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Reassessing the commuting penalty for immigrants: new evidence from Spain

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Abstract
This article examines the differences in commuting length between native and immigrant employees in Spain, a relevant issue since immigrants' longer commuting times may, among other factors, reflect an imperfect spatial matching of their labour supply and demand with negative implications for their relative labour outcomes and their individual well-being. The research differentiates immigrants according to their origin and is based on a rich, nationally representative database. A novel contribution of the research is the use of decomposition econometric techniques that allow quantifying the joint and individual influence of a wide range of explanatory factors. The evidence obtained shows that, although a relevant part of the explanation of the greater commuting observed for immigrants is related to observed elements such as a different use of modes of transport, they make overall significantly longer journeys when comparing with observationally similar natives. This commuting penalty occurs yet only in the case of immigrants from emerging countries as it does not exist for those from advanced economies. Although the penalty is overall rather similar along several sociodemographic and occupational lines, it is much more pronounced for individuals living in large municipalities, which implies that previous analyses focusing on specific densely populated territories could not be nationally representative. To conclude, we offer additional novel evidence about the potential explanations of the commuting penalty of immigrants showing that it does not seem to derive from a hypothetically greater tolerance to commuting.

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Introduction

Commuting to work is a research topic that has attracted a growing interest from different areas of knowledge in recent years. On the one hand, commuting trips reflect the decisions concerning the binomial place of residence/workplace in a social and spatial context (Taylor and Ong 1995; Houston 2005; Beckman and Goulias 2008), since they are directly related to the behaviour of individuals in both markets. For that reason, studying commuting trips is relevant for the design, implementation and evaluation of policies concerning transportation and territorial planning and, in general, for all issues related to the design of the cities with the objective of achieving more efficient mobility patterns. On the other hand, from the individual point of view commuting consumes a significant part of the total time that individuals devote to their work activities and reduces the time available for other activities (Kenworthy and Laube 1999; Kahneman et al. 2004; Kahneman and Krueger 2006). Accordingly, the monetary and time costs derived from commuting have been associated with multiple negative effects in the work, health and personal life spheres (Jansen et al. 2003; Stutzer and Frey 2008; Novaco and Gonzalez 2009; Wener et al. 2003; Gottholmseder et al. 2009), and is therefore a relevant phenomenon when analysing individual well-being.

In this vein, the relative commuting of immigrants is an important issue for this group and their host countries, given both the crucial relevance of their labour integration for their assimilation and the significant increase in international migratory flows in last years (OECD 2018a, b). Hence, part of the origin of the lower wages and poorer working conditions that immigrants tend to exhibit (very especially in the case of immigrants from emerging economies) may be explained by the differences in the patterns of commuting between natives and immigrants, which according to some authors could constitute a good indicator of the lack of spatial matching of immigrants' labour supply and demand (Preston et al. 1998; Blázquez et al. 2010; Liu 2009). Yet, although research on both the determinants of commuting patterns and their individual and social consequences has grown significantly in the last years, not many studies have specifically focused on the differences between native and immigrant workers. Consequently, although there is now a growing body literature on immigrant commuting, this is overall an understudied line of research.

The aim of this article is to examine the differences in terms of commuting between natives and immigrants in Spain. One of the main contributions of the research is the use of decomposition techniques for the first time in this field of study. This is relevant insofar they permit quantifying which part of the raw differences in commuting times between immigrant and natives is explained by their different characteristics and which part remains unexplained, reflecting actual differences in the patterns of commuting for individuals otherwise observationally similar. In the same vein, the analysis considers also the immigrants' type of countries of origin as a potential source of heterogeneity within this group, given that such heterogeneity has been identified both in their labour market performance (Chiswick 1978; Borjas 1985; Friedberg 2000) and in their overall use of time (Ribar 2013). Furthermore, this is one of the few studies based on individual data from a nation-wide representative survey (as far as we know the only other exceptions are Hu 2017 and Hu et al. 2019), which contrasts with the focus of previous studies on limited territories, such as certain metropolitan areas or regions, which hampers the generalisation of the findings of their case studies. Finally, another distinctive point of the research is that it explores whether the divergent behaviour of native and

immigrant workers in terms of commuting could be related to a differential effect of commuting in terms of individual well-being and, specifically, to a hypothetical greater tolerance to commuting by immigrants.

Spain is a particularly interesting case study for the examination of immigrants' relative commuting. Hence, it is a country characterized by a significant amount of recent migratory flows in last two decades, when it became the destination of a significant portion of the overall recent immigration to the European Union (OECD 2018a). Immigrants to this country exhibit a high labour participation and immigration flows have had, in fact, very notable impacts on the Spanish economy, including an increase of the flexibility of its labour market and its potential economic growth (Izquierdo et al. 2010; Arce 2010). On the other hand, there is also evidence about the territorial and labour segregation of immigrants in Spain, as immigrants tend to concentrate in particular regions, types of cities and neighbourhoods (Fernández-Huertas et al. 2019; Maza et al. 2013; Pareja-Eastaway 2009). They are also strongly segregated in certain disadvantaged segments of the labour market such as low-skilled occupations (Simón et al. 2008), inter alia because at their arrival they experience an intense downward occupational mobility and the subsequent occupational progress is rather limited (Simón et al. 2014).

In summary, the evidence obtained shows that immigrants in Spain have significantly unadjusted longer commuting trips than native workers. Part of the explanation of this phenomenon is related to the important differences existing between both groups in terms of observed characteristics, such as a different distribution in the use of modes of transport. In any case, one of the main findings of the research is that immigrants have significantly adjusted longer commutes than observationally similar native workers (i.e., even when differences in a broad set of relevant personal, territorial, mode of transport and labour attributes are controlled), which confirms the existence of an immigrant penalty in commuting. The penalty is only observed, yet, in the case of immigrants from emerging countries, as the commuting behaviour of those from advanced countries is not significantly different to that of comparable native workers. Moreover, although the penalty is rather similar along gender, education and occupational lines, it is on the contrary much more pronounced for individuals living in large municipalities and the region of Madrid, respectively. This implies that the vast majority of previous studies on the commuting of immigrants, which focus on specific highly populated geographical environments, could offer a biased perspective so that their results may not be applicable to other territories with different characteristics. Finally, given that commuting has a similar negative impact on satisfaction in different domains of life for immigrants and natives, immigrants' longer commutes are not apparently associated to a greater tolerance, which helps to discriminate against potential competing explanations of the phenomenon.

The structure of the article is as follows. After this introduction, the second section reviews the literature related to immigration and commuting. Then, the third section describes both the database and the main variables. Next, the econometric strategy used in the empirical analysis is explained in the fourth section. The results are presented and discussed in the fifth section and, finally, the main findings of the research are synthesized in the conclusions section, where some policymaking implications are also outlined.

Literature review

In the last years, the literature has paid a considerable attention to the economic and social integration of immigrants in their host countries (see e.g. Borjas 1999; Lalonde and Topel 1997; OECD 2018b). Given that the relative situation of immigrants in the

labour market is a crucial point in their assimilation, a large number of empirical analyses focus on comparisons with native workers in terms of relevant labour attributes such as occupational attainment or earnings. Their findings show that immigrants are typically segregated into worse occupations than native-born workers and that this occupational segregation tends to persist over time (Green 1999; Chiswick et al. 2005a and 2005b; Jasso and Rosenzweig 1988; Bauer and Zimmerman 1999; Constant and Massey 2003; Amuedo-Dorantes and De la Rica 2007). In the same vein, they confirm that immigrants typically face a significant gap in earnings relative to native-born workers, although it tends to diminish the longer they remain in their host country (Chiswick 1978; Borjas 1994 and 1999; Chiswick et al. 2005b; Friedberg 2000; Baker and Benjamin 1994; Lacuesta et al. 2009). Moreover, they show that the labour results of immigrants differ significantly according to their origin, due to the heterogeneity in the transferability of human capital acquired in their country of origin and its relationship with the cultural, linguistic and economic distance with the host country. In part as a result of these factors, immigrants from less developed economies tend to experience poorer occupational attainment and lower earnings (Chiswick 1978; Borjas 1985; Friedberg 2000; Hagan 2004; Chiswick et al. 2005a). This is particularly evident, for example, in the case of Spain, where the labour performance of immigrants from advanced countries is overall rather similar to those of native Spaniards and e.g. they do not experience an occupational downgrading when entering the Spanish labour market. In contrast, those from emerging economies exhibit significantly lower earnings due to their intense segregation into low-wage firms and occupations (Simón et al. 2008; Amuedo-Dorantes and De la Rica 2006, 2007), and also experience a very severe occupational degradation at their arrival and a very slow occupational progress afterwards (Simón et al. 2014).

In this context, studies that focus on the commuting behavior of immigrants are not very abundant, which is striking. On the one hand, because commuting is an activity that in aggregate terms has significant environmental and social implications, and that from an individual point of view involves monetary and time costs that have been commonly associated with multiple negative effects in different domains such as health, personal life and work (Jansen et al. 2003; Stutzer and Frey 2008; Novaco and González 2008; Wener et al. 2003; Gottholmseder et al. 2009). On the other hand, because commuting reflects the individual choices made in terms of place of residence/place of work within a given social and spatial context (Taylor and Ong 1995; Houston 2005; Beckman and Goulias 2008). Hence, the study of the relative commuting of immigrants may contribute to a better understanding of the consequences of their geographical concentration and the subsequent poorer relative labour outcomes.

In their seminal study on the topic Preston et al. (1998) examine the commuting patterns of immigrants in the New York metropolitan area in order to contrast whether they incur in a commuting penalty. Their results confirm that after controlling for individual, household, economic and mode of transport characteristics, certain immigrant subgroups have longer commuting times than natives, which is interpreted as an indirect evidence on the negative impact that spatial barriers associated with their residential segregation, their limited access to certain means of transport or the geographical distance to employment opportunities have on their adaptation within the labour market. Blázquez et al. (2010) and Liu (2009) also explore indirectly the relationship between residential location and job accessibility of immigrants in the Madrid region and certain United States metropolitan areas (Chicago, Los Angeles, and Washington, DC), respectively, by analyzing immigrants' commuting patterns. Their findings confirm that, after controlling for personal, household, job and mode of transport characteristics, immigrants tend to have longer travel times than

natives, which is consistent with immigrants having specific location patterns that lead to intense residential segregation in ethnic enclaves.

Along these same lines, in their analysis of the spatial, social, demographic, and economic determinants of immigrant commuting in California, Beckman and Goulias (2008) confirm that they present longer relative commutes, although this varies depending on elements such as age, residential location, or the relative use of public transportation. With a different approach, Newbold et al. (2015) examine the relative patterns of commuting of immigrants in the Ontario Golden Horseshoe secondary region in terms of distance rather than duration of commuting. They conclude that immigrants exhibit lower relative commuting distances, although differences with natives tend to decrease with immigrants' length of stay in the country of destination, due to their progressively increasing use of private means of transport, which allow for longer journeys. Finally, Hu (2017) and Hu et al. (2019) analyze the relative commuting of immigrants for the United States as a whole using nationally representative data. On the one hand, Hu (2017) examines changes in the commuting behavior of Asian immigrants by years of stay in the country and arrival cohort. The results show that differences in commuting time relative to native-born Asian Americans are only significant for recent Asian immigrants who have lived in the United States for less than four years (albeit only for the most recent cohorts), but not for established Asian immigrants with longer stays. On the other hand, Hu et al. (2019) find that there are significant differences by immigrant race/ethnicity in both the relative use of public transportation and commuting behavior, and that, in terms of assimilation, the time required to converge with the U.S.-born is considerable in all cases, but shorter for white immigrants (23.8 years) than for Hispanics (27.6 years) and Asians (32 years).

Aside from being relatively scarce, the aforementioned studies suffer some limitations. The first one is that although they distinguish in some cases according to the racial/ethnic group of immigrants (Preston et al. 1998; Newbold et al. 2015; Hu 2017; Hu et al. 2019), they do not differentiate according to the level of development of the country/region of origin. The only exception is Blázquez et al. (2010), who observe that immigrants in the region of Madrid coming from emerging areas exhibit higher commutings than natives, but that this is not the case for immigrants coming from advanced areas such as the European Union-15, United States and Canada. The second one arises in terms of the specific groups of workers and, very especially, of the territories covered. Hence, with the exception of Hu (2017) and Hu et al. (2019), none of them is nationally representative, as they cover specific metropolitan areas in the United States (Preston et al. 1998; Beckman and Goulias 2008), certain secondary regions in Canada (Newbold et al. 2015), and a particular region in Spain (Blázquez et al. 2010), while some of them focus moreover on certain specific sub-groups of immigrants (Liu 2009; Hu 2017).

According to the results of the literature on the determinants of commuting, there are four types of potential explanatory factors that help to explain the individual patterns of commuting and, therefore, could be behind the differences in commuting between immigrants and the native population. The first is related to individual or family characteristics, as men, older workers, individuals with higher levels of education, those acting as reference in the household and those who live with a partner or who have children tend to be more likely to get involved in longer commuting trips (Gimenez-Nadal et al. 2018; McQuaid and Chen 2012; Lee and McDonald 2003). The second regards spatial factors related to urban form and the built environment, that exert a significant influence on commuting patterns (Ewing and Cervero 2010; Lin et al. 2015), among which variables such as urban size and population density stand out (Engelfriet and Koomen 2018). In the first case, an increase in size is usually related to the expansion of available employment and

housing options and, therefore, to longer commutes (Levinson and Kumar 1997). In the second case, higher levels of density generally result in shorter commuting distances due to increased accessibility (Ewing and Cervero 2010), although this effect is moderated by congestion, which may plausibly be increased by the self-selection of low-income households into dense urban neighborhoods that are well served by public transit and may cause that shorter distances do not result in shorter travel times (Levinson and Kumar 1997). The third type of explanatory factors are those related to transportation modes. The mode of transport affects commuting duration in a significant way, given that the use of public transport modes significantly increases travel times compared to private means which provide greater mobility and independence such as the car (Asensio 2002; Van Vugt et al. 1996). The choice between these different modes is conditioned by accessibility to them, which is determined by residential and work location, and the type of routes, with public transport means more associated in practice with urban routes and the use of the private vehicle with other type of routes and long distances (Commins and Nolan 2011; Kawabata and Shen 2007). As regards active modes of transport such as cycling or walking, they are often associated with reduced travel times, although their use depends on available infrastructure and travel distance, especially in densely populated territories (Vandenbulcke et al. 2011; Panter et al. 2011). Finally, a last type of explanatory factors includes those related to job attributes, as they exhibit a significant influence on the duration of daily commute to work, since the distribution of different types of jobs is not homogeneous throughout the territory, giving rise to differentiated geographical labour markets by occupations and sectors, and commuting trips that tend to be longer in skilled occupations as well as in sectors such as manufacturing industry and certain branches of the service sector, such as financial activities (Bill et al. 2008; Cubukgil and Miller 1982; Gera and Kuhn 1981; Zhang and Wang 2015; Casado-Díaz 2000; Eurostat 2020).

These elements are expected to have a significant influence in explaining differences in commuting between immigrants and native people. In this vein, several studies indicate that immigrants and natives tend to use different means of transport and that, although this relationship is moderated by certain factors, this contrasting behaviour persists even after controlling for various personal, housing and employment characteristics (Kim 2009; Heisz and Schellenberg 2004; Tal and Handy 2010). Consequently, immigrants tend to be more dependent on public transport due to their limited access to private means (Blumenberg 2008; Bohon et al. 2008), although their use of public transport decreases as age, income, distance to workplace and length of stay in the country of destination increase (Heisz and Schellenberg 2004; Newbold et al. 2015; Hu 2017). In the same vein, the influence of job attributes could also be relevant in this context given that, as previously noted, immigrants tend to be segregated in worse occupations and have overall poorer working conditions (Waldinger 1994; Catanzarite 2000; Wilson 2003; Bohon 2005; Blázquez et al. 2010). Finally, spatial variables could be relevant given the significant residential segregation generally observed for immigrants, especially in densely populated areas (Newbold et al. 2015; Preston et al. 1998).

Previous studies have precisely proposed immigrants' residential segregation as one of the basic explanatory hypotheses of the commuting penalty they face compared to natives of the same characteristics (Preston et al. 1998; Blázquez et al. 2010; Newbold et al. 2015). This circumstance could derive from their preference for locating in ethnic enclaves with a significant presence of culturally similar immigrants (Preston et al. 1998; Liu and Painter 2012; Liu 2009; Elliott and Sims 2001; Blumenberg and Smart 2009; Parks 2004; Wang 2006, 2010; Cutler et al. 2008), a process driven by a search for more cultural comfort, family and friendship ties, or for easier access to housing (European Commission 2003;

Echazarra 2010). Although in Spain the residential segregation of immigrants is lower than in the United States or other European countries (Fernández-Huertas et al. 2019), due to factors such as the low importance of elements such as public housing that tend to increase the residential segregation of immigrants (Pareja-Eastaway 2009), immigrants also tend to concentrate there in areas where there is a large presence of other culturally related immigrants (Maza et al. 2013; Ballester and Vorsatz 2014; Blázquez et al. 2010; Pareja-Eastaway 2009; Echazarra 2010). This non-random location of immigrants in the territory could reduce their job opportunities, insofar as spatial concentration in disadvantaged areas increases the probability of locating far from jobs (Parks 2004; Wang 2006, 2010; Cutler et al. 2008), thereby introducing incentives to widen the job search area (Blázquez et al. 2010; Newbold et al. 2015; Liu 2009; Zavodny 1999). This is even more accentuated if, in addition, the areas in which they are located are characterized by poorer access to public transportation and, consequently, limited connectivity (Taylor and Ong 1995; Shen 2001; Grengs 2010; Cohen and Sirkeci 2011).

A second potential explanatory hypothesis of the commuting penalty is the possible presence of a phenomenon of discrimination against immigrants in both the labour and housing markets deriving from xenophobic attitudes among the native population (Cohen and Sirkeci 2011). This is a phenomenon widely documented in the case of the labour market, where there is abundant evidence on the existence of employer discrimination against immigrants, so that in practice they effectively receive fewer job opportunities than natives with exactly the same characteristics (Bertrand and Mullainathan 2004; Silberman et al. 2007; Drydakis and Vlassis 2010; Booth et al. 2012). Moreover, this circumstance also occurs in the housing market, where several studies for different countries, including Spain, confirm that immigrants also receive discriminatory treatment in access to rental housing (Bosch et al. 2010, 2015; Bengtsson et al. 2012; Baldini and Federici 2011). This discriminatory practices could restrict immigrants' choice in terms of the spatial location of their housing and jobs, which could indirectly result in longer commuting times.

Finally, another possible explanatory hypothesis is that immigrants tend to have a greater tolerance for long commutes than natives. In general terms, differences in the preferences/attitudes of immigrants and natives have been verified in very diverse fields, such as risk attitudes, time preferences, trust and reciprocity, or residential location (Constant et al. 2011; Albanese et al. 2016; Hui et al. 2012; Dimou et al. 2020). In the specific case of commuting, their hypothetical greater tolerance could be related to the priorities of immigrants, plausibly related to a situation of necessity, who often have an urgent need for income after migration and, in general, greater financial restrictions than natives, which could force them to be less selective in their choice of employment, and therefore more susceptible to accept job opportunities associated with long commutes (Akresh 2006; Chiswick et al. 2003; Landesmann and Leitner 2020; Chatman and Klein 2009). This is seen, for example, in their access to different modes of transport, as financial constraints force immigrants initially to use inexpensive modes and/or to accommodate their commutes to those of relatives or friends, until they have sufficient resources to afford options that allow them to expand their mobility (Lovejoy and Handy 2008; Chatman and Klein 2013; Landesmann and Leitner 2020). A higher immigrant commuting tolerance may also be related to the exposure to long commutes in their countries of origin, as commuting habits are strongly persistent over time and only tend to change significantly upon significant modifications in individuals' family, work, or residential circumstances (Klein and Smart 2019; Klein et al. 2018). In this sense, immigrants tend to have a greater exposure to public transport and less access to private means of transport in their areas of origin (Chatman and Klein 2013; Chatman 2014; Blumenberg and Smart 2009; Blumenberg 2009;

Blumenberg and Evans 2010; Jost 2020; Simonsohn 2006), in a context where in many emerging countries public transport systems suffer from major deficiencies (Hu et al. 2018; Henderson 2002; Carruthers et al. 2005; Wu et al. 2019).

One way of examining a population group's degree of tolerance for commuting is by analyzing the effect of commuting on their individual satisfaction. In this sense, the bulk of studies that have explored this relationship tend to conclude that commuting is an activity that has an overall negative impact on individual satisfaction. Thus, for example, longer commutes reduce the time available for family relationships or enjoying free time (Kahneman et al. 2004; Kahneman and Krueger 2006) and produce higher levels of stress or negative feelings (Wener et al. 2003; Gottholmseder et al. 2009; Evans et al. 2002).[1] One factor that has not been explored in depth, however, is whether the relationship between commuting and overall individual well-being varies with the worker migrant status, although this factor could contribute to explaining the differences observed in the commuting patterns of the two groups of workers and, in particular, the afore-described migrant penalty. In fact, in the studies that explore the relationship between commuting and satisfaction with different areas of life, the immigrant variable is not usually introduced even as a control variable (e.g. Dickerson et al. 2014; Olsson et al. 2013; Wheatley 2014). The very few exceptions are Albert et al. (2019) and Simón et al. (2020), who show that the satisfaction of immigrants in these domains is comparatively lower, although no evidence is offered for this group as regards the particular impact of commuting on satisfaction. For this reason, the final part of our empirical analysis examines in a novel way whether the impact of commuting on satisfaction differs between immigrants and natives.

Data and variables

The empirical analysis is based on the *Survey on Quality of Life at Work* (in Spanish *Encuesta de Calidad de Vida en el Trabajo*; hereafter SQLW), a yearly survey conducted by the Spanish Ministry of Employment and Social Security between 1999 and 2010, when it was interrupted without being replaced by a comparable survey in terms of size, representativeness and variables considered. The SQLW is composed of independent cross-sections that have a yearly sample size of around 8,000 workers. The purpose of the survey is to offer detailed information on the social and labour circumstances of Spanish workers. For that reason, it includes very rich information, including individual and household characteristics and the objective attributes and subjective assessment of certain characteristics of jobs. In addition, the survey includes information on variables that measure the level of satisfaction of workers in different life domains such as job, housing, personal life, and leisure time.

As regards the main variables of interest in the analyses, self-reported commuting is measured as the time devoted by an individual to the one-way daily trip between home and work, measured in minutes. The immigrant status is derived from the nationality of the individual so that those whose nationality is not Spanish are considered as immigrants.

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[1] Although commuting time has been found to exert significant negative effects on a wide range of labour, health and personal life aspects, this evidence is nuanced, however, by findings according to which, at least for certain individuals and specific modes of transport, commuting might also be associated with positive utility deriving from e.g. the activities conducted during the commute (Redmond and Mokhtarian 2001; Mokhtarian et al. 2001; Ory and Mokhtarian 2005; Lyons et al., 2010; St-Louis et al. 2014).

This group is additionally divided into two different subgroups depending on the geographical origin of the individual, to distinguish between those coming from advanced economies, on the one hand, and emerging and developing countries, on the other.[2] Finally, the individual level of satisfaction with different life domains are derived from the answers to a set of questions where the level of satisfaction is measured on a 0–10 scale where the extremes denote the lowest and highest level of satisfaction, respectively.

Regarding the independent variables in the empirical analysis, according to the literature, four different types of characteristics have been considered. First, individual and family attributes: gender; age; maximum level of education; presence of children under 15 years old; marital status (whether the person lives with a partner or not); daily time spent on household tasks (in minutes); and household income.[3] Second, variables related to the geographical environment: region of residence (there are 17 regions in Spain), size of the municipality (five categories ranging from less than 10,000 inhabitants to more than one million are distinguished), and density (measured in inhabitants per km^2, approximated as the average population density of the municipalities of a similar size in the individual's region of residence).[4] Third, the mode of transport used in the travel to work, distinguishing between a wide range of modes of transport, both public (bus, metro or tram, taxi or train), private (car, motorcycle or bicycle), or other modes (traveling on foot or other means). Finally, several attributes of the jobs have also been considered, including objective attributes and worker' subjective perceptions. The objective characteristics considered are type of workday (part-time or full-time and continuous shift or split shift); type of contract (temporary or permanent); seniority; occupation (distinguishing between those characterised by high levels of qualification -directive and technical-; low qualification -elementary occupations- and medium qualification -the rest of occupations-); firm size (less than 10 workers, between 10 and 249 or more than 249); the activity sector (primary sector, industry, construction, or services); and type of sector (public or private). Subjective variables include over-education (an individual is considered to be over-educated if he/she declares that his/her education level exceeds that required in his/her job); the perceived level of routine and physical effort in the job; as well as the perceived level of danger/risk and the valuation of the security and health in the workplace, all of them measured on a 0–10 scale.

The analysis uses microdata from the SQLW for the period 2007–2010, given that prior to 2007 the main variable of interest, commuting, was measured in intervals. The sample

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[2] In doing so, the classification of countries currently used by the International Monetary Fund is used (see, e.g. International Monetary Fund 2020).

[3] The household income of the survey respondent is measured in the SQLW in net terms and in intervals. Given that the number of intervals is relatively high (nine intervals), it is measured using the class mark of each interval.

[4] It is important to acknowledge that due to data limitations our measures of the characteristics of the geographical environment are rather limited, which could be an important weakness given that accessibility to employment has proven to be a key determinant of the length of commuting (Levinson 1998; Shen 2000). Another significant limitation is that although the database used includes a large variety of variables that permits to control for a wide range of individual, geographical, mode of transport and work-related characteristics, it does not, however, provide information on how long the immigrants had resided in Spain, in a context where immigrants' commuting patterns could evolve as time elapses from the moment they arrive in the country due to their adaptation in terms of language skills or access to private means of transportation (Newbold et al. 2015 and Tal and Handy 2010).

includes employees aged 16–65 (62 observations have been excluded).[5] Those individuals who declare a commuting time exceeding 3 h (8 observations) have also been excluded. The final sample consists of 25,957 salaried employees (23.252 native workers and 2.705 immigrants, of which 2,415 are from emerging countries and 290 from advanced economies) for the pool of four years, which represent 99.7% of the total salaried employees surveyed.[6] The sample weights provided by the SQLW have been used throughout the empirical analysis. Consequently, the evidence obtained is representative for the entire salaried population in Spain.

Methodology

Different econometric methodologies of estimation and decomposition are used in the empirical analysis. First, the Oaxaca-Blinder technique (Oaxaca 1973; and Blinder 1973) is used in order to perform a detailed decomposition of the differential in the average commuting between natives and immigrants. Secondly, an ordered logit type model is used to estimate the impact of commuting on the job satisfaction of natives and immigrants. Both techniques are described below.

Oaxaca-Blinder decomposition

The Oaxaca-Blinder technique starts with the OLS estimation of an equation with the form:

$$C_i = X_i \beta + \varepsilon_i \tag{1}$$

where C_i is the duration of commuting for individual i; X_i is a vector of individual explanatory variables plus a constant term; β is a vector of parameters and ε_i is a random error term.

After estimating Eq. (1) for the joint sample of natives and immigrants, and using their returns structure as the reference structure in the decomposition (see Oaxaca and Ramson 1994; and Neumark 1988),[7] the difference in the duration of the average commuting between immigrants and natives (Δ) can be broken down as follows:

$$\Delta = \left(\bar{C}^i - \bar{C}^n \right) = \left(\bar{X}^i - \bar{X}^n \right) \hat{\beta}^* + \left\{ \bar{X}^i \left(\hat{\beta}^n - \hat{\beta}^* \right) + \bar{X}^n \left(\hat{\beta}^* - \hat{\beta}^i \right) \right\} \tag{2}$$

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[5] The exclusion of self-employed workers is a relatively frequent decision in this type of analysis to the extent that they have different relative commuting patterns, usually characterized by lower levels of mobility (see, for example, Gimenez-Nadal et al. 2018; and Albert et al. 2019).

[6] One of the limitations of the analysis concerns the relatively small size of the sample of immigrants from advanced countries in the SQLW, which is consistent with the fact that Spain mainly receives immigrants from emerging countries. The results reveal that this group of immigrants exhibits a mobility pattern differentiated from that of immigrants from emerging countries, and generally comparable to that of Spaniards. This is consistent with the results of previous studies for Spain in other areas, such as the relative wages of immigrants (Simón et al. 2008) or their occupational mobility between their countries of origin and Spain (Simón et al. 2014). The adherence of our results to those obtained when studying other labor related aspects softens the possible concerns related to this sample size.

[7] A dummy variable has also been included in the estimation to identify the group each observation belongs to, given that the non-inclusion thereof can lead to biases in the decomposition that take the form of an overvaluation of the component of characteristics and the corresponding undervaluation of the returns component, caused by the omission of specific intercepts for each group (Elder et al. 2010).

where $\bar{C}^i$ and $\bar{C}^n$ are the average commuting times of immigrants and natives; $\bar{X}^i$ and $\bar{X}^n$ are the average observed characteristics of the individuals of both groups and $\hat{\beta}^i$, $\hat{\beta}^n$ and $\hat{\beta}^*$ are the estimated coefficients after the regression of the commuting duration on the set of explanatory variables for immigrants, natives and the pool of both groups, respectively.

The first component on the right side of Eq. (2) represents the effect on the differential in the average commuting caused by differences in characteristics (or 'explained' component), while the second corresponds to the effect of the coefficients (or 'unexplained' component). It should be noted that this procedure allows to obtain a detailed decomposition, distinguishing the contribution of each individual explanatory variable to the characteristics component.

Ordered logit

In order to estimate the determinants of satisfaction in different life domains of individuals, the following equation is estimated:

$$S_i = Z_i\delta + \varepsilon_i \tag{3}$$

where S_i is the satisfaction in a specific domain (job, personal life, leisure time or housing) expressed by the individual i; Z_i is a vector of individual explanatory variables plus a constant term; δ is a vector of parameters and ε_i is a random error term.

The most usual approach in the literature in the analyses where the dependent variable is a subjective measure of satisfaction or well-being, that expresses preferences or opinions of the individuals on a certain question, is based on the consideration that the alternatives of the decision process implicitly express a utility order and have, therefore, an ordinal character. For that reason, it is preferable to estimate ordered logit or probit models (see, e.g., Ng 1997; Van Praag 1991; and MacKerron 2012). In these models, the values taken by the dependent variable are irrelevant, with the exception that higher values correspond to comparatively higher levels of satisfaction. These models process the data ordinally, and they estimate two sets of parameters, a vector of coefficients used to predict the latent variable from the independent variables and a set of cut-off points, which are the values of the latent variable where changes occur in the discrete order observed.

In the case of the ordered logit, it is assumed that the ordinal variable observed is determined by a latent variable unobserved (underlying score), which is estimated as a linear function of the independent variables and a set of thresholds (setpoints). The probability of observing result i corresponds to the probability that the estimated linear function plus the error term is in the range of the estimated thresholds for the dependent variable, where it is assumed that u_j follows a logistic distribution, so:

$$p_{ij} = \Pr(y_i = i) = \Pr(K_{i-1} < x_j\beta + u \leq K_i) = \frac{1}{1 + \exp(-K_i + x_j\beta)} - \frac{1}{1 + \exp(-K_{i-1} + x_j\beta)} \tag{4}$$

The coefficients β_1, β_2, …, β_K are jointly estimated together with the thresholds K_1, K_2, …, K_{K-1} (where k is the number of possible outcomes, K_0 is taken as $-\infty$ and K_k as $+\infty$) and they do not have a direct interpretation because they correspond to the latent variable used in the estimation of the model. The estimated model is a proportional-odds ordered logit model where it is assumed that the relative magnitudes of the effects of each explanatory variable are constant through the distribution of the dependent variable and the coefficients and thresholds are estimated by maximum likelihood.

Results

Descriptive evidence

Table of the Appendix contains descriptive evidence about the main variable of interest, commuting time. The average commuting of immigrant employees in Spain is substantially greater than that of natives (with a commuting of 27 min for immigrants, 21.9 for natives, and a 5.1 min or 18% difference) being the gap more pronounced for immigrants from emerging countries (whose commuting time is of 27.3 min) than for those from advanced countries (24.5). When measuring individuals who make relatively long journeys (those over 45 min) the proportion is hence notably higher among immigrants (15%) than among natives (9%). In turn, in the case of the satisfaction variables that are also used as dependent variables in the empirical analysis, in all the domains considered satisfaction is comparatively lower for immigrants, although in some cases differences are only found for those from emerging countries.

Evidence on the rest of the variables in Table 5 confirms that most immigrants in Spain come from emerging countries (90% of the total), so that immigrants from advanced countries are a minority (10%). Moreover, they also show that immigrants differ from native workers in many of their characteristics, particularly in the specific case of those from emerging economies.[8] Thus, regarding personal characteristics, immigrants are comparatively younger, have lower levels of education, and live in households whose characteristics are also different (e.g. with a wider presence of children under 15 years old and with lower incomes). Likewise, as regards regional variables, immigrants have a greater relative presence in certain highly populated regions, such as Catalonia or Madrid (47% of immigrants live in these two regions, compared with 32% of natives), and in large municipalities with more than one million inhabitants, which correspond to the cities of Madrid and Barcelona (18% of immigrants compared with 9% of natives). Moreover, immigrants make a more intense use of public transport (27%, compared with 13% of natives) and, reversely, their use of private modes of transports as using a car is much less frequent (45% and 63%, respectively). Finally, when comparing job attributes with natives, immigrants generally hold worse jobs, characterized by less stability (more fixed-term contracts and less seniority) and a higher probability of being over-educated. Similarly, they are segregated into low-skilled occupations, small firms and certain industries such as the primary sector and construction. These overall differences in relative observed characteristics tend to be lower for immigrants from advanced economies, whose characteristics are in many cases more similar to native workers (such as in the case of the use of modes of transport) and they even exhibit better relative endowments than natives in some elements (such as educational levels and occupational distributions).

According to this evidence, very significant differences exist between native and immigrants in several elements that the literature suggests that may be relevant in explaining their different patterns in commuting. For this reason, in the subsequent empirical analysis econometric decomposition techniques are used to identify the global effect associated

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[8] Most of the immigrants from emerging countries residing in Spain come from Latin American countries (especially Ecuador, Colombia, Bolivia, Argentina, and Venezuela), with other notable origins being North Africa (especially Morocco) and Eastern Europe (mainly Romania and Bulgaria). Alternatively, the vast majority of immigrants from advanced countries come from European countries such as France, Germany or the United Kingdom.

with differences in observed characteristics and to provide detailed evidence on the separate relevance of each individual factor.

Multivariate analysis

Commuting

Prior to the development of the econometric decompositions, in order to examine the determinants of commuting, Table 1 reports the results of the OLS estimation of Eq. (1) for the pool of immigrants and natives. The dependent variable is commuting time and the set of explanatory variables includes either dichotomous variables that reflect whether the worker is an immigrant or not (models 1 and 3; in model 3 two dichotomous variables are included, reflecting whether the immigrant comes from an advanced or an emerging country, respectively) or a most complete specification of the equation which also comprises an additional set of factors (models 2 and 4). In all cases, the specifications also include fixed effects of region and year, in order to control for the potential influence of cyclical changes. As previously noted, the additional explanatory variables include controls related to individual and household characteristics (gender, age, level of education, presence of children under 15 years old, marital status, time devoted to housework, and household income); variables related to the geographic environment (region of residence, size of the municipality, and population density); the mode of transport used in the commute; as well as attributes of jobs (full-/part-time job, continuous/split workday, permanent or fixed-term contract, seniority, occupation, firm size, public/private sector, and industry).

The results of the estimations confirm that immigrants exhibit significantly longer commuting times than natives, and that the magnitude of these differences varies significantly when controlling for the wide set of elements considered as potential determinants of commuting. The influence of the different explanatory factors on commuting is generally in line with the results of previous studies. Consequently, as regards personal characteristics, elder and more educated individuals experience higher commuting times. In terms of variables related to the geographical environment, commuting is also lower for workers who reside in comparatively smaller municipalities, and the mode of transport is particularly important, with significantly longer journeys compared to the reference category (journeys by car) for those who use public modes of transport (bus, metro or tram, and train) and shorter journeys for those on foot or by bicycle. Finally, in the case of job attributes, longer commutes are not only associated to better working conditions (such as working full-time, in high-skilled occupations, and in large size companies), but also to working in certain sectors (such as the primary sector and construction) and to less stable jobs (associated with temporary contracts and lower levels of seniority).

When the nationality of the individual is considered as the only control (models 1 and 3), the results obtained in the descriptive evidence are confirmed and therefore commuting times are significantly longer among immigrants (although in the case of those from advanced countries the gap is comparatively lower and statistically significant only at 5%). However, when the full set of determinants of commuting are considered in the estimations (models 2 and 4) the coefficient associated with the immigrant variable decreases and turns out not to be statistically significant for immigrants coming from advanced countries. These findings suggest that a large part of the difference in commuting times between immigrant and native workers is explained by the differences in the average characteristics of both groups, and also that in the case of immigrants from advanced countries this factor in fact fully explains their larger commutes.

Table 1 Determinants of commuting

	(1)	(2)	(3)	(4)
Immigrant	5.056	2.313	–	–
	(0.396)***	(0.374)***		
Immigrant from advanced countries	–	–	2.601	0.121
			(1.119)**	(0.984)
Immigrant from emerging countries	–	–	5.371	2.628
			(0.419)***	(0.396)***
Woman	–	− 0.353	–	− 0.346
		(0.254)		(0.254)
Age	–	0.099	–	0.100
		(0.014)***		(0.014)***
Secondary education	–	− 0.211	–	− 0.204
		(0.322)		(0.322)
University education	–	0.752	–	0.766
		(0.434)*		(0.434)*
Lives with a partner	–	− 0.126	–	− 0.125
		(0.283)		(0.283)
Presence of children under 15 years	–	0.530	–	0.524
		(0.258)**		(0.258)**
Housework time	–	− 0.008	–	− 0.008
		(0.001)***		(0.001)***
Household income	–	0.000	––	0.000
		(0.000)		(0.000)
Municipality size 10,000–50,000	–	− 0.243	–	− 0.256
		(0.331)		(0.331)
Municipality size 50,000–100,000	–	0.489	–	0.490
		(0.399)		(0.399)
Municipality size 100,000–1 million	–	0.868	–	0.846
		(0.331)***		(0.331)**
Municipality size > 1 million	–	0.094	–	0.075
		(0.537)		(0.537)
Population density	–	− 0.000	–	− 0.000
		(0.000)		(0.000)
Mean of transport: motorbike	–	− 5.767	–	− 5.744
		(0.638)***		(0.638)***
Mean of transport: taxi	–	0.016	–	− 0.009
		(3.203)		(3.203)
Mean of transport: bus	–	13.654	–	13.643
		(0.427)***		(0.427)***
Mean of transport: metro or tram	–	12.790	–	12.768
		(0.580)***		(0.580)***
Mean of transport: train	–	26.658	–	26.620
		(0.741)***		(0.741)***
Mean of transport: bike	–	− 7.944	–	− 7.980
		(1.079)***		(1.079)***

Table 1 (continued)

	(1)	(2)	(3)	(4)
Mode of transport: walking	–	− 10.227	–	− 10.232
		(0.300)***		(0.300)***
Mean of transport: other	–	− 4.614	–	− 4.632
		(0.763)***		(0.763)***
Full-time	–	0.739	–	0.730
		(0.328)**		(0.328)**
Continuous working day	–	0.527	–	0.528
		(0.237)**		(0.237)**
Permanent contract	–	− 1.991	–	− 1.978
		(0.276)***		(0.276)***
Seniority	–	− 0.093	–	− 0.093
		(0.015)***		(0.015)***
Semi-skilled occupation	–	0.094	–	0.120
		(0.346)		(0.347)
Skilled occupation	–	2.003	–	2.055
		(0.425)***		(0.425)***
Firm size 10–249	–	1.020	–	1.043
		(0.323)***		(0.323)***
Firm size 250 or more	–	3.293	–	3.327
		(0.292)***		(0.292)***
Private sector	–	0.350	–	0.362
		(0.288)		(0.288)
Industry	–	− 4.911	–	− 4.890
		(0.691)***		(0.691)***
Construction	–	3.184	–	3.201
		(0.710)***		(0.710)***
Services	–	− 3.587	–	− 3.566
		(0.658)***		(0.658)***
Constant	21.933	20.977	21.933	20.896
	(0.129)***	(1.012)***	(0.129)***	(1.012)***
R^2	0.01	0.24	0.01	0.24
N	25,957	25,957	25,957	25,957

*$p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

The standard errors of the variables are robust. Fixed effects have been included per year and per region. As reference categories, primary education has been taken for the educational level; no presence of a partner and children under 15 years of age in variables related to the composition of the household; municipalities with less than 10,000 inhabitants for the size of the municipality; the use of cars for the mode of transport; part-time, split working day and temporary contract for these characteristics of the jobs; unskilled occupations for the occupation; company size of less than 10 workers for the size of the company; public sector for the type of sector and primary sector for the sector of activity

The use of econometric decompositions permits a much deeper examination of this point, given that it provides a quantification of the exact influence that arises from differences in the relative characteristics of both groups (as well of the specific impact of each explanatory factor). Therefore, Table 2 shows the results of applying the Oaxaca-Blinder

decomposition technique according to Eq. (2) with a complete specification of the model that considers the aforementioned wide set of explanatory variables related to personal, territorial, mode of transport, and labour characteristics (in addition to fixed effects per year). The table reports the magnitude of the average raw differential in commuting times, as well as the two components on the right side of Eq. (2), namely the part that arises from differences in characteristics between groups (characteristics component) and the unexplained part (returns component), as well as the detailed results of the former term by each individual explanatory variable. A positive value of these components indicates that it is an element that causes longer commuting times for immigrants. Apart from the general case, the analysis has been carried out separately for the two sub-groups of immigrants according to their types of countries of origin.

Along with the evidence reported in Table 2, the unadjusted difference in commuting length between immigrants and natives (5.06 min) is explained both by their different characteristics (2.74 min) and by unobserved elements (2.31 min), both components being statistically significant at conventional levels. These findings imply in particular that even when immigrants have the same characteristics as native workers their commuting times are 2.31 min longer on average, confirming the presence of an immigrant penalty in commuting. Yet, this penalty exists only for immigrants from emerging countries, given that in the case of those from advanced countries their longer commutes are fully explained by their different relative characteristics, so that the unexplained component of the decomposition is not statistically significant.

The lower part of Table 2 contains the detailed contribution of each individual explanatory factor to the characteristics component of the gap in commuting time. The main individual explanatory factor is related to differences in transportation modes, which accounts for around 1.9 min (or 40% of the unadjusted difference). Other elements that also contribute significantly to the longer commutes of immigrants include their regional distribution, holding less stable jobs (with more fixed-term contracts and lower seniority), and their sectoral segregation. On the contrary, certain immigrant characteristics, such as their lower age and educational levels and their higher presence in low-skilled occupations and small firms act in the opposite way and contribute to lower their relative commuting times.

The evidence is overall very similar when carrying out the separate analysis for immigrants from advanced countries and emerging countries (second and third columns of Table 2), with a similar magnitude of the characteristics component. Yet, in the former case this is the result of the fact that the higher similarity of their relative characteristics when compared to natives in terms of educational levels and occupational and firm-size distributions is counteracted by a lower influence on their relative commuting of elements such as the regional distribution, the transport mode, the type of contract, seniority in the firm, firm size, and the sector of activity.

The final step in this part of the analysis consists of examining in a disaggregated way the commuting patterns of various categories of immigrants in order to contrast whether there is heterogeneity in the commuting penalty observed for immigrants. In this vein, Table 3 contains the results of applying the Oaxaca-Blinder decomposition to different subgroups of immigrants, according to gender, educational level (distinguishing between higher education and other levels of education), type of occupation (skilled versus semi- and unskilled occupations), size of municipality (3 size strata are considered), and

Table 2 Decomposition of the differences in the duration of commuting between natives and immigrants. Oaxaca–Blinder technique

		Total	Immigrant from advanced countries	Immigrant from emerging countries
Total	Immigrants	26.989	24.533	27.304
		(0.525)***	(1.230)***	(0.563)***
	Natives	21.933	21.933	21.933
		(0.161)***	(0.161)***	(0.161)***
	Difference	5.056	2.601	5.371
		(0.549)***	(1.240)**	(0.585)***
	Characteristics	2.743	2.433	2.781
		(0.306)***	(0.622)***	(0.331)***
	Coefficients	2.313	0.167	2.591
		(0.514)***	(1.155)	(0.548)***
Characteristics	Gender	− 0.000	− 0.012	0.001
		(0.004)	(0.016)	(0.003)
	Age	− 0.402	− 0.286	− 0.420
		(0.078)***	(0.079)***	(0.081)***
	Education level	− 0.075	0.127	− 0.110
		(0.035)**	(0.084)	(0.048)**
	Type of home	0.001	− 0.005	0.001
		(0.002)	(0.012)	(0.004)
	Children under 15 years	0.040	0.032	0.036
		(0.026)	(0.026)	(0.026)
	Housework time	− 0.015	0.064	− 0.026
		(0.015)	(0.040)	(0.017)
	Household income	− 0.027	0.003	− 0.024
		(0.066)	(0.018)	(0.076)
	Municipality size	− 0.024	− 0.048	− 0.019
		(0.068)	(0.069)	(0.070)
	Population density	0.003	0.020	0.001
		(0.004)	(0.019)	(0.004)
	Region	0.758	0.515	0.791
		(0.102)***	(0.205)**	(0.108)***
	Transport mean	1.931	0.889	2.071
		(0.212)***	(0.478)*	(0.229)***
	Full/Part time	− 0.011	0.006	− 0.013
		(0.008)	(0.013)	(0.010)
	Continuous/shift working day	− 0.024	− 0.011	− 0.024
		(0.015)	(0.015)	(0.016)
	Contract	0.382	0.136	0.419
		(0.079)***	(0.059)**	(0.086)***
	Seniority	0.623	0.458	0.634
		(0.122)***	(0.100)***	(0.127)***
	Occupation	− 0.459	0.126	− 0.523
		(0.112)***	(0.064)**	(0.130)***
	Firm size	− 0.710	− 0.025	− 0.812

Table 2 (continued)

		Total	Immigrant from advanced countries	Immigrant from emerging countries
		(0.084)***	(0.082)	(0.095)***
	Public/Private sector	0.063	0.040	0.068
		(0.068)	(0.051)	(0.071)
	Sector of activity	0.647	0.243	0.703
		(0.079)***	(0.129)*	(0.086)***
N		25,957	23,542	25,667

*$p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

distinguishing between the region of Madrid and the rest of Spain. Due to restrictions in the sample size, the analysis is limited in this case to immigrants from emerging countries.

The results of this disaggregated analysis show that the commuting penalty tends to be rather homogenous in general, with unexplained components that are positive and significant for all subgroups, irrelevant of gender, level of education or type of occupation.[9] Yet, the penalty is much more higher in the case of immigrants residing in large municipalities, with more than 1 million inhabitants (i.e. the cities of Madrid and Barcelona), where the penalty is of 5.3 min (in this case the unadjusted difference is 9.4 min, what almost doubles the general case, and the average commuting for immigrants is around 40 min). Similarly, it is much higher for immigrants living in the region of Madrid (5.2 min, with unadjusted differences of 8.5 min, and an average commuting also around 40 min) than in the rest of Spain (2, 2.8, and 22 min, respectively). Very interestingly, these findings imply that most of previous studies on the commuting of immigrants, which are mainly focused on specific highly populated metropolitan areas or regions could offer a partial picture on the overall magnitude and nature of the commuting penalty of immigrants.

Satisfaction

Prior evidence has shown that a large part of the higher commuting of immigrants in Spain cannot be accounted for by their characteristics, revealing a penalty in commuting, at least in the case of most of the immigrants, those coming from emerging countries. As previously noted, among the various potential explanations for the commuting penalty are the residential segregation of immigrants associated with their tendency to locate in ethnic enclaves, the presence of discrimination in the labour and housing markets, or a potential greater tolerance for longer commutes. In this vein, the final part of the empirical analysis tests whether immigrants have a higher tolerance towards commuting. To this end, the impact of commuting time on individual wellbeing in different life domains is explored by estimating Eq. (3) through an ordered logit model and using satisfaction with job, personal life, leisure time and housing as dependent variables. For a question of space, Table 4 includes information only for a subset of

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[9] The penalty is yet slightly lower for immigrant women (1.9 min, compared with 3 for immigrant men), which suggests that immigrant females may also be subject to the specific constraints that restrict the commuting of women due to issues such as their greater family responsibilities (Giménez-Nadal and Molina 2016; Hanson and Johnston 1985; Wheatley 2013; Blau et al. 2020).

Table 3 Decomposition of the differences in the duration of commuting between natives and immigrants from emerging countries. Oaxaca-Blinder–technique. Disaggregated analysis

	Total	Males	Females	Less than tertiary education	Tertiary education	Semi-skilled and unskilled occupations	Skilled occupations	Municipality <50.000	Municipality 50.000–1.000.000	Municipality >1.000.000	Region of Madrid	Rest of Spain
Immigrants	27.304	28.191	26.178	26.682	29.442	26.989	30.076	21.582	27.067	40.628	40.689	22.890
	(0.563)***	(0.760)***	(0.795)***	(0.625)***	(1.207)***	(0.603)***	(1.507)***	(0.717)***	(0.804)***	(1.764)***	(1.537)***	(0.516)***
Natives	21.933	22.158	21.651	20.742	23.726	20.675	24.040	19.791	22.375	31.208	32.195	20.092
	(0.161)***	(0.227)***	(0.222)***	(0.204)***	(0.257)***	(0.201)***	(0.261)***	(0.233)***	(0.241)***	(0.493)***	(0.505)***	(0.165)***
Difference	5.371	6.033	4.528	5.940	5.716	6.314	6.036	1.792	4.692	9.420	8.494	2.797
	(0.585)***	(0.793)***	(0.826)***	(0.657)***	(1.234)***	(0.636)***	(1.530)***	(0.754)**	(0.840)***	(1.832)***	(1.618)***	(0.541)***
Characteristics	2.781	3.036	2.626	3.256	2.745	4.058	3.437	0.052	2.206	4.096	3.274	0.754
	(0.331)***	(0.440)***	(0.519)***	(0.376)***	(0.710)***	(0.363)***	(0.843)***	(0.439)	(0.478)***	(0.987)***	(1.002)***	(0.284)***
Coefficients	2.591	2.997	1.902	2.684	2.970	2.257	2.599	1.740	2.486	5.324	5.220	2.044
	(0.548)***	(0.756)***	(0.738)***	(0.626)***	(1.095)***	(0.600)***	(1.250)**	(0.755)**	(0.775)***	(1.785)***	(1.555)***	(0.528)***
N	25,667	14,371	11,296	16,005	9,662	16,867	8,800	12,003	11,554	2,110	2,796	22,871

$*p<0.1; **p<0.05; ***p<0.01$

Table 4 Determinants of satisfaction

	Job	Personal life	Leisure time	Housing
Commuting	− 0.005	− 0.004	− 0.008	− 0.005
	(0.001)***	(0.001)***	(0.001)***	(0.001)***
Immigrant from advanced countries	− 0.157	0.096	− 0.285	− 0.175
	(0.203)	(0.237)	(0.211)	(0.204)
Immigrant from emerging countries	− 0.022	− 0.641	− 0.243	− 0.727
	(0.091)	(0.086)***	(0.094)***	(0.090)***
Immigrant from advanced countries*Commuting	− 0.002	− 0.006	− 0.002	0.000
	(0.007)	(0.010)	(0.006)	(0.006)
Immigrant from emerging countries*Commuting	0.001	0.001	0.001	− 0.002
	(0.002)	(0.002)	(0.003)	(0.002)
N	25,957	25,957	19,663	25,957

$*p < 0.1$; $** p < 0.05$; $*** p < 0.01$

The standard errors of the variables are robust. Fixed effects have been included per year and per region. The satisfaction variable with leisure time is available just from the 2008 wave of the SQLW

dependent variables, including commuting time, the immigrant status (distinguishing between those from advanced and emerging countries) and the main variable of interest in this part of the analysis, the interaction of both variables (full estimation results can be found in Table 6 in the Appendix). The rest of the explanatory variables that have been considered as controls include in every case the same personal, regional and mode of transport explanatory variables as in the previous part of the analysis (and fixed effects of year), while the model regarding job satisfaction also includes objective attributes of jobs and subjective valuations (namely over-education, perceived level of routine and physical effort in the workplace, perceived level of danger/risk at work and the valuation of safety and health at work) that the literature has shown to significantly influence job satisfaction (see e.g. Simón et al. 2020).

These results confirm both that a longer commuting is associated to lower levels of satisfaction for employees in all domains of life and that satisfaction tends to be general comparatively lower for immigrants (although just for those from emerging economies), which is overall in coherence with previous evidence in the literature (Kifle et al. 2016; Cheng et al. 2014; Gamero 2010; Simón et al. 2020). Yet, it does not support a hypothetical higher tolerance toward longer commuting times among immigrant workers, given that the coefficient of the interaction of the commuting and immigrant variables is not statistically significant in any case (Blázquez et al. 2010; Newbold et al. 2015; Liu 2009).

Conclusions

This research examines differences in the duration of commuting to work between the immigrant and native population in Spain, a relevant issue since immigrants' longer commuting may reflect, among other factors, an imperfect spatial matching of their labour supply and demand with negative implications for their relative labour outcomes and their

individual well-being. The study contributes to an under-researched line of research that, in contrast with the intense overall attention paid in the literature to the relative situation of immigrants in host countries, has been little explored, with a reduced number of studies that with a few exceptions (Hu 2017; Hu et al. 2019) mostly cover specific territories (Preston et al. 1998; Beckman and Goulias 2008; Newbold et al. 2015; Blázquez et al. 2010) or sub-groups of workers (Liu 2009; Hu 2017). In contrast to many of these works, our empirical analysis is based on microdata from a nation-wide representative survey, whose richness of information permits taking into account properly how different personal, geographical, mode of transport and job characteristics highlighted by the literature as determinants of the commuting can affect the relative commuting times of immigrants. The novel use in this field of study of decomposition econometric techniques allows quantifying the joint and individual effect in the commuting gap of explanatory factors and eventually isolating mobility patterns for observationally similar natives and immigrants. Furthermore, the research focuses on the potential heterogeneity within immigrants by considering separately those coming from advanced countries and emerging countries, a factor frequently neglected in previous studies on the topic, and a plausibly relevant question given the abundant evidence on the heterogeneity of labour performance of immigrants according to the level of development of their areas of origin. Finally, the article also explores whether immigrants' commuting penalty could be associated to a hypothetical lower effect of commuting time on their satisfaction levels in different domains of life.

The evidence obtained confirms that, in line with previous results in the literature (Preston et al. 1998; Blázquez et al. 2010; Liu 2009; Hu et al. 2019), immigrants in Spain have significantly longer unadjusted commutes compared to native workers, especially in the case of those from emerging countries. The use of decomposition techniques allows us to confirm that a significant part of the unadjusted differences in commuting length between immigrants and natives are due to their different observed characteristics. Although other elements such as their regional distribution and their sectoral segregation also contribute significantly to the longer commutes of immigrants, transportation modes have a very influential effect in this vein, which is consistent with the important differences in the mode of transport used by immigrants and natives (Kim 2009; Heisz and Schellenberg 2004; Tal and Handy 2010; Blumenberg 2008; Bohon et al. 2008; Newbold et al. 2015; Hu 2017).

Yet, according to the results of the decomposition analysis longer commutes are also explained in a significant manner by unobserved elements, which confirms the presence of different patterns in mobility for observationally similar natives and immigrants and, hence, the immigrant penalty in commuting found in previous studies (Preston et al. 1998; Blázquez et al. 2010; Liu 2009; Hu et al. 2019). It is important to note, however, that this penalty apparently exists only for immigrants from emerging countries, given that in the case of those from advanced countries their longer commutes are fully explained by their different relative characteristics.

The results of a disaggregated analysis for immigrants from emerging countries show in turn that the commuting penalty for immigrants tends to be rather homogenous along different socioeconomic lines, which suggests transversal potential explanatory elements for all types of immigrants regardless of their gender, education or type of job, a question that should be tested in future research. Yet, the commuting penalty experienced by immigrants is on the contrary much higher in highly populated areas, such as the very large municipalities of Madrid and Barcelona or the whole region of Madrid. This finding is relevant insofar as it suggests that previous studies on the topic, which tend to be focused mostly on these types of highly populated environments (Preston et al. 1998; Beckman and Goulias

2008; Newbold et al. 2015; Blázquez et al. 2010), tend to overestimate the commuting penalty of immigrants and, hence, could offer a biased perspective on the phenomenon.

In many of the previous studies on the topic, the commuting penalty of immigrants is solely attributed to a phenomenon of involuntary spatial entrapment in areas that restrict their labour opportunities, without providing direct evidence of the presence of this spatial mismatch. However, the commuting penalty could be due to a combination of elements such as their preference for locating in ethnic enclaves (Carlson and Theodore 1997; Shen 2000; Pareja-Eastaway 2009; and Echazarra 2010), the presence of discrimination phenomena in the labour and housing markets that reduce their ability to choose in terms of spatial location (Bertrand and Mullainathan 2004; Silberman et al 2007; Drydakis and Vlassis 2010; Bosch et al. 2010, 2015; Bengtsson et al. 2012), as well as to a greater tolerance of this group towards commuting (Chatman and Klein 2013; Landesmann and Leitner 2020; Chatman 2014). The results achieved in our empirical analysis contribute to increase our knowledge on this matter, since they do not support the last of these hypotheses, according to which the unexplained differences in commuting times between immigrants and natives are due to contrasting attitudes towards this phenomenon.

In any case, the origin of immigrants' commuting penalty must continue to be investigated in the future. Analysing commuting constitutes a central element of transport and infrastructure policies, and understanding and modelling commuting patterns and worker location decisions is a major concern for urban planners and policymakers aiming to reduce it. Thus, in the case that the origin of immigrants' commuting penalty is residential segregation derived from their preference to voluntarily reside in ethnic enclaves, and given the strong explanatory capacity of modes of transport in immigrants' relative commuting patterns, improving their access to cars could be an effective measure (which could not be adopted without a broader assessment incorporating aspects related to its social cost in environmental terms), as well as improving the efficiency of public transportation in order to reduce commuting times. Alternatively, if the commuting penalty has an essentially involuntary origin, deriving from discriminatory practices against this group in the housing and labour markets, policies aimed at offering solutions to the spatial segregation of immigrants could be effective by acting on these mechanisms to expand their access to employment and housing and therefore bringing their places of residence and work closer together.

Appendix

See Tables 5 and 6.

Table 5 Descriptive of the variables

	Natives		Immigrants		Immigrant from advanced countries		Immigrant from emerging countries	
	Average	Standard deviation	Average	Standard deviation	Average	Standard deviation	Average	Standard deviation
Commuting time (minutes)	21.93	19.16	26.99	23.27	24.53	18.75	27.30	23.78
Commuting greater than 45 min	0.09	0.28	0.15	0.35	0.12	0.33	0.15	0.36
Job satisfaction	7.31	1.71	6.93	1.93	7.09	1.85	6.91	1.94
Satisfaction with personal life	7.63	1.78	6.96	2.08	7.57	1.93	6.89	2.09
Satisfaction with leisure time	6.38	2.47	6.03	2.49	5.91	2.36	6.04	2.50
Satisfaction with housing	7.85	1.66	7.00	2.05	7.67	1.75	6.91	2.07
Man	0.56	0.50	0.56	0.50	0.53	0.50	0.56	0.50
Woman	0.44	0.50	0.44	0.50	0.47	0.50	0.44	0.50
Age	39.50	11.11	35.46	8.99	36.51	9.46	35.32	8.93
Primary education	0.17	0.37	0.18	0.39	0.05	0.23	0.20	0.40
Secondary education	0.55	0.50	0.62	0.49	0.52	0.50	0.63	0.48
University education	0.28	0.45	0.20	0.40	0.42	0.49	0.17	0.38
Lives with a partner	0.66	0.47	0.66	0.48	0.69	0.46	0.65	0.48
Lives without a partner	0.34	0.47	0.34	0.48	0.31	0.46	0.35	0.48
Presence of children under 15 years	0.35	0.48	0.42	0.49	0.41	0.49	0.42	0.49
No presence of children under 15 years	0.65	0.48	0.58	0.49	0.59	0.49	0.58	0.49
Housework time (min)	103.45	82.13	105.22	83.60	95.62	75.36	106.45	84.53
Household income	2199.21	1219.56	1764.54	1027.75	2313.58	1549.08	1694.09	917.18
Andalusia	0.16	0.37	0.09	0.28	0.09	0.29	0.09	0.28
Aragon	0.03	0.17	0.03	0.17	0.03	0.17	0.03	0.17
Asturias	0.02	0.15	0.01	0.10	0.02	0.15	0.01	0.10
Balearic Islands	0.02	0.15	0.04	0.18	0.06	0.24	0.03	0.17
Canary Islands	0.04	0.20	0.05	0.22	0.08	0.28	0.05	0.22
Cantabria	0.01	0.11	0.01	0.08	0.01	0.11	0.01	0.08
Castilla y Leon	0.05	0.21	0.05	0.22	0.01	0.12	0.06	0.23

Table 5 (continued)

	Natives		Immigrants		Immigrant from advanced countries		Immigrant from emerging countries	
	Average	Standard deviation	Average	Standard deviation	Average	Standard deviation	Average	Standard deviation
Castilla-La Mancha	0.05	0.21	0.03	0.16	0.06	0.24	0.02	0.14
Catalonia	0.17	0.37	0.23	0.42	0.15	0.36	0.24	0.43
Valencia	0.11	0.31	0.11	0.31	0.10	0.30	0.11	0.31
Extremadura	0.02	0.15	0.00	0.07	0.01	0.09	0.00	0.06
Galicia	0.06	0.24	0.02	0.15	0.07	0.26	0.02	0.13
Madrid	0.15	0.36	0.24	0.43	0.22	0.41	0.25	0.43
Murcia	0.03	0.17	0.05	0.21	0.02	0.15	0.05	0.22
Navarre	0.01	0.12	0.02	0.13	0.01	0.09	0.02	0.13
Basque country	0.05	0.23	0.02	0.15	0.03	0.18	0.02	0.15
La Rioja	0.01	0.08	0.01	0.08	0.01	0.07	0.01	0.08
Municipality of less than 10,000	0.19	0.39	0.13	0.34	0.16	0.37	0.13	0.33
Municipality of 10,000 to 50,000	0.27	0.45	0.27	0.45	0.26	0.44	0.27	0.45
Municipality of 50,000 to 100,000	0.13	0.34	0.14	0.35	0.20	0.40	0.13	0.34
Municipality of 100,000 to one million	0.32	0.47	0.28	0.45	0.23	0.42	0.29	0.45
Municipality more than one million	0.09	0.28	0.18	0.38	0.15	0.36	0.18	0.38
Density	1768.77	3002.76	1724.23	3055.80	1510.41	2994.99	1751.67	3063.08
Mean of transport: public	0.13	0.34	0.27	0.45	0.20	0.40	0.28	0.45
Mean of transport: private	0.67	0.47	0.50	0.50	0.61	0.49	0.49	0.50
Mean of transport: walking or other	0.20	0.40	0.23	0.42	0.19	0.39	0.23	0.42
Mean of transport: car	0.63	0.48	0.45	0.50	0.56	0.50	0.44	0.50
Mean of transport: motorbike	0.03	0.17	0.03	0.16	0.05	0.22	0.03	0.16
Mean of transport: taxi	0.00	0.03	0.00	0.02	0.00	0.00	0.00	0.03
Mean of transport: bus	0.07	0.26	0.12	0.33	0.10	0.30	0.13	0.33

Table 5 (continued)

	Natives		Immigrants		Immigrant from advanced countries		Immigrant from emerging countries	
	Average	Standard deviation	Average	Standard deviation	Average	Standard deviation	Average	Standard deviation
Mean of transport: metro or tram	0.04	0.19	0.11	0.31	0.08	0.27	0.11	0.31
Mean of transport: train	0.02	0.14	0.04	0.21	0.02	0.15	0.05	0.21
Mean of transport: bike	0.01	0.09	0.02	0.15	0.01	0.09	0.02	0.15
Mean of transport: walking	0.18	0.38	0.20	0.40	0.17	0.38	0.20	0.40
Mean of transport: other	0.02	0.14	0.03	0.17	0.02	0.12	0.03	0.17
Year 2007	0.26	0.44	0.29	0.45	0.40	0.49	0.28	0.45
Year 2008	0.27	0.44	0.25	0.43	0.19	0.39	0.26	0.44
Year 2009	0.24	0.43	0.23	0.42	0.17	0.38	0.23	0.42
Year 2010	0.24	0.42	0.23	0.42	0.24	0.43	0.23	0.42
Full-time	0.86	0.35	0.84	0.36	0.87	0.34	0.84	0.37
Part-time	0.14	0.35	0.16	0.36	0.13	0.34	0.16	0.37
Continuous working day	0.58	0.49	0.54	0.50	0.56	0.50	0.54	0.50
Split working day	0.42	0.49	0.46	0.50	0.44	0.50	0.46	0.50
Permanent contract	0.77	0.42	0.58	0.49	0.69	0.46	0.56	0.50
Temporary contract	0.23	0.42	0.42	0.49	0.31	0.46	0.44	0.50
Seniority	9.75	10.04	3.04	4.16	4.77	6.76	2.82	3.64
Unskilled occupation	0.11	0.32	0.25	0.44	0.10	0.30	0.27	0.45
Semi-skilled occupation	0.51	0.50	0.61	0.49	0.46	0.50	0.62	0.48
Skilled occupation	0.37	0.48	0.14	0.35	0.44	0.50	0.10	0.30
Firm size 9 or less	0.21	0.41	0.40	0.49	0.19	0.40	0.43	0.49
Firm size 10–249	0.21	0.41	0.26	0.44	0.25	0.43	0.26	0.44
Firm size 250 or more	0.57	0.49	0.34	0.47	0.55	0.50	0.31	0.46
Public sector	0.26	0.44	0.08	0.27	0.13	0.34	0.07	0.26

Table 5 (continued)

	Natives		Immigrants		Immigrant from advanced countries		Immigrant from emerging countries	
	Average	Standard deviation	Average	Standard deviation	Average	Standard deviation	Average	Standard deviation
Private sector	0.74	0.44	0.92	0.27	0.87	0.34	0.93	0.26
Primary sector	0.03	0.16	0.07	0.25	0.04	0.19	0.07	0.26
Industry	0.17	0.38	0.12	0.33	0.13	0.34	0.12	0.33
Construction	0.09	0.29	0.16	0.36	0.12	0.32	0.16	0.37
Services	0.70	0.46	0.65	0.48	0.71	0.45	0.64	0.48
Over-educated	0.18	0.38	0.34	0.47	0.24	0.43	0.35	0.48
Level of routine at workplace	4.94	3.10	4.99	3.10	4.67	3.23	5.04	3.08
Level of physical effort at workplace	4.44	3.21	5.34	3.24	4.04	3.44	5.50	3.17
Danger/perceived risk at workplace	3.54	3.21	3.53	3.27	2.91	3.16	3.61	3.28
Valuation of safety and health at work	7.30	2.18	7.16	2.29	7.63	1.94	7.09	2.33
Number of observations	23,252		2,705		290		2,415	

Table 6 Determinants of the satisfaction of Spanish employees

	Job	Personal life	Leisure time	Housing
Commuting	− 0.005	− 0.004	− 0.008	− 0.005
	(0.001)***	(0.001)***	(0.001)***	(0.001)***
Immigrant from advanced countries	− 0.157	0.096	− 0.285	− 0.175
	(0.203)	(0.237)	(0.211)	(0.204)
Immigrant from emerging countries	− 0.022	− 0.641	− 0.243	− 0.727
	(0.091)	(0.086)***	(0.094)***	(0.090)***
Immigrant from advanced countries*Commuting	− 0.002	− 0.006	− 0.002	0.000
	(0.007)	(0.010)	(0.006)	(0.006)
Immigrant from emerging countries*Commuting	0.001	0.001	0.001	− 0.002
	(0.002)	(0.002)	(0.003)	(0.002)
Women	0.051	− 0.085	− 0.343	0.023
	(0.036)	(0.034)**	(0.039)***	(0.034)
Age	− 0.000	− 0.014	0.006	− 0.003
	(0.002)	(0.002)***	(0.002)***	(0.002)*
Secondary education	0.026	0.035	− 0.069	0.160
	(0.047)	(0.048)	(0.050)	(0.047)***
University education	− 0.035	0.106	0.037	0.095
	(0.062)	(0.054)**	(0.059)	(0.053)*
Lives with a partner	0.024	0.580	− 0.056	0.162
	(0.039)	(0.040)***	(0.045)	(0.040)***
Presence of children under 15 years	− 0.033	− 0.161	− 0.279	− 0.058
	(0.034)	(0.034)***	(0.038)***	(0.034)*
Housework time	0.000	0.000	0.000	0.000
	(0.000)**	(0.000)	(0.000)*	(0.000)**
Household income	0.000	0.000	− 0.000	0.000
	(0.000)***	(0.000)***	(0.000)	(0.000)***
Municipality of 10,000 to 50,000	− 0.066	0.001	− 0.023	− 0.016
	(0.045)	(0.044)	(0.049)	(0.045)
Municipality of 50,000 to 100,000	− 0.164	− 0.047	− 0.152	− 0.108
	(0.057)***	(0.058)	(0.066)**	(0.057)*
Municipality of 100,000 to one million	− 0.154	− 0.011	− 0.092	− 0.152
	(0.044)***	(0.044)	(0.049)*	(0.044)***
Municipality more than one million	− 0.333	− 0.257	− 0.303	− 0.477
	(0.069)***	(0.069)***	(0.079)***	(0.071)***
Density	0.000	− 0.000	− 0.000	− 0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Mean of transport: private	− 0.001	− 0.005	− 0.049	0.076
	(0.048)	(0.048)	(0.055)	(0.048)
Mean of transport: walking or other	0.012	0.052	− 0.027	0.073
	(0.057)	(0.056)	(0.064)	(0.057)
Full-time	0.119	–	–	–
	(0.049)**			
Continuous working day	0.007	–	–	–
	(0.032)			

Table 6 (continued)

	Job	Personal life	Leisure time	Housing
Permanent contract	0.322	–	–	–
	(0.040)***			
Seniority	− 0.006	–	–	–
	(0.002)***			
Semi-skilled occupation	0.061	–	–	–
	(0.054)			
Skilled occupation	0.098	–	–	–
	(0.064)			
Firm size 10–249	− 0.097	–	–	–
	(0.047)**			
Firm size 250 or more	− 0.041	–	–	–
	(0.043)			
Private sector	− 0.308	–	–	–
	(0.039)***			
Industry	0.453	–	–	–
	(0.107)***			
Construction	0.453	–	–	–
	(0.109)***			
Services	0.551	–	–	–
	(0.104)***			
Over-educated	− 0.839	–	–	–
	(0.040)***			
Level of routine at workplace	− 0.109	–	–	–
	(0.005)***			
Level of physical effort at workplace	− 0.012	–	–	–
	(0.006)**			
Danger/perceived risk at workplace	− 0.017	–	–	–
	(0.006)***			
Valuation of safety and health at workplace	0.359	–	–	–
	(0.010)***			
Constant	5.155	1.524	1.823	1.873
	(0.191)***	(0.117)***	(0.136)***	(0.116)***
N	25,957	25,957	19,663	25,957

$* p<0.1$; $** p<0.05$; $*** p<0.01$

The standard errors of the variables are robust. Fixed effects have been included per year and per region. The satisfaction variable with free time is available just from the 2008 wave of the SQLW

Declarations

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

Availability of data Ministry of Labour, Spain, http://www.mitramiss.gob.es/estadisticas/Ecvt/welcome.htm.

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