and Eastern Europe and Western Europe. Their findings indicate that more generous family policies tend to reduce poverty, and the Central and Eastern European countries do not distort this general pattern. However, in terms of the relationship between family policy and infant mortality, Central and Eastern European countries and Western European countries form two separate clusters. The relationship is much stronger for the longstanding European democracies. In terms of the association between family policy and mortality risk due to child injuries there is a larger negative effect in the Central and Eastern European countries than in Western European countries.

The descriptive results presented so far in this study indicate that the rental sector does matter for housing deprivation, but we can also note a geographical divide between new and old democracies in Europe. The greater prevalence of housing deprivation in Central and Eastern Europe may in part be a legacy of a tightly state-controlled housing sector during the communist regimes. Hegedüs, Tosics and Mayo (1996) argues that at the time of transition, housing conditions in Central and Eastern European countries were, by and large, no better or worse than housing conditions in countries with similar levels of economic development. Differences between Central and Eastern European countries and Western European countries
in terms of living conditions increased during the socialist period, but this gap can partly be explained by more general economic development. Moreover, the transition to a market economy in Central and Eastern Europe resulted in a rapid privatization of state rental housing, starting with high levels of home ownership, thus creating what is known as super-owner-occupied nations. Given economic resources, home-owners are more likely to maintain their housing. However, according to the high levels of home-ownership observed in Central and Eastern Europe, high home-ownership rates may have had quite the opposite effect. Promoting home-ownership for low income households could have the consequence that these groups find it more difficult than others to maintain their housing (for further discussion on home-ownership and (in)security see Elsinga 2007).

Analysis

The pattern found at the aggregate level above calls for an in-depth analysis of the link between the role of the rental sectors and the prevalence of housing deprivation. The analysis therefore continues with a series of random intercept multilevel logistic regressions of tenure types on housing deprivation. Table 2 presents the results from a series of random intercept multilevel regressions. The first model is “empty” and does not include any individual or country level variables. The purpose of this model is to benchmark the extent of between-country variation in housing deprivation that is to be explained by the independent variables. To be able to measure the variance at the country level, the intraclass correlation coefficient (ICC) is calculated. The ICC is defined as the degree of resemblance between micro-units belonging to the same macro-unit (Bosker and Snijders 1999:16). For the empty model, the ICC is 0.29, which indicates that 29 percent of the variation in housing deprivation can be explained by country differences.

The second model includes variables at the individual level: gender, age, household type, educational attainment and citizenship, all of which are factors that may confound the
results. The results are presented as log odds, and these fixed effects represent the average effect for individual characteristics across countries. At the individual level, the coefficients show mostly the expected signs. Women are more likely than men to experience housing deprivation. Also, young adults aged between 18-29 face a higher risk of experiencing housing deprivation. Belonging to older age groups reduces the likelihood of experiencing housing deprivation. Compared to couples, all the other household types are more likely to suffer from housing deprivation, although being single is not statistically significant. Single parents and two-parent families seem to have similarly high risks of experiencing housing deprivation compared to couples. Less educated persons are more likely to experience housing deprivation compared to those with higher educational attainment. The likelihood of experiencing housing deprivation is significantly higher for non-European immigrants compared to individuals with a European citizenship. Renters, compared to home-owners, are more likely to experience housing deprivation, while tenants renting at reduced rents seem to be the most vulnerable.

To rule out possible compositional effects at the individual level, a comparison of the intraclass correlation coefficient (ICC) of model two with model one is helpful. Thus, if individuals with differing characteristics are at higher or lower risk of experiencing housing deprivation, some of the variation in housing deprivation across countries will be due to differences in population composition, i.e. the relative size of the respective individual demographic characteristic. As there is hardly any change in the variation left to be explained by country differences from model one to model two, the conclusion is that no sizable compositional effects are present. In fact, due to the fixed variance at level one, the intraclass correlation coefficient (ICC) may increase slightly after inclusion of individual level variables (Bosker and Snijders 1999). Still, after introducing individual level variables, there is considerable unexplained variance in the prevalence of housing deprivation across countries.
In order to explain this variation in housing deprivation at the country level, we will next introduce a series of country level effects, e.g. contextual variables. Model 3 includes the three variables that characterize rental tenure types; the integrated rental market, social housing and rental for free. The reference category is home-ownership.

In model 3, the negative association found at the aggregate level between the integrated rental market sector and the prevalence of housing deprivation is again confirmed. A negative but insignificant association is also seen for the association between social housing and deprivation rates. A positive association found for accommodation provided for free is also established. The integrated rental market sector seems to be the most important tenure type for less extensive levels of housing deprivation. Adding the contextual variables substantially reduces the variance left unexplained at the country level, from around 30 percent in model two to around 17 percent in the full model. Thus, the rental sector accounts for a 42 percent proportional decrease of the cross-national variation in housing deprivation. Thus, two-fifths of the variance in housing deprivation is explained when introducing rental system types, which is quite remarkable. However, the likelihood of experiencing housing deprivation is still significantly higher for renters as opposed to home-owners, suggesting that tenure choice at the individual level matters. As has been described and seen in the figures, Central and Eastern European countries are influencing the association between the size of the rental sector and housing deprivation, with very high levels of housing deprivation and small rental sectors.

To account for the possibility of outliers affecting the results, and to be able to address the possible influence of the Central and Eastern European countries, a series of sensitivity analyses were conducted. Excluding the Central and Eastern European counties from the analysis does not distort the results presented in table 2. Excluding seven countries (LT, LV,
HU, EE, PL, SI, SK) reduces the statistical explanatory power, but the negative direction of the coefficient is not altered. Descriptions of the gap in levels of housing conditions between the new and ‘old’ member states have been extensively highlighted in the literature (Norris and Shiels 2007; Mandic and Cirman 2012; Lowe and Tsenkova 2003). The conclusion that the integrated rental market sector may reduce the prevalence of housing deprivation should be interpreted with some caution as Eastern and Central European countries are likely to influence results. It may be that other factors are more important for explaining the high levels of housing deprivation in the new democracies. Three suggestions posed in the literature are the level of economic development, the legacy of poor housing conditions from the socialist era and the limited state intervention in the housing market after the transition to a market economy (Hegedüs, Tosics, and Mayo 1996; Struyk 1996; Clapham 1996; Hegedus, Tosics, and Turner 1992). However, the purpose of this study is to explore the linkages between rental tenure types and housing deprivation in Europe. Excluding the Eastern and Central European countries would remove nearly a third of European countries from the analysis. Moreover, there are also substantial differences within Eastern and Central European countries, where Slovakia has a housing deprivation rate of three percent while Poland has a deprivation rate of 15 percent. Emphasizing the legacy of a particular and common Eastern European Housing Model that creates high deprivation rates can be questioned in view of such results. Therefore, Eastern and Central European countries are not removed from analysis.

Since housing deprivation is an index consisting of five components, each indicating a separate housing deficiency, the next step was to decompose the effect of rental tenure types on the components one by one. The result of these analyses (not shown) shows that the negative association between the integrated rental market and the prevalence of housing deprivation is consistent when testing each indicator one at a time.
However, having looked at possible confounders at the individual level, the next step is to examine other contextual factors that are relevant. As we can see in table 2, 17 percent of the variation in the prevalence in housing deprivation can be ascribed to country differences after including housing tenure types. Economic development, often measured as GDP, is sometimes assumed to be an important factor in explaining levels of deprivation across countries (Norris and Shiels 2007). Moreover, economic development has been suggested to play a decisive role in the development of housing tenure systems, whereas it is likely that highly developed countries more often have a comprehensive housing tenure system (Doling 1997).

Also, the rate of female labour force participation, unemployment rates, long-term unemployment, total fertility rate, activity rate and spending on housing (as percent of GDP) are potential confounders that should be controlled for, as they both may be factors considered as additional intervening variables affecting the nature of tenure systems and thus the outcome studied. Table 3 shows the results from further random intercept multilevel logistic regressions on housing deprivation where the effects of a set of country level variables are explored. All individual characteristics are included in the models, but not shown. Including many contextual variables at the same time could be problematic for small group sizes (Meuleman and Billiet 2009). Therefore, we will here regress each of the contextual variables one at a time, whereas in the second section the various contextual variables are regressed together with tenure types.

[Table 3 about here]

GDP, female labour force participation, total fertility rate and activity rate are significantly negatively associated with the prevalence of housing deprivation. The negative association is particularly weak for GDP. In previous research, GDP had a decisive role in explaining variations in housing deprivation across countries (Mandic and Cirman 2012;
Norris and Shiels 2007). In this study however, no effect of economic development on deprivation levels across countries is seen. Spending on housing (in percent of GDP), which includes spending on housing allowance schemes also shows a negative association, albeit statistically insignificant. The two unemployment indicators show an expected positive association, but only the long-term unemployment rate is statistically significant. When including the rental tenure types in the second half of Table 3, GDP becomes insignificant and the negative association found for total fertility rate and activity rate weakens but retains its explanatory power. The current unemployment rate is still positive and now statistically significant. Again, it seems to be the integrated rental market tenure type that significantly reduces the prevalence of deprivation, and the strength of this relationship is stable across the regression models. A significant positive association is found for the tenure type where accommodation is provided for free when controlling for female labour force participation, long term unemployment rate, activity rate and spending on housing as a percentage of GDP.

**Conclusions**

This paper has evaluated the role of rental housing types in explaining the prevalence of housing deprivation across European countries. It has been possible to show that the role of an integrated rental system where the non-profit and the profit rental sector create an extensive rental market, accounts for many of the differences and reduces the prevalence housing deprivation across European countries. A series of logistic multilevel regressions on housing deprivation confirms a negative association between the integrated rental market sector and the prevalence of housing deprivation. The analysis also provides us with important insights into how the Central and Eastern European countries influence the cross-national patterns of housing deprivation. The findings presented here suggest the need for more in-depth and institutional analysis in the variations of rental tenure systems. In statistical terms, there is no evidence that a dual rental system where social housing is targeted towards low income
groups reduces the likelihood of experiencing housing deprivation.

**Discussion**

The results indicate that an integrated regulated rental sector aimed at providing decent housing for all is more successful in providing housing of an adequate standard. This indicates that redistributive housing policy strategies are more successful in equalizing acceptable living standards than targeted policy strategies. Although the policy shift towards privatizations in countries which formerly had an integrated rental system is hard to capture in a cross-sectional study, the evidence indicates that a larger integrated rental sector reduces the prevalence of housing deprivation.

The difference in living standards between the transitory countries compared to the longstanding welfare democracies can again be confirmed. The highest deprivation rates are found in the Central and Eastern European countries. A high reliance on home-ownership and a residualised rental sector may be influencing the negative association found between the integrated rental market sector and housing deprivation rates. When excluding the Central and Eastern European countries from the sensitivity analysis, the negative association for the association between the integrated rental market sector and prevalence of housing deprivation is maintained. Possible explanations for the particularities of the Central and Eastern European countries may be found in the experience of the transition to a market economy, and a legacy of a tightly state-controlled housing sector which neglected reinvestment and maintenance support. However, the policy trend to replace the strongly state-regulated housing system with a residualised privatized rental sector, and a large dependence upon home-ownership have not been effective in reducing the gap in living standards. The deteriorated fiscal capacities in the countries experiencing a transition to a market economy are likely to have hindered successful poverty solutions as well as the expansion of welfare...
programs.

The lower prevalence of housing deprivation in countries with an integrated rental system are probably also dependent upon programmes in other policy areas which alleviate needs and reduce the necessity of targeted public assistance. In the case of housing for example, income-tested housing allowances are available to ensure that low income groups have access to adequate housing. Family policies are providing fairly substantial benefits to single parents who are extra vulnerable. Furthermore, active labour market policies are important because they create retraining programmes, further training or public work projects which prevents economic resources being depleted. This paper conveys the rental system as an important factor accounting for variation in housing deprivation rates. However, substantial cross-national differences in poverty alleviation are well documented, and the role of welfare state efforts cannot be emphasized enough. But the extent to which different parts of the welfare state system account for this variation has previously been less researched. Accordingly, at the aggregate level, there might be an institutional interplay, where high spending on social protection goes hand in hand with elaborated rental systems. This underlines the importance for future research to study the linkages between welfare state systems, rental systems and patterns of social stratification (see for example chapter 2 in Stephens et al. 2010). In particular, the role of housing allowances in welfare state systems would be a fruitful first step.

Mandic and Cirman (2012) confirmed that a housing market dependent upon high rates of home-ownership is associated with inadequate housing standards. Low income households are not successfully provided for in such housing markets. From the present study, we can add that the organization of the rental system matters. A targeted version of the rental sector is either not successful in achieving adequate standards in its own housing stock, or low income
households are forced to adopt market solutions where lack of resources may lead to an inability to uphold acceptable housing standards. From previous research we have also seen that the degree of economic development, measured as GDP per capita, is an important factor influencing the variations in housing standards across societies. The results from the present study show that the integrated rental market sector explains a great proportion of variations in the prevalence of housing deprivation after controlling for the level of economic development. Theories emphasizing a convergence perspective are therefore challenged by such results.

Using tenure types as a proxy for complex state intervention in market principles has opened up a possible future research field in which there is great need to develop contextual and institutional measures that in a more detailed way capture the different dimensions of state intervention. This study should be seen as a mere first step in the systematic analysis of links between housing tenure types and housing deprivation. The role of rental systems in the patterning of housing deprivation deserves close attention in the comparative analysis of welfare states and citizens’ living conditions.

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