

## **Inequalities and Segregation across the Long-Term Economic Cycle An Analysis of South and North European Cities**

Tammaru, Tiit; Marcinzak, S; Aunap, R.; van Ham, Maarten

### **Publication date**

2017

### **Document Version**

Final published version

### **Citation (APA)**

Tammaru, T., Marcinzak, S., Aunap, R., & van Ham, M. (2017). *Inequalities and Segregation across the Long-Term Economic Cycle: An Analysis of South and North European Cities*. (IZA Discussion Paper; No. 10980). Forschungsinstitut zur Zukunft der Arbeit/ Institute for the Study of Labor (IZA).

### **Important note**

To cite this publication, please use the final published version (if applicable).  
Please check the document version above.

### **Copyright**

Other than for strictly personal use, it is not permitted to download, forward or distribute the text or part of it, without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license such as Creative Commons.

### **Takedown policy**

Please contact us and provide details if you believe this document breaches copyrights.  
We will remove access to the work immediately and investigate your claim.

DISCUSSION PAPER SERIES

IZA DP No. 10980

**Inequalities and Segregation across the  
Long-Term Economic Cycle: An Analysis of  
South and North European Cities**

Tiit Tammaru  
Szymon Marcińczak  
Raivo Aunap  
Maarten van Ham

AUGUST 2017

## DISCUSSION PAPER SERIES

IZA DP No. 10980

# Inequalities and Segregation across the Long-Term Economic Cycle: An Analysis of South and North European Cities

**Tiit Tammaru**  
*University of Tartu*

**Maarten van Ham**  
*Delft University of Technology and IZA*

**Szymon Marcińczak**  
*University of Tartu*

**Raivo Aunap**  
*University of Tartu*

AUGUST 2017

Any opinions expressed in this paper are those of the author(s) and not those of IZA. Research published in this series may include views on policy, but IZA takes no institutional policy positions. The IZA research network is committed to the IZA Guiding Principles of Research Integrity.

The IZA Institute of Labor Economics is an independent economic research institute that conducts research in labor economics and offers evidence-based policy advice on labor market issues. Supported by the Deutsche Post Foundation, IZA runs the world's largest network of economists, whose research aims to provide answers to the global labor market challenges of our time. Our key objective is to build bridges between academic research, policymakers and society.

IZA Discussion Papers often represent preliminary work and are circulated to encourage discussion. Citation of such a paper should account for its provisional character. A revised version may be available directly from the author.

## ABSTRACT

---

# **Inequalities and Segregation across the Long-Term Economic Cycle: An Analysis of South and North European Cities**

The aim of this paper is to get new insight into the complex relationship between social inequalities and socioeconomic segregation by undertaking a comparative study North and South European cities. Our main finding shows that during the last global economic cycle from the 1980s through the 2000s, both levels of social inequalities and socio-economic segregation have grown. However, the effects of rising levels of inequality affect levels of segregation with a strong time lag. This reminds us that the effect of the most recent economic crisis will most likely be long-term, especially in the South of Europe.

**JEL Classification:** N94, O18, P25, R21, R23

**Keywords:** social inequalities, residential segregation, comparative urban studies, South Europe, North Europe

**Corresponding author:**

Tiit Tammaru  
University of Tartu  
Faculty of Science and Technology  
Institute of Ecology and Earth Sciences  
Department of Geography  
Vanemuise 46  
Tartu 51014  
Estonia  
E-mail: tiit.tammaru@ut.ee

## Introduction

Social inequalities have increased in most countries in Europe over the past decades, and this rising inequality also drives socio-economic segregation across large European cities (Tammaru et al. 2016). As a result, low and high income groups are increasingly living in separate neighbourhoods. As is the case in the US, also in Europe it is the higher income households who are driving the rise of segregation in cities, as they have most freedom to realise their housing and neighbourhood preferences (Maloutas 2016). In most European cities there is a strong overlap between social inequality and inequality along ethnic lines, since many immigrant groups are over-represented in low-skilled jobs. The marginalization and spatial concentration of lower income people, often with an ethnic minority background, signals deeply entrenched structural inequality, and can lead to social unrest (Malmberg et al. 2013).

The relationship between social inequalities, housing segregation and spatial segregation is very complex as higher levels of social inequality do not necessarily relate to higher levels of socio-economic segregation, and vice versa (Maloutas and Fujita 2013; Tammaru et al. 2016). Since the 1980s, liberalization and marketization trends led to rising social inequalities (Piketty 2013). The parallel marketization of the housing sector led to growing housing inequalities (Kovács and Szábo 2016; Maloutas and Fujita 2013), which in turn is one of the most important explanations of increasing residential segregation in European cities (Musterd et al. 2017). However, also other factors, such as the type of welfare regime in a country, might intervene (Marcinczak et al. 2016).

The aim of this paper is get more insight into the complex relationship between social inequalities and socioeconomic residential segregation. We focus our analyses on a comparison of North and South European cities as they represent very different welfare regimes. The North European countries are traditionally considered as the model social democratic welfare states (Esping-Andersen 1990) with strong public sector involvement also in urban planning and housing (Andersson and Kährlik 2016). The South European cities have been characterized by much more family-based social arrangements and a Mediterranean welfare regime, with a traditionally stronger role of markets in housing (Maloutas 2016). We also include countries with a centrally planned past that underwent rapid social transformations in the 1990s (Sykora and Bouzarovski 2012). In the 1990s, these countries went through a deep economic crisis as they transformed from centrally planned authoritarian societies to market based democratic societies.

Based on a comparative study of North and South European cities, we seek answers to three central research questions: 1) What are the initial differences in the levels of socio-economic segregation in North and South European cities in the 1990 or before the rise of social inequalities as a result of the liberalization and marketization of economies and the housing sector?; 2) How have the levels of socio-economic segregation changed in North and South European cities between the 1990, 2000 and 2010 census rounds?; and 3) Do we find a clear correlation between social inequalities and socio-economic segregation in North and South European cities? Since segregation levels follow changes in social inequalities with a time lag, we follow changes in social inequalities since 1980. This allows us to capture social and spatial changes through the last long-term global economic cycle, from the 1980s through the 2000s.

Our empirical evidence comes from the cities of Helsinki, Oslo, Stockholm and Tallinn in the North of Europe, and from Athens, Budapest, Madrid and Milan in the South of Europe. In order to trace changes in social inequalities, we start our study with the analysis of changes in

the Gini Index since 1980. We then proceed with an analysis of the levels of spatial segregation between the top and bottom socio-economic groups measured by Dissimilarity Index at the 1990, 2000 and 2010 census rounds. We also explore the relationship between the Gini Index and the Dissimilarity Index to get more insight in the relationship between inequality and segregation.

### **The relationship between social inequalities and socio-economic segregation**

Fundamentally, the most important cause of socio-economic segregation is income-related social inequality (Musterd and Ostendorf 1998; Nightingale 2012). Income inequalities started to grow in Europe during the 1980s (EC 2010; Piketty 2013; Sachs 2012), a decade of great social transformations induced by rapid globalization, economic liberalization, marketization and deindustrialization that combined shape today's social relations and spatial structures (Marcuse and van Kempen 2000; Tammaru et al. 2016). As a result the incomes of the highly-skilled were rising, while the incomes of the lower skilled were under pressure due to competition of low-income countries (Hechscher and Ohlin 1933).

Before the great social transformations of the 1980s, the levels of social inequalities were already high in the South Europe, with the Gini Index value ranging between 30 and 35 in Greece, Italy and Spain in 1980 (figure 1). The Gini Index values were around 20 in North and East Europe in 1980. In international comparison, the Nordic countries were relative equal societies and wealthy, while the centrally planned countries in the east of Europe were relatively equal but poor (Kornai 1992). Figure 1 shows the trajectories of the Gini Index since the 1980s. In the North Europe, the Gini Index values have steadily but slowly increased between 1980 and 2015 and now hover around 25. In the South Europe, Gini Index values decreased in the 1980s, but then climbing back to the levels of 1980 thereafter. In other words, the differences in income based social inequalities between North and South Europe have decreased during the last few decades, but inequality is still considerably higher in the South. In the East of Europe, the Gini Index increased rapidly in the 1990s to the levels of South Europe. Since then the social inequalities in Estonia have remained at South European levels, but have decreased in Hungary. Across the board, the most rapid changes in the Gini Index values took place in the 1990s.

\*\*\*\*FIGURE 1 ABOUT HERE\*\*\*\*

Although socio-economic segregation is fundamentally related to social inequalities (as illustrated in figure 2a), a recent study of European capital cities (Tammaru et al. 2016; Musterd et al. 2017) found that the association between the two is not universal and the expected and actual levels of segregation levels do not always coincide. This leads us to formulate several inequality-segregation trajectories as illustrated in figure 2b-g. Tammaru and colleagues found a considerable time-lag between increases in social inequalities and increases in socioeconomic segregation (illustrated by figure 2b). Furthermore, a segregation paradox might occur in the form of an inverse association between the levels of social inequalities and socio-economic segregation at times of rapid social changes (figure 2c). When growing social inequalities take places in tandem with a rapid professionalization of the workforce, the expanding higher socioeconomic groups start to seek new areas of residence. This can result in processes of gentrification, which bring along temporary social mixing as higher incomes infiltrate in low income areas (Musterd and van Gent 2016). But ultimately gentrification will lead to higher levels of segregation as high income groups colonise the inner city (Leal and Sorando 2016)

and low income groups are pushed towards the urban margins (Musterd et al. 2017; Kavanagh et al. 2017).

\*\*\*\*FIGURE 2 ABOUT HERE\*\*\*\*

Parallel there are often processes of residualization of social housing, strongly related to urban planning practices during the modernist housing construction period. In the 1960s and 70s large, pre-fabricated, high-rise and uniform housing estates were built at the outskirts of European cities, with the aim to solve housing shortages and to provide a more egalitarian housing system (Wassenberg 2013). In North European countries with social democratic welfare regimes and strong egalitarian ideals, modernist housing construction was especially important. Sweden became world-famous with its so-called “Million Programme” that added 1.5 million housing units between 1965 and 1974 to a country of about 8 million people at that time (Andersson and Bråmås 2017). The constructions took place on large suburban plots of land. In corporatist societies such as in the South of Europe both the available plots of land as well as the developers were smaller (Arbaci 2007). Hence, both the scale and the spatial clustering of modernist housing construction remained more modest in South Europe (Leal and Sorando 2016; Maloutas et al. 2017; Petsimeris 2017). The more spatially clustered low cost housing is planned, the higher the level of segregation by income (figure 2d). And this process is accentuated further because of the social downgrading of many of the modernist housing estates over time, as they no longer meet the higher demands of higher income groups (Andersson and Bråmås 2017; Wassenberg 2013).

The speed of sorting of low-income and high-income groups into different types of neighbourhoods is, in turn, conditional on the degree of marketization of the housing market. South European countries have traditionally been home-ownership dominated while the share of public housing used to be high in most North European countries. Since the 1980s, marketization has taken place in the Nordic countries as well. The formerly centrally planned countries, both in the North and South of Europe, have now become super-homeownership societies with more than 90% of the housing stock being in private hands. The stronger the role of markets, the more rapidly do increasing social inequalities translate into higher levels of socio-economic segregation (figure 2e).

The global oil crisis of the 1970s reversed internal migration flows in Europe, temporarily halting the urban population growth and bringing along a wave of counter urbanization (Berry 1976; Geyer and Kontuly 1996; van den Berg et al 1982). The 1970s decade of crisis paved the way for the social transformations in the 1980s, characterized by a new wave of urban population growth, now strongly based on immigration. Deindustrialization brought along the professionalization of the native workforce. The employer demand for low-skilled jobs remained as fertility levels in Europe dropped and, in tandem with globalization, immigration started to grow both in North and South Europe in the 1990s (Castles et al. 2013). The professionalization of the native workforce and the residualization of low-skilled jobs introduced an ethnic component to the structure of social inequalities in Europe. In this light Andersson and Kährik (2016) refer to ‘eth-class’ segregation, a process of double sorting of non-Western immigrants to low-income jobs and less prestigious neighbourhoods with cheap housing, and natives to high-income jobs and more prestigious neighbourhoods. Since ethnic segregation is driven both by income and by preferences to reside together with co-ethnic and discrimination, segregation in cities with high share of immigrants can grow more than social inequalities (figure 2f).

Compared to the North of Europe, young people in the South are more likely to be socially mobile without moving to a better neighbourhoods. One reason is that well educated young people in the South often have very low starting salaries and no job security (Leal and Sorando 2016). This, combined with a more family-centred social organization, leads to young people in the south leaving their parental home relatively late. In the North of Europe, young people leave their parental home on average 10 years earlier, around the age of 20 (Eurostat 2017). So even if are socially mobile and obtain a higher level of education, it takes much more time to translate social inequalities into higher levels of segregation in the South of Europe (figure 2g).

## **Hypotheses**

It is often assumed that higher levels of social inequalities lead to higher levels of socio-economic segregation, but this is not supported by empirical evidence because of a range of intervening variables that moderate such a relationship. Furthermore, these intervening variables are context specific. This leads us to the following hypotheses.

First, we expect to find that the levels of social segregation are higher in South European cities at the beginning of our study period (1990 census round) than in the North of Europe. In the north the post-World War II welfare systems have kept levels of inequality and segregation low. We expect relatively low levels of inequality and segregation in the formerly centrally planned countries of Europe, both in the North and in the South, because of the egalitarian ideologies pursued by the communist ruling party.

Second, we expect to find a convergence in segregation levels during the study period (1990, 2000 and 2010 census rounds). We expect that the marketization in the North of Europe, and especially in the formerly centrally planned countries during the period of great social transformations in the 1980s and in the 1990s, increased levels of socio-economic segregation in those two regions of Europe. In the North the development of large modernist housing estates resulted in a rapid increase of socio-economic segregation. In the South the slow rates of parental home leaving has slowed down the increasing trend of segregation. Furthermore, the South European cities, also the ones that were formerly centrally planned, have a specific pattern of vertical segregation within buildings, that also reduces horizontal segregation across neighbourhoods.

Third, we assume that there is a lagged positive correlation between social inequalities and socio-economic segregation. Because of the range of intervening factors, it takes at least a decade for rising levels of social inequalities to result in higher levels of socio-economic segregation (Marcinczak et al. 2015; van Ham et. al. 2017; Wessel 2016). We further expect that in market based countries, countries with large modernist housing estates, a high share of ethnic minorities, and a young age of parental home leaving, it takes less time to translate rising levels of social inequalities to higher levels of socio-economic segregation.

## **Data and methods**

We use data from the years 1991, 2001 and 2011, representing the years of the last three censuses in many European Countries. Despite some minor inconsistencies across time and between countries, census years provide the most reliable information on socio-economic segregation across Europe. Data for Athens, Budapest, Madrid, Milan and Tallinn is based on



censuses. Data on Helsinki, Oslo and Stockholm is based on registers. Census data does not include income, and register data does not include occupation, but both sources do contain information about education. However, education is only weakly related to income, while there is a strong correlation between occupation and income (Tammaru et al. 2016). Hence, we measure socio-economic status using occupational groups in census-based countries and data on income in register-based countries.

Occupational status is based on the International Standard Classification of Occupations (ISCO). We used the nine main ISCO categories in our study. For studying socio-economic segregation in register-based countries, we use income quintiles. Since socio-economic segregation is the highest between the highest and lowest income groups (Tammaru et al. 2016), we will analyse segregation between managers and unskilled workers, and between people belonging to the first and fifth income quintile. From here on, we will use interchangeably the terms top and bottom socio-economic groups or high-income and low-income groups to denote them. To facilitate comparison, the spatial units in all cities are made comparable to areas with around 1000 people per unit on average.

Although new methods have been proposed to investigate both the global and local patterns of segregation (Johnston et al. 2010, Marcińczak et al. 2015), this study uses the easily comparable and index of dissimilarity. Our analyses consist of two steps. In the first we analyse changes in the levels of socio-economic segregation between 1991, 2001 and 2011 by means of the dissimilarity index ( $D$ ) between the top and bottom socio-economic groups. The  $D$ -values range from 0 to 100, indicating the percentage of the group members that need to move to another neighbourhoods in order to achieve an even residential distribution to the reference group. Marcińczak et al. (2015) suggest that  $D$ -values below 20 can be interpreted as low and  $D$ -values above 40 can be interpreted as high levels of segregation. To add detail to the  $D$ -values, we will also analyse difference in the geography of socio-economic segregation by drawing stylized maps that portray the main patterns of the spatial distribution of the top and bottom socioeconomic groups in each of the case study city.

In the second step we depict graphically the change of  $D$ -values and values of the Gini ( $G$ ) coefficients to better understand the relationship between social inequalities and socio-economic segregation. Since the rise of social inequalities come first, followed by the rise in socio-economic segregation, we use lagged  $G$ -values for 10 years in our graphs. In other words, we match the  $G$ -values from 1980, 1990 and 2000 with the  $D$ -values of 1991, 2001 and 2011. It is important to note that the  $G$ -values are for whole countries and, as a rule of thumb,  $G$ -values in large cities are bigger (Tammaru et al. 2016). As our primary interest is the co-variation, and not the exact levels of  $G$  and  $D$ , this somewhat reduces this issue.

### **Changing levels of segregation in North and South European cities**

The levels of socio-economic segregation varied considerably in 1991; the range of  $D$ -values was between 22 and 27 in North European cities and between 39 and 46 in South European cities (table 1). This implies that North European cities could be considered as moderately or even weakly segregated with the lowest  $D$ -value of 22 in Oslo, while South European cities could be considered highly segregated with the highest  $D$ -value of 46 in Milan. The formerly centrally planned countries fall in-between the North and South European city groups. Both the speed and trajectory of change in segregation varies significantly across countries. In South European cities, the level of segregation decreased between 1991 and 2001, followed by an

increase thereafter. In Madrid, the rise in segregation was especially rapid between 2001 and 2011 with a considerably higher  $D$  in 2011 than in 1991, while in Athens and Milan the 2011  $D$  is lower than in 1991. Like in other South European cities, segregation between the top and bottom socio-economic groups decreased in Budapest between 1991 and 2011, followed by an increase to the 1991 level by 2011. In North European cities, there has been a steady rise of socio-economic segregation throughout the 1991–2011 period with Stockholm showing a very rapid rise in the spatial separation between high-income and low-income groups. In 2011, the  $D$ -value between those two groups was 40 in Stockholm which is bigger than in Athens. Segregation in Tallinn follows the North European trajectory, especially that of Stockholm, with a rapid rise of  $D$  in the 2000s.

\*\*\*\*TABLE 1 ABOUT HERE\*\*\*\*

The advancement of great social transformations that started in the 1980s and brought along increasing economic inequalities throughout Europe has thus blurred the clear geographical distinction between highly segregated South European cities and moderately segregated North European cities. Likewise, the once important distinction between the strong welfare states in the North and familism in Southern European countries seems to be less decisive in understanding trends in socio-economic segregation. Stockholm and Tallinn have joined Madrid and Milan as the most segregated cities among our case study cities.

The global segregation levels in our study cities is the outcome of very different and city-specific residential geographies of the top and bottom socio-economic groups. In figure 3 we have tried to summarise the spatial segregation patterns in a comparable way. Milan has a historically evolved concentric form that reflects the now land-covered canal system that still characterizes today's spatial structure and the social geography of the city (Petsimeris and Rimoldi 2016; 2017). The high-income groups are over-represented in the city centre (figure 3), most notably in the Centro Storico neighbourhoods of Brera, Sempione and Guastalla. This housing-wise heterogenous zone was the main playground for the post-WWII rapid processes of urbanisation and industrialisation of Milan, providing shelter to the working class and immigrants.

\*\*\*\*FIGURE 3 ABOUT HERE\*\*\*\*

The high-income groups are also over-represented in the city centre of Madrid, in districts such as Centro, Salamanca and Tetuán (figure 3). The growth of young professionals has been rapid in those historical central neighbourhoods that are undergoing regeneration and gentrification, and the process resembles to the colonisation of most central parts of the city by high-income groups (Leal and Sorando 2016). Likewise, wealthier suburban low-density neighbourhoods are mostly located in the North-Western parts of the metropolitan Madrid. The Southern parts of Madrid became subject to large-scale urbanization and industrialization similar to Milan in the post-War decades in Madrid, now housing working class and immigrants.

Like Madrid, Athens lacks concentric urban zones that characterize Milan, but the wealthier neighbourhoods such as Chalandri, Amarousio and Kifista are located outside the urban core, in the Eastern part of the metro area (figure 3). As the share of high-income groups has expanded, they have spilled over to the adjacent areas, rather than contributing to the gentrification of the city centre (Maloutas 2016). The city centre of Athens is socially mixed, partly because of the vertical rather than horizontal patterns of social segregation. The densification of housing in the central parts of the city have left apartments on the lower floors

into darkness, suffering also from noise. Hence, lower-income groups tend to live on the lower floors while higher-income groups tend to live on upper floors (Maloutas 2016). The Western part of the metropolis has a working-class nature, where lower-income groups are over-represented.

Similarly to Athens, the higher-income groups are over-represented in the suburban neighbourhoods in Stockholm, mainly in the North-East parts of metro such as Danderyd, Lidingö and Täby (figure 3). The distinctive feature of Stockholm relates to the large spatially clustered modernist housing estates built between 1950 and 1970 (Andersson and Kährrik 2016). Large immigration to Sweden has occurred since the 1990s, and immigrants are strongly over-represented in those housing estates mainly located in the South-Western part of the suburban ring, contributing to the rapid growth of segregation. Neither Helsinki nor Oslo have such vast and spatially clustered modernist housing estates (figure 3). However, immigrants and lower income groups do concentrate to this housing segment located in the Eastern side of the metro areas in those two cities, too (Wessel 2016; Kauppinen 2017). Higher income groups are over-represented in Western parts in Oslo, expanding from around the royal castle, and on the Southern waterfront areas in Helsinki.

The physical geography of the case study cities, in combination with the planning zoning regulations implemented in the 19<sup>th</sup> century, largely determine the spatial pattern of residential segregation of Budapest by allowing an easy separation between the top and bottom socio-economic groups (Kovács and Szábo 2016). The first are strongly clustered to the villa areas on the Buda hills at the Western coast of the river Danube, while the latter are located in the Eastern side of Danube, in Pest (figure 3). Their concentration is highest in South-Eastern industrial parts of Budapest where large modernist housing estates as well as the less attractive detached housing areas can be found. The inner city of Budapest is mixed as a result of the gentrification processes in the last decades. In Tallinn, the top socio-economic groups are increasingly over-represented along the coast-line of the metro area, both in the city centre as well as in the lower-density suburban areas of Kakumäe-Tiskre in the East and Pirita-Viimsi in the West. Gentrifying inner city area is more mixed. Tallinn's modernist housing areas were largely modelled from Sweden (Metspalu and Hess 2017), and in these spatially clustered and large areas the bottom socio-economic groups are increasingly over-represented.

### **Relationship between social inequalities and socio-economic segregation**

Since changes in socio-economic segregation tend to follow changes in social inequalities with a time lag, we will next compare the Dissimilarity Index with a 10-year lagged Gini Index. The most general impression we get from figure 4 is a strong correlation between the changes of the two. In North Europe, including Tallinn, the rise of  $G$  has led to the rise of  $D$  10 years later. In Oslo, the time-lag is the greatest, which can be explained by a very generous welfare system for those in need of it (Wessel 2016). In Tallinn, the role of the market mechanism in housing is more important than in other Nordic countries, allowing for a quick translation of social inequalities into growing levels of socio-economic segregation. In Stockholm, interestingly, socio-economic segregation has grown in parallel to social inequalities, but more rapidly. This can be due to the fact that both housing marketization and immigration of non-Western immigrants have been especially rapid in Sweden (Andersson and Kährrik 2016; Marcinczak et al. 2015). Housing inequalities are not part of the Gini Index, so it seems that housing inequalities have become a crucial element of social inequalities in Sweden.

\*\*\*FIGURE 5 ABOUT HERE\*\*\*

The changes of the  $D$  and  $G$  correlate also in South Europe, but the trajectory of change is different. In Madrid and Milan, the  $G$ -values decreased in the 1980s, reducing socio-economic segregation a decade later, in the 1990s. Socio-economic segregation decreased also in Athens in the 1990s, although the Gini Index stayed almost unchanged in the 1980s. In addition to social inequalities, the social mobility of a young generation without spatial mobility can explain the reduction in the segregation levels (cf. Maloutas 2016). Similar tendencies can be found in Milan a decade later. In Madrid, the situation is the opposite and, like in Stockholm, socio-economic segregation grew more rapidly in the 2000s than one would predict from the rise of Gini Index a decade earlier. A plausible explanation pertains to the boom of new housing construction in the 2000s that was an important driving force of segregation (Leal and Sorando 2016) and has, as a consequence, become a key dimension of social inequalities.

In Budapest, changes in  $G$  and  $D$  are similar to Athens but more pronounced. The marketization of housing in Hungary started already in the 1980s (Kovacs 2016), earlier than in Estonia, but it led to lower levels of socio-economic segregation in the 1990s. Budapest thus is a good example of the segregation paradox (figure 2c); as the top socio-economic groups move to low-income neighbourhoods, socio-economic segregation can lower at times of growing social inequalities. Lowering of segregation was a temporary phenomenon and the continued growth of social inequalities in the 1990s led to a growing levels of segregation in Budapest a decade later, in the 2000s. In Tallinn, the growth of segregation was rapid, but it reflects well the lagged growth of social inequalities. The role of markets is very strong in Tallinn with more than 90% of housing being in private ownership, allowing for a quick translation of social inequalities into socio-economic segregation.

## **Conclusions and discussion of the findings**

Socio-economic segregation hinges strongly on income based social inequalities, but there is no one-to-one relationship between the two. In line with our first hypothesis we find that, cities in South Europe were more segregated than cities in North Europe in 1991. Since then, the clear distinction has disappeared because a steady increase in segregation has occurred in North Europe. This confirms our second hypothesis on the convergence of segregation levels. In South Europe, segregation levels decreased in the 1990s, followed by an increase in the 2000s, being comparable in 2011 to segregation levels in 1991. Our third hypothesis is confirmed, too as we find that segregation trajectories largely follow the trajectories of income based social inequalities with a roughly 10-year lag.

Our main finding from this comparative analysis of North and South European cities thus is that the main cause of increasing segregation by income is related to the increasing inequality, but that the effect of increasing inequality on the spatial organisation of cities is very slow. In other words, the urban mosaic of neighbourhoods by socio-economic status tends to be very stable. The main reason is that the housing stock is very stable and the symbolic reputation of neighbourhoods is slow to change. Rising levels of social inequalities and socio-economic segregation become problematic when there are large concentrations of poverty, and when low income people get cut off from mainstream society and from important social opportunities such as better schools, jobs and services. High and slowly growing social inequalities should thus be the prime concern of urban policies, but the policy interventions should be more

complex than that, especially in having an eye on the long-term processes behind the currently growing segregation levels in European cities.

To conclude, the previous global economic crises of the 1970s paved the way to major social reorganizations in Europe in the 1980s that strongly affected labour and housing markets. These reorganization laid foundations for a new structure of social inequalities Europe, reflected in growing levels of social inequalities in the 1990s both in North and South Europe despite different welfare regimes and levels of social inequalities. The growing social inequalities, in turn, triggered the growth of socio-economic segregation one decade later, in the 2000s, both in cities of North and South Europe. Socio-economic segregation is thus a symptom of the long-term evolution of inequality and poverty. Its seeds are often planted decades before we can witness widening spatial separation of the top and bottom socio-economic groups.

Hence, in laying foundations to the architecture of exiting from the ongoing economic crises in South Europe, a vision should exist not only for short-term, but also to the long-term effects of those measures. Reducing poverty and its spatial clustering should be an important aim of urban policy. The best strategy would be to focus on stimulating the social mobility of people, the upgrading of neighbourhoods, and by improving the connectivity in cities, connecting low income households to places of opportunities (van Ham et al., 2017). Because of the many contextual differences between cities, these policies should be sensitive to certain neighbourhoods and cities, functioning within the larger urban housing and labour markets.

### **Acknowledgements**

The research leading to these results has received funding from the Estonian Research Council (Institutional Research Grant IUT2-17 on Spatial Population Mobility and Geographical Changes in Urban Regions); and the European Research Council under the European Union's Seventh Framework Programme (FP/2007-2013)/ERC [Grant Agreement No. 615159] (ERC Consolidator Grant DEPRIVEDHOODS, Socio-spatial inequality, deprived neighbourhoods, and neighbourhood effects).

### **References**

- Andersson, R. and Bråmås, A. 2017. Large housing estates in Stockholm – do initial conditions matter? *Large Housing Estates in Europe: Poverty, Ethnic Segregation, and Policy Challenges* (ed. D.B.Hess, T. Tammaru, M. van Ham). London: Springer-Verlag.
- Andersson, R. and Kährlik, A. 2016, Widening gaps: segregation dynamics during two decades of economic and institutional change in Stockholm. In T. Tammaru, S. Marcińczak, M. van Ham and S. Musterd, editors, *Socio-Economic Segregation in European Capital Cities. East meets West*, London: Routledge, 110-131.
- Arbaci, S. 2007, 'Ethnic segregation, housing systems and welfare regimes in Europe' *European Journal of Housing Policy* 7(4), 401–433.
- Berg, L. van den, Drewett, R. Klaassen, L. Rossi, A. and Vijverberg, C. 1982, *A study of growth and decline*. Oxford: Bergamon Press.
- Berry, B. 1976. The counterurbanisation process: Urban America since 1970. *Urban Affairs Annual Review* 11, 17-30.
- Castles, S., de Haas, H. and Miller M. J. 2013, *The Age of migration. International population movements in the modern world*. 5<sup>th</sup> edition, Palgrave MacMillan, New York.

- EC 2010 Why Socio-economic Inequalities Increase? Facts and Policy Responses in Europe. Luxembourg: Publication Office of the European Union
- Esping-Andersen, G 1990, *The three worlds of welfare capitalism*, Cambridge, Polity.
- Eurostat 2017. Eurostat Database on social inequality. Electronically available at [http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc\\_di12](http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_di12)
- Geyer, H. S. and Kontuly, T. 1996, Historical perspectives on differential urbanization, in *Global Perspectives on Urbanization* edited by George Pomeroy, Gerald Webster, Lanham : University Press of America.
- Heckscher, E. and Ohlin, B. 1933, *Interregional and International Trade*. Harvard University Press, Cambridge.
- Revisiting the role of architects in planning large-scale housing in the USSR: the birth of socialist residential districts in Tallinn, Estonia, 1957–1979
- Metspalu, P., Hess, DB 2017. Revisiting the role of architects in planning large-scale housing in the USSR: the birth of socialist residential districts in Tallinn, Estonia, 1957–1979 *Planning Perspectives*, 1-27.
- Johnston, R . Poulsen, M. and Forrest, J. 2010, Moving On from Indices, Refocusing on Mix: On Measuring and Understanding Ethnic Patterns of Residential Segregation, *Journal of Ethnic and Migration Studies*, 36:4, 697-706, DOI: 10.1080/13691830903505045
- Kauppinen, T. 2017. Data brief on segregation of the three major cities of Finland: Helsinki: URMI.
- Kornai, J 1992, *The Socialist System: The Political Economy of Communism*, Princeton University Press: Princeton: N J.
- Kovács, Z & Szabó, B 2016, ‘Urban restructuring and changing patterns of socio-economic segregation in Budapest’ in *Socio-Economic Segregation in European Capital Cities. East meets West*, eds T Tammaru, S Marcińczak, M van Ham & S Musterd, Routledge.
- Kovács, Z. and Szabó, B. 2016, ‘Urban restructuring and changing patterns of socio-economic segregation in Budapest’ in *Socio-economic segregation in European capital cities. East meets West*, eds T Tammaru, S Marcińczak, M van Ham and S Musterd, Routledge, London.
- Leal, J and Sorando, D, 2016, ‘Economic crisis, social change and segregation processes in Madrid’ in *Socio-Economic Segregation in European Capital Cities. East Meets West*, eds T Tammaru, S Marcińczak, M van Ham and S Musterd, Routledge, London.
- Malmberg, B Andresson, E and Östh J 2013, ‘Segregation and urban unrest in Sweden *Urban Geography*, 34(7), 1031–1046.
- Maloutas, T 2016, ‘Socioeconomic segregation in Athens at the beginning of the 21st century’ in *Socio-Economic Segregation in European Capital Cities. East meets West*, eds T Tammaru, S Marcińczak, M van Ham & S Musterd, Routledge, London.
- Maloutas, T., George Kandylis, G. and Myofa, N. 2017. Housing Estates in Athens. An uncommon form of social housing within a residual welfare state. *Large Housing Estates in Europe: Poverty, Ethnic Segregation, and Policy Challenges* (ed. D.B.Hess, T. Tammaru, M. van Ham). London: Springer-Verlag.
- Maloutas, T and Fujita, K (eds) 2012, *Residential segregation in comparative perspective. Making sense of contextual diversity*. City and society series, Farnham, UK, Ashgate.
- Marcińczak, S, Tammaru, T, Novak, J, Gentile, M, Kovács, Z, Temelova, J, Valatka, V, Kährik, A and Szabo, B 2015, ‘Patterns of socioeconomic segregation in the capital cities of fast-track reforming postsocialist countries *Annals of the American Association of Geographers* 105(1), 183–202.
- Marcińczak, S, Musterd, S, van Ham, M & Tammaru, T 2016, ‘Inequality and rising levels of socio-economic segregation: Lessons from a pan-European comparative study’ in *Socio-*

- Economic Segregation in European Capital Cities. East meets West, eds T Tammaru, S Marcińczak, M van Ham & S Musterd, Routledge, London.
- Marcuse, P and Van Kempen, R. 2000, 'Introduction' in *Globalizing Cities: A New Spatial Order?*, eds P Marcuse and R Van Kempen, Blackwell Publishing: Oxford, pp. 1–21.
- Musterd, S. and Ostendorf W. 1998, *Urban Segregation and the Welfare State: Inequality and Exclusion in Western Cities*, Routledge: London
- Musterd, S. and van Gent, W. 2016, 'Changing welfare context and income segregation in Amsterdam and its metropolitan area' in *Socio-Economic Segregation in European Capital Cities. East meets West*, eds T Tammaru, S Marcińczak, M van Ham and S Musterd, Routledge: London.
- Musterd, S., Marcińczak, S., van Ham, M. and Tammaru, T. 2017. Socioeconomic segregation in European capital cities. Increasing separation between poor and rich. *Urban Geography* 38 (7), 1062-1083.
- Nightingale, C.H. 2012, *Segregation: A global history of divided city*, Chicago, University of Chicago Press.
- Petsimeris, P. 2017. The social and ethnic transformations of large social housing estates in Milan: from modernity to marginalisation. *Large Housing Estates in Europe: Poverty, Ethnic Segregation, and Policy Challenges* (ed. D.B.Hess, T. Tammaru, M. van Ham). London: Springer-Verlag.
- Petsimeris, P. and Rimoldi S. 2016, 'Socio-economic divisions of space in Milan in the post-Fordist era' in *Socio-Economic Segregation in European Capital Cities. East meets West*, eds T Tammaru, S Marcińczak, M van Ham and S Musterd, Routledge: London.
- Piketty, T 2013, *Capital in the 21st Century*, Harvard University Press, Cambridge, MA.
- Kavanagh, L., Lee, D. and Pryce, G. 2017. Is poverty decentralizing? Quantifying uncertainty in the decentralization of urban poverty. *Annals of the American Association of Geographers* 106 (6), 1286-1298.
- Sachs, S 2012, *The Price of Civilization. Reawakening Virtue and Prosperity after the Economic Fall*, Vintage, London.
- Sýkora, L. and Bouzarovski, S. 2012, 'Multiple transformations: Conceptualising the post-communist urban transition' *Urban Studies* 49(1), 43–60.
- Tammaru, T, Kährik, A, Mägi, K Novák, J & Leetmaa, K 2016, 'The 'market experiment': Increasing socio-economic segregation in the inherited bi-ethnic context of Tallinn' in *Socio-Economic Segregation in European Capital Cities. East meets West*, eds T Tammaru, S Marcińczak, M van Ham & S Musterd, Routledge, London.
- van Ham et al., Tammaru, T., de Vuijst, E. and Zwiers, M. 2017. Spatial segregation and socio-economic mobility in European cities. *IZA Discussion Paper No. 10277*
- Wassenberg, F. 2013 *Large Housing Estates: Ideas, Rise, Fall and Recovery – The Bijlmermeer and Beyond*, Amsterdam, Netherlands: IOS Press under the imprint Delft University Press.
- Wessel, T. 2015, 'Economic segregation in Oslo: polarisation as a contingent outcome' in *Socio-Economic Segregation in European Capital Cities. East meets West*, eds T Tammaru, S Marcińczak, M van Ham and S Musterd, Routledge: London.

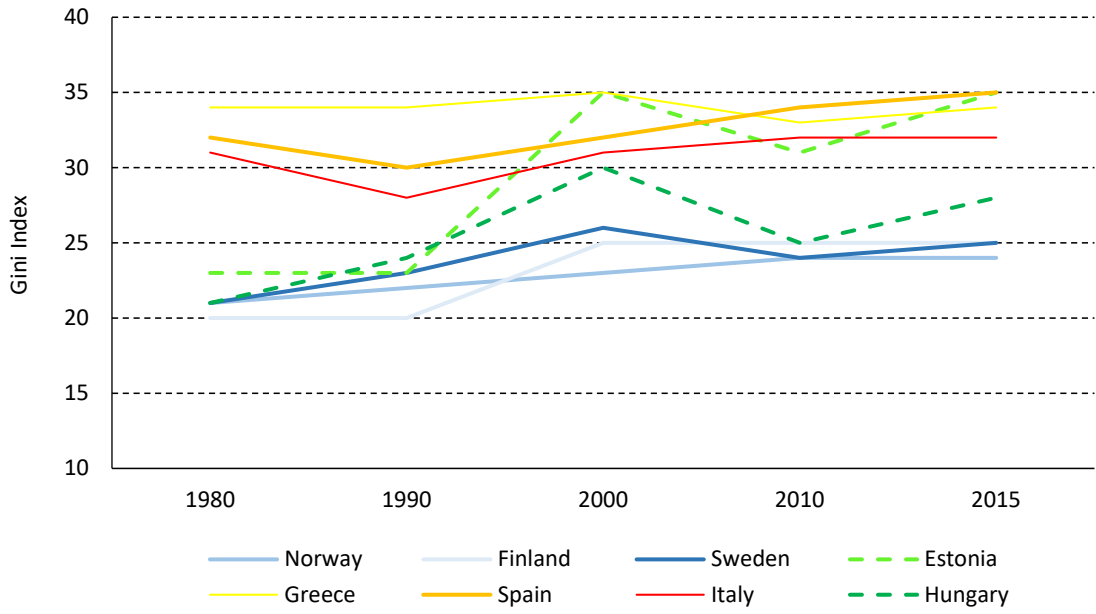
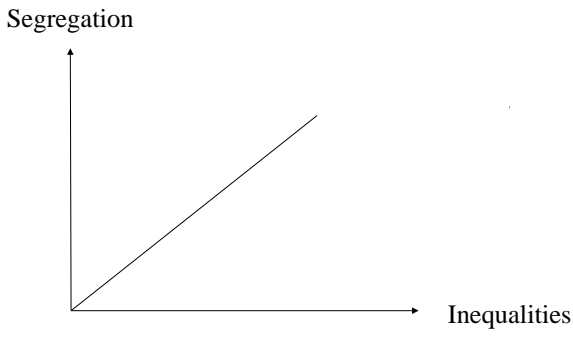
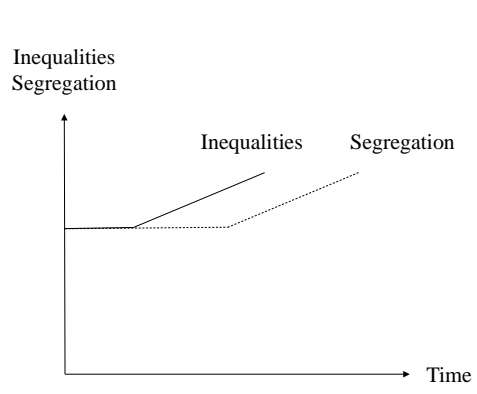


Figure 1. Gini Index in case study countries, 1980–2015.

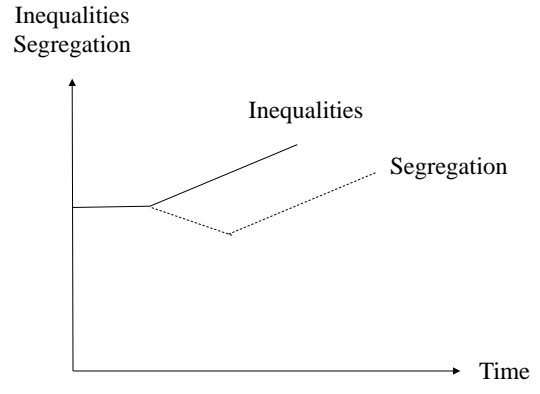




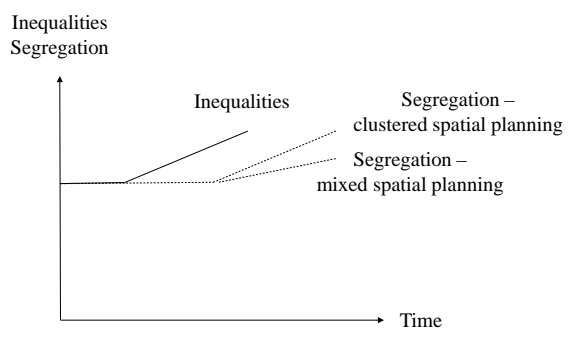
(a)



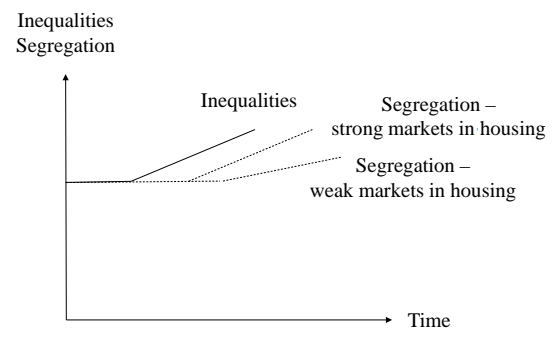
(b) time-lag



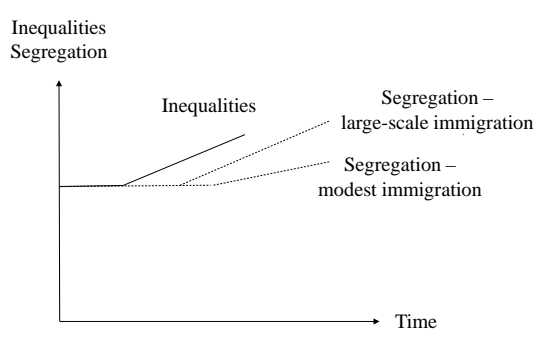
(c) segregation paradox



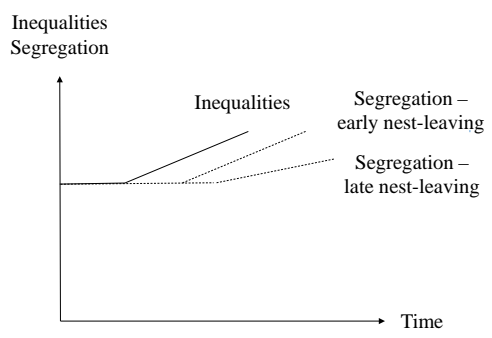
(d) urban planning



(e) housing marketization



(f) immigration



(g) age of nest-leaving

Figure 2. Possible relationships between social inequalities and socio-economic segregation.

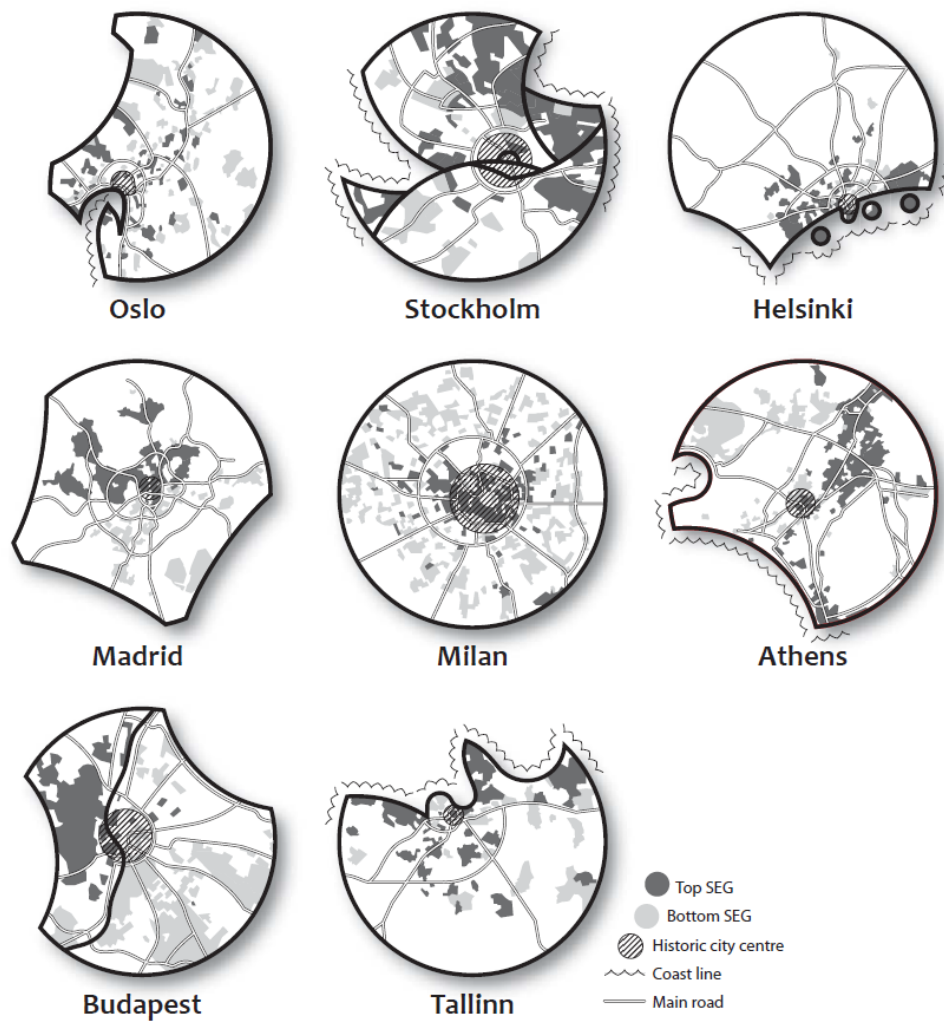
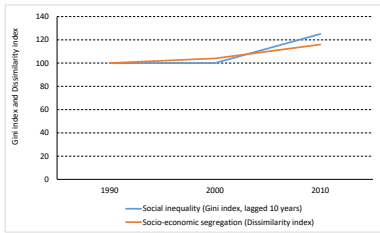
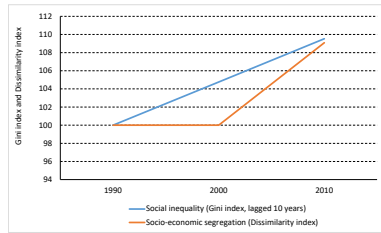


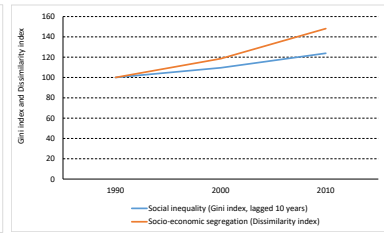
Figure 3. Geographies of top and bottom socio-economic groups.



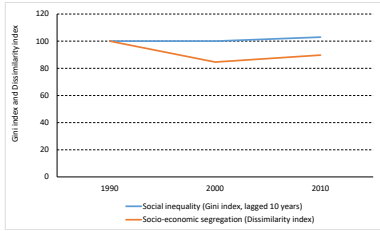
Helsinki, Finland



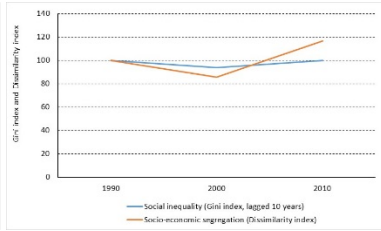
Oslo, Norway



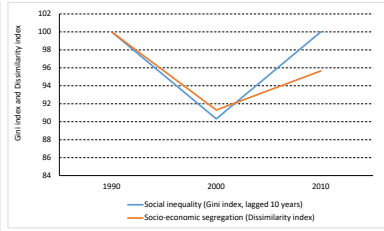
Stockholm, Sweden



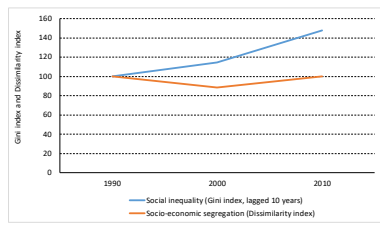
Athens, Greece



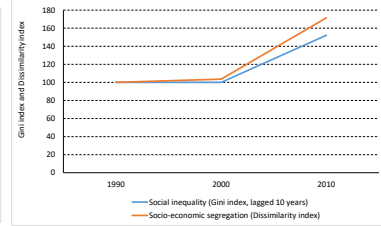
Madrid, Spain



Milan, Italy



Budapest, Hungary



Tallinn, Estonia

Figure 4. Changes in Gini Index and Dissimilarity index.

Table 1. Index of dissimilarity between the top and bottom socio-economic groups.

	1991	2001	2011
Madrid	42	36	49
Tallinn	28	29	48
Milan	46	42	44
Stockholm	27	32	40
Athens	39	33	35
Budapest	34	30	34
Helsinki	25	26	29
Oslo	22	22	24