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**Socioeconomic Integration through
Language: Evidence from the European
Union**

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Socioeconomic Integration through Language: Evidence from the European Union

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Abstract In this paper, I explore the role of language for a sustainable socioeconomic integration of migrants in the European Union. Building upon insights concerning the emergence of *shared mental models* through social learning mechanisms, I argue that language is substantial, not only for simple communication, but also to effectively transmit and decrypt expectations, opinions and ideas. This is of considerable importance for integration processes, since shared mental models enables a common interpretation of reality, which facilitates any further social interaction. This works all the more smoothly if individuals originate from the same sociocultural background and share a common language. If not, as in case of migration, immigrants as well as natives face several issues. Some of this I demonstrate empirically with data from the *European Union Labour Force Survey*. I show that for first-generation male and female migrants within the EU, language problems significantly reduce the probability to be in paid work. Additionally, they increase the probability to be overqualified.

Keywords Shared mental models · Language skills · Migrants · Labour market participation · Overqualification

JEL Classification C36 · J15 · Z13

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1 Introduction

Through the act of social and economic integration, immigrants get involved in sociocultural learning processes which include a certain learning stress. A certain learning stress is also imposed on the native population since intercultural learning is not a one-way street but a process that goes in two directions and demands effort from both the minorities and the majority. Bilateral learning stress is the source of blockages and entails immense economic and political dangers. In order to deal with these issues, it is essential to explore how social learning occurs. In a given sociocultural environment, individuals continually communicate with other individuals while trying to solve their problems. These communication processes provide the framework for a common interpretation of reality and give rise to collective solutions to problems arising in a society. The importance of this social learning process is obvious: A common interpretation of reality is the foundation of any further social interaction (Mantzavinos et al. 2004). Especially language as a tool of communication for social learning mechanisms plays a substantial role. There are multiple channels through which the linguistic “distance” between a migrant’s native language and that of the destination country affects social and economic integration. Better local language skills are associated with greater return to human capital, better job matches and better professional development (Dustmann and van Soest 2002). It also helps refugees navigate local institutions and understand their rights to employment and social welfare programs. Above all, better local language proficiency should foster intercultural learning, which is a requirement for cross-cultural cooperation of all kind.

In the theoretical part of the paper, I work out in detail how informal institutions respectively group-specific ideologies, ideas, dogmas, social norms, etc. occur. As Mantzavinos et al. (2004) argue: “*The emergence of informal institutions is a process of innovation and imitation that takes place in a social group that is learning collectively*” (p. 7). A deeper understanding of this evolutionary process is necessary to explore what factors are essential for sustainable socioeconomic integration. I argue that language as a communication tool and an instrument of thought (Asoulin 2016) within social learning processes is essential. This, I verify thereupon in the empirical part of the paper with data from the *European Union Labour Force Survey (EU-LFS)*, by showing the consequences of language proficiency for migrants. More specifically, the consequences for labour market participation as well as for job matches for both male and female first-generation immigrants in the European Union. At this point it should be mentioned that language skills are considered here not only as human capital, as it is common in the conventional economic literature, but also as an essential factor to effectively communicate expectations, opinions and ideas. In addition, to account for possible endogeneity problems that stem from unobserved heterogeneity and reverse causality, I apply an instrumental variables approach. On the one side, language skills and labour market outcomes may be correlated through unobserved characteristics like cognitive and non-cognitive skills, which could lead to biased and inconsistent

parameter estimates. On the other side, reverse causality may arise because increasing labour market experience very likely improve language skills.

In summary, this paper asks for the role of language within socioeconomic integration processes of male and female migrants in the European Union and proposes a theoretical framework as well as uses different econometric strategies to identify it.

The work contributes to the pertinent literature in three ways. First, it complements the predominantly empirical literature with a sound theoretical basis. For this, I mainly follow the approaches of Mantzavinos et al. (2004) and Denzau and North (1994) on the emergence of informal institutions, supplemented by remarks concerning the importance of language for social learning processes. Second, it introduces to the related literature, which mainly focuses on the effects of language for earnings and active employment, overqualification as a new socioeconomic integration indicator. Third, an aggregated dataset on most of the 27 EU countries is applied, which enables to draw some general policy implications for the whole European Union.

The paper unfolds as follows. *Section 2* summarizes related previous studies. *Section 3* discusses a heuristic approach of social learning processes. *Section 4* introduces the data set and shows some descriptive statistics. *Section 5* describes the econometric strategies and presents the estimation outputs. Finally, *Section 6* concludes and gives some policy suggestions.

2 Related Literature

The importance of the institutional setting of an economy for socioeconomic development was repeatedly emphasized by *New Institutional Economics*, which initially focused on the design of formal institutions (Buchanan 1975; Williamson 1985). Later, this analytical framework was expanded by North (1990), who distinguishes between formal institutions (based on written regulations and laws) and unwritten informal institutions (based on social norms, values, and conventions). I focus on the emergence of informal institutions and how they shape decisions. As Mantzavinos et al. (2004) demonstrate, informal institutions evolve out of evolutionary learning processes, which take place in social groups. In that sense, informal institutions can be considered as *Shared Mental Models* (Denzau and North 1994; Mantzavinos et al. 2004). Denzau and North (1994) show that due to lack of information and limitations in information processing capacity, social norms, values, conventions, etc., i.e. shared mental models, are used to interpret complex social circumstances and therefore, as Stein (1997) puts it, informal institutions have a significant impact on human behavior. Mental models are acquired, shared and spread through communication processes (Denzau and North 1994), for which language as a transmission tool of thought is essential. Given the case that two or more interacting individuals share the same language, the better the acquisition, division and distribution of mental models, which in turn considerably facilitates social and economic interactions.

Economists usually view language skills as a form of human capital, and since the 1980s they analyse it in the context of migration (see, e.g. Carliner 1981; McManus et al. 1983). This was mainly due to the increasing immigrant flows into the US and Canada and due to the growing interest in human capital theory (Chiswick and Miller 2015). Two strands of empirical literature in the field *Economics of Language* are relevant for the present study. The *first* one addresses the determinants of proficiency in the primary language of the destination country. Both the spouse, if married, and children are relevant. Various studies have shown that those who married after migration are the most proficient in the destination language, followed by those who are not married, and those who married their current spouse before migration (Dustmann 1994; Chiswick et al. 2005; Chiswick and Miller 2008). Children serve wittingly, or unwittingly, as “language teachers”. They learn the destination language more quickly, because of their youth and because they are directly exposed to the host country’s language in schools. Children can therefore share at home what they learn. Empirically it is shown that pupils have an ambiguous effect on language skills of their immigrant parents (Chiswick et al. 2005; Chiswick and Miller 2008). While there is no clear impact of children on their father’s language skills, in the same data, it is less positive or more negative for their mother’s skills (Chiswick and Miller 2008). While there is a positive impact of children on their father’s language skills, the effect on their mother’s skills is statistically insignificant (Dustmann 1994). The *second* relevant strand of literature investigates the consequences of language skills for labour market outcomes. Normally, the focus is on earnings because it is a key determinant of economic status and poverty. Dustmann and van Soest (2002) show for Germany, by estimating a standard earnings equation, that fluently speaking German is associated with about 5% higher earnings for males as well as for females. Studies about language effects have to deal with endogeneity issues that stem from unobserved heterogeneity and reverse causality. Chiswick and Miller (1995) were the first who applied an instrumental variable approach to account for such problems. They show that local language skills are associated with a wage premium of more than 20% on average. In later studies, age-at-arrival become a frequently used instrument to endogenize language skills. Bleakly and Chin (2010) use the interaction between a dummy indicating whether and individual is arrived in the US before age of 11 or not, and a dummy for being born in a non-English speaking country. Their English proficiency parameter estimates show a significant positive effect of 33%. By following a similar identification strategy, Miranda and Zhu (2013) investigated the impact of language skills on the migrant-native wage gap in the UK. Later on, Yao and van Ours (2015) studied how Dutch speaking and reading problems affect active employment, hours worked as well as wages. They demonstrate, by using the interaction between age-at-arrival and a dummy for speaking Dutch during childhood as an instrument, that for female migrants, language problems have a significant negative effect on wages, but not on the probability to be employed nor on hours worked. For male migrants, they found no significant impact of language problems on active employment, hourly earnings or hours of work. Zorlu and Hartog (2018) use three identifying instruments for Dutch language skills: Age at arrival, homeland education and having satellite antenna at home. They examined the effects of Dutch language skills on two

objective indicators for socioeconomic integration (employment and income) and two subjective indicators (feeling Dutch and feeling integrated). There are a lot of studies from different destination and origin countries and languages (for an overview, see Chiswick and Miller 2015), but there is no study found which analyses the situation for the whole European Union. What is also missing in the literature is a study with a sound theoretical basis.

3 Theoretical Background

Individuals usually process information within their own institutional framework. Due to lack of information and limited information processing capacity, social norms, values, conventions, etc., i.e. shared mental models, are used to interpret complex social circumstances. Mental models serve as important resources in explanatory models of human behaviour, given the complexity of social, political and economic processes (Denzau and North 1994; North 1994). Thus, shared mental models as informal institutions have a substantial influence on social and economic interactions.

In order to understand how mental models emerges and are socially transmitted, it is necessary to focus on individual as well as social learning mechanisms (Denzau and North 1994, Mantzavinos et al. 2004).

3.1 The Individual Learning Mechanism

In recent decades, *Cognitive Science* contributed considerably to a better understanding on how information is processed within the framework of human thought and decision-making. More specifically, work from the field *Cognitive Neuroscience* demonstrates how brain structures are connected to mental phenomena and observable individual behaviour (Damasio 1999). Because Cognitive Science is still a relatively young discipline, there are a number of competing explanations for perception, learning, memory and attention. The nature of cognitive processes and the interaction between mind and brain is discussed even more broadly (Mantzavinos et al. 2004). I follow Mantzavinos et al. (2004) and consider the mind as a complex structural system that actively interprets and at the same time integrates different signals perceived by the senses. The mind categorizes experiences from the physical environment as well as from the linguistic-sociocultural environment (Gigerenzer 2001).

Mental models gradually evolve during the cognitive development of an individual to classify perceptions and process them consistently with memories. As flexible knowledge structures they are typically formed by an organism as a pragmatic response to certain problem situations in order to explain and interpret their nature (Holland et al. 1986). A mental model may best be understood as the final prediction of a future development created by the mind, or more simply, as an expectation on the physical as well as linguistic-sociocultural environment before it gives feedback. Depending on whether

or not the expectations are confirmed by the environmental feedback, a mental model can be refined, adjusted, or rejected entirely. Learning is the complex modification of mental models in response to the environment. A unique feature of human learning is that the above-described modification is a process in which specific solution strategies are stored and then are subsequently reordered and applied to a wider range of problems. However, the formation of mental models and the testing of solutions for complex problem situations is not necessarily associated with success. Learning is an evolutionary process that goes hand in hand with the "trial and error"-method: Possible solutions are tested until a problem can be solved. During this process, failures are pervasive and part of the learning mechanism (Mantzavinos et al. 2004).

If the physical as well as linguistic-sociocultural environment confirms a mental model many times, it becomes stabilized to a certain extent. North (1994) calls such a mental model a "belief", and a combination of "beliefs", which can be either consistent or inconsistent, a "belief system". If an individual was able to survive in the past in his or her sociocultural environment with a certain belief system, it becomes connected with the motivational system. In other words, the belief system is continuously shaped by parallel-involved emotional adaptation and can therefore be seen as a general filter for all new stimuli, which, as Mantzavinos et al. (2004) hypothesize, is relatively resistant to abrupt changes.

If a solution strategy based on a certain mental model does not lead to the desired success, the individual uses inferential strategies - primarily analogies - in a quasi-automatic manner (Holyoak and Thagard 1997). If such strategies do not solve this specific problem either, the individual is forced to become creative, i.e. find new solutions and develop new mental models.

Whether a mental model can be applied successfully and whether a subsequent stabilization or modification takes place is primarily determined by the sociocultural environment. To sum up: Whether or not creative learning takes place depends decisively on the feedback from the environment, which is processed cognitively while trying to solve problems. However, there is apparently nothing that guarantees an objectively correct perception of the environmental feedback. Since the brain actively interprets any sensory input, it can easily lead to misinterpretation of signals about success or failure of problem solutions. Indeed, the history of cultural and social development shows a persistence of dogmas, myths, superstitions and ideologies based on insufficient belief systems (Mantzavinos et al. 2004).

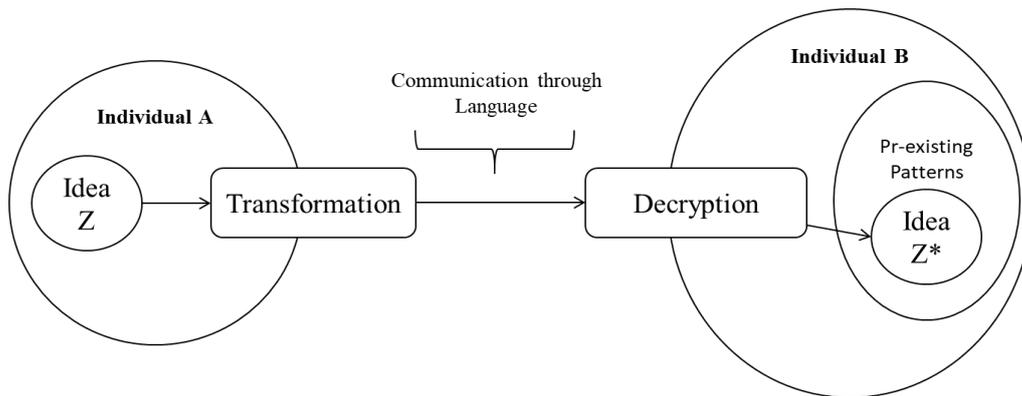
Of course, the analytical approach presented so far needs further elaborations. Nevertheless, for the purpose of the paper, it offers an appropriate account of individual learning mechanisms and at the same time provides a sufficient fundament to explain the process of social and cultural learning, which will be discussed in more detail below.

3.2 The Social Learning Mechanism

Learning at the societal level may best be conceptualised as shared or collective learning. In order to explain the emergence of social or cultural knowledge, it is necessary to distinguish between two aspects of collective learning, namely static and evolutionary collective learning.

In the static dimension, individuals in a given sociocultural environment continuously communicate with other individuals while trying to solve their problems (Mantzavinos et al. 2004). *Figure 1* shows the idea of this active communication process.

Figure 1 A theory of communication of two interacting individuals



(Source: Author's illustration in accordance with Denzau and North 1994, p. 19)

Individual A has made a decision on the basis of a "belief system", whose principle (idea) he or she now wants to explain to individual B. The decision structure in the mind of individual A must first be converted into language (i.e. German). This transformation would be perfect if A could declare all criteria that contributed to his or her decision to individual B. However, this would require a set of dimensions that allow a holistic determination of all decision criteria and their weighting. From this, adequate statistics of individual decision-making processes could be derived and the communication of these data would be a perfect substitute for neural patterns in the mind of an individual.

The problem is, however, that it is not possible to name every single factor that contributed to a decision. Most of our understanding in choice situations is based on tacit knowledge. Individuals perceive many things they are not aware of, but which can significantly affect decision-making. Attempts can be made to detect all relevant choice factors and to determine their weighting. However, this almost always involves uncertainty regarding the dimensions of the knowledge space that must be measured for this purpose. Consequently, the transformation is most likely imperfect, because not all information that A uses for his decision is transferred into the communication channel (Denzau and North 1994).

Now I take a closer look at the communication channel itself. With regard to the aim of the paper, the focus is on language, one of the most important communication tools that conveys social norms,

values, conventions or traditions related to group identity. Whenever human natural language is under considerations in different sciences like *Linguistics*, *Philosophy*, *Psychology* and *Cognitive Science*, it is often contrasted with animal communication, implying that the particular disciplines sees language as a more complex instrument for symbolic communication as compared with animal communication systems. They all agree that the primary function of the human language faculty is to support linguistic conventions, and that these have a substantial communicative function. But not only that, there is an ongoing research that demonstrates that language – not a specific natural language but rather its underlying computational mechanisms – is an instrument of thought. It gives us a unique way to structure our sociocultural environment, which is used for various purposes such as thinking and talking about aspects of life (Asoulin 2016). In addition, recent work suggests that there are strong interdependencies and mutual conditionality relations between language occurrence and the cultural evolution of a society, as a consequence of repeated learning cycles (Smith 2020). All these observations go in line with the theory of the transmission of mental models. Clearly, if individual A and B share a common linguistic-sociocultural environment, A can communicate his or her principles to B better and more effectively. If not, it becomes increasingly difficult for A to verbally share his or her beliefs. In a nutshell, with increasing linguistic-sociocultural distance, the degree of difficulty increases for A to effectively communicate his or her expectations, opinions and ideas to B.

The decryption process poses further difficulties. Individual B has to integrate the newly acquired information from the communication channel into neural patterns of his or her mind. The decryption process is substantially affected by pre-existent cognitive patterns, i.e. the perception of information and its interpretation by individual B is significantly influenced by mental models respectively "belief systems" that have emerged during his or her cognitive development (Denzau and North 1994).

Assuming that mental models of two interacting individuals have many common features, e.g. due to a common sociocultural background, individuals are more likely to be able to transform and decrypt their ideas into a shared language. The direct result of this communication is the formation of shared mental models, which provide a cognitive reference system for a common interpretation of reality and lead to collective solutions of certain problem situations. The importance of this process is obvious: A common interpretation of reality facilitates any further social interaction.

Concerning the evolution of shared mental models in a society: The evolution of shared mental models – that is, collective cultural-based learning – depends on the group size. Collective learning first takes place within families, neighbourhoods and schools (i.e. within an organisation). The modern theory of organisational learning views organisations as knowledge distribution systems in which skills and abilities are conveyed through knowledge exchange. At the societal level, the growth and transmission of knowledge over time is shaped by cultural heritage (Mantzavinos et al. 2004). This reduces the natural divergence of individual mental models¹ and, moreover, constitutes a medium for

¹ Similar problem situations are perceived differently to a certain extent, so that mental models also diverge.

the intergenerational transmission of unified perceptions. This learning can thus be described as cultural learning, which enables the members of a society to organise their perceptions and to exchange information about them.

Mental models are shared and spread through communication. This mutual information exchange constitutes the basis of the emergence of informal and formal institutions that undergo a co-evolutionary process (Denzau and North 1994). The emergence of institutions can thus be seen as a process of continuous innovation and imitation that takes place within social groups, or as a process based on continuous collective learning. Members of a community create shared mental models or collective knowledge to coordinate individual activities at the behavioural level (Mantzavinos et al. 2004).

The mechanism just described runs all the more smoothly if individuals of a community originate from the same sociocultural background and share a common language. This is usually not the case in societies facing recurring migration, which, by the way, applies to many societies worldwide. Due to the act of social and economic integration, migrants as well as natives are consequently confronted with a certain intercultural learning stress. This learning stress can be reduced by fostering communication on the basis of a common language, bearing in mind that a shared language should be seen as an instrument to transmit expectations, opinions and ideas.

The theoretical framework presented so far provides very useful insights for empirical research. In summary, it tells us that it is increasingly difficult for migrants to become sustainably socio-economically integrated with increasing linguistic-sociocultural distance. A common linguistic basis, on the other hand, offers the potential to create shared mental models with natives by continuously exchanging expectations, opinions and ideas, which considerably facilitates any further social and economic interactions. There are many socioeconomic integration spheres where this unfolds impact, such as the labour market, education and training, political and cultural engagement, as well as accommodation and housing, just to name a few. In the following empirical part of the paper, I investigate the effects of local language skills of migrants in the European Union for labour market outcomes. More specifically, the effects on the probability to be in paid work as well as on the probability to be overqualified.

4 Data

4.1 Data Description

In order to detect the consequences of language proficiency for labour market participation as well as for job matches of both male and female first-generation immigrants in the EU, I draw on the *European Union Labour Force Survey (EU LFS)* data. The EU LFS is a large cross-sectional and longitudinal sample survey established in 1998 and conducted in all Member States of the European Union, four EU-

candidate countries and three EFTA countries. The main goal of the LFS is to provide comparable data on employment and unemployment of persons aged 15 and over, as well as on persons outside the labour force. The definitions of employment and unemployment are strongly related to the *International Labour Organisation* (ILO) guidelines.

The EU LFS is organised in core topics and rotating modules. The core topics focus on demographic background, labour status, employment characteristics, hours worked, previous work experience of unemployed persons, education and training. Since 1999, the LFS also includes rotating topics, the so called ‘ad-hoc modules’. These modules rotate on a yearly basis and are dedicated to specific labour market issues. I use the ad-hoc module from 2014 on the labour market situation of migrants and their immediate descendants. This module consists of two sub-modules: One about the background of migrants and their descendants, and one about the obstacles they face to participate active in the labour market. In addition – and of most importance for this work – the EU LFS ad-hoc module from 2014 provides information about self-reported knowledge of the host country’s language.

4.2 Sample Selection and Descriptive Statistics

Since the primary objective is to study the impact of language skills on labour market outcomes, the focus is on persons at working age, i.e. from 15 to 64 years old. Moreover, in the empirical analysis I concentrate exclusively on first-generation male and female immigrants, as primarily for these subgroups local language knowledge in the context of labour market performance plays a substantial role. I classify respondents as migrants if one or both parents were born in a foreign country. Supplementary, I then define first-generation immigrants if they were born abroad themselves.

In order to be able to draw some general policy implications for the EU, I aggregate the yearly data from the 2014 EU LFS of those countries, who are a member of the European Union and participated in the ad-hoc module on the labour market situation of migrants and their immediate descendants, ending up with a total of 23 countries and approximately 40,800 first-generation immigrant observations.

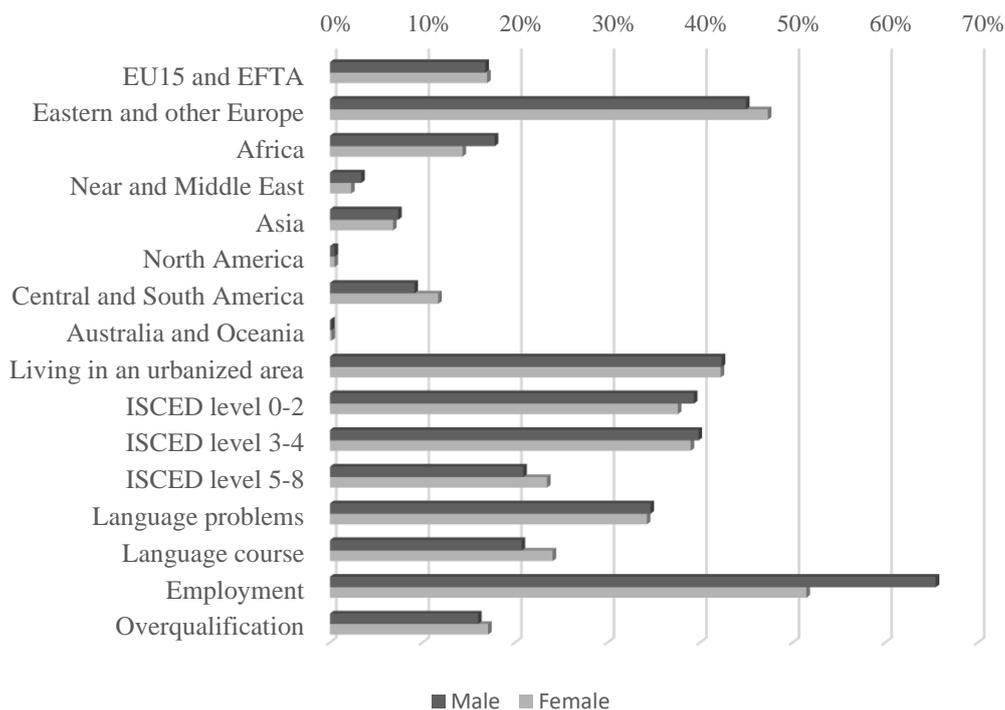
The focus is on two indicators of labour market outcomes: Employment and job match. Respondents are considered to be employed if they have any type of paid work, including self-employment. The job match is measured by a subjective question included in the ad-hoc module, where the individuals are asked whether their qualifications or skills would allow more demanding tasks than current job.

As almost all existing literature on Economics of Language, the present study relies on self-reported information on local language knowledge. Language skills are captured by the data in such a way that the respondents themselves indicate their degree of command of speaking the main host country’s language. This is often associated with measurement errors that could lead to an underestimation of language effects. Anyway, the respondents can choose answers from 1 ‘language is like mother tongue’ to 4 ‘beginner or less skills’. Here, language problems are measured by using a dummy variable, which

is equal to one if the respondents report either beginner respectively less skills or intermediate skills, and zero otherwise.

After deleting missing observations, the final sample consists of 35,383 individuals (15,698 first-generation male and 19,685 first-generation female migrants) covering the countries Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Estonia, Spain, Finland, France, Greece, Croatia, Hungary, Italy, Lithuania, Luxembourg, Latvia, Malta, Poland, Portugal, Romania, Sweden, Slovenia and Slovakia.

Figure 2 Descriptive statistics by gender



(Source: EU LFS ad-hoc module 2014 data, author's calculations)

Figure 2 gives an overview of the main variables of interest as well as additional background variables separated by gender. Over 65% of first-generation male migrants are in any type of paid work, but only 52% of first-generation female migrants within the European Union. Among those individuals, 16% of male and slightly more than 17% of female respondents report overqualification. The majority of first-generation male and female immigrants within the EU Member States originate from Eastern Europe, followed by those from Africa and those from EU15 and EFTA countries. More than 40% of them live in an urbanized area. Around 34% of both men and women respondents report problems with the host country's main language. Only 20% of males and around 24% of females participated in a language course. Furthermore, *Figure 2* shows that both men and women migrants within the EU are overrepresented in the lowest and intermediate education categories, but underrepresented in the highest. More than 37% of female and almost 40% of male respondents have at most a lower secondary degree, whereas just 23% of males and 20% of females hold a tertiary degree.

5 Empirical Methods and Results

In this section, I first discuss the econometric methods that are used to estimate the impact of local language skills of both male and female first-generation immigrants in the European Union on labour market participation as well as on job matches, followed by the regression results.

5.1 General Approach

Starting point are ordinary least squares (OLS) regressions, where I, in the first instance, abstract from possible endogeneity issues and estimate the following baseline model:

$$Y_i = X_i' \beta_{X_i} + \beta_{lp} lp_i + \varepsilon_i \quad (1)$$

In equation (1), Y_i denotes two indicators for socioeconomic integration. The first indicator is a measure for labour market participation and represented by a dummy, which is equal to one if individual i is in any type of paid work, and zero otherwise. The second indicator is also a dummy variable that take the value one if a male or female respondent is confronted with overqualification. The matrix of covariates, X_i , contains individual background characteristics affecting labour market performance. One of the most important covariates is a categorical measure for the highest educational attainment achieved by individual i . Furthermore, X_i contains two dummies: One that capture if a respondent lives with a partner, and one that indicates whether individual i lives in an urbanised area. In addition, the age of the respondent, a quadratic term of age and the number of children at home are included in X_i . Supplementary, I control for region-of-origin effects and host country effects. The inclusion of host country effects is essential because of substantial differences between European Union member states with regard to labour market institutions. Finally, lp_i refers to the language problems dummy, the main variable of interest, and e_i denotes the error term. By interacting the language problems dummy with an indicator for the participation in a language course, possible differences between those who report language problems and attend in a language course and those who did not can be revealed. And because of the considerable disparities in employment rates across genders, I look at males and females separately.

In *Table 1*, I report the OLS estimation results of each explanatory variable on the probability to be in paid work as well as on the probability to be overqualified. The effects of language problems are illustrated in bold in the first row of the male and female samples. The parameter estimates show that, in the European Union, having local language problems reduces the probability to be in paid work on average by almost 4% for first-generation male migrants, and by 11% for female migrants. Interestingly, a participation in a language course reduces the probability to be in paid work for males by around 5%

and there is no significant difference between those who report language problems and attend in a language course and those who did not. The opposite is true for first-generation female migrants. Here, a language course participation has no significant effect on the probability to be in paid work, but if female migrants report language problems and attend in a language course, the probability to participate active in the labour market decreases by additionally 3.4%. The effect of age on the probability to be in paid work is significant and positive for both male and female migrants, but this increasing effect diminishes as age increases (shown by the Age² parameter estimates). While living with a partner has a positive effect on employment probability for males, it is negative for females.

Table 1 OLS estimation results by gender

	Employment		Overqualification	
	<i>Males</i>	<i>Females</i>	<i>Males</i>	<i>Females</i>
Language problems (LP)	-0.036*** (0.009)	-0.110*** (0.009)	0.010 (0.008)	-0.026*** (0.007)
Language course (LC)	-0.048*** (0.013)	-0.020 (0.012)	0.011 (0.011)	0.002 (0.010)
LP*LC	0.011 (0.019)	-0.034** (0.017)	0.036** (0.016)	-0.010 (0.014)
Age	0.075*** (0.002)	0.078*** (0.002)	0.023*** (0.002)	0.024*** (0.001)
Age ²	-0.001*** (0.00002)	-0.001*** (0.00002)	-0.0003*** (0.0000)	-0.0003*** (0.0000)
Living with a partner	0.094*** (0.009)	-0.092*** (0.007)		
Number of children at home	-0.010*** (0.003)	-0.043*** (0.003)		
ISCED level 3-4	0.064*** (0.008)	0.058*** (0.008)	0.097*** (0.007)	0.119*** (0.006)
ISCED level 5-8	0.128*** (0.010)	0.110*** (0.009)	0.205*** (0.008)	0.154*** (0.007)
Living in an urbanised area	0.002 (0.007)	0.067*** (0.007)	-0.0003 (0.006)	0.029*** (0.005)
Eastern and other Europe	-0.050*** (0.012)	-0.033*** (0.011)	0.013 (0.010)	0.064*** (0.009)
Africa	-0.109*** (0.012)	-0.126*** (0.012)	0.026*** (0.010)	-0.001 (0.009)
Near and Middle East	-0.089*** (0.025)	-0.100*** (0.028)	-0.021 (0.021)	-0.028 (0.023)
Asia	0.048*** (0.016)	0.029* (0.016)	0.054*** (0.013)	0.022* (0.013)
North America	-0.003 (0.057)	0.014 (0.049)	-0.115*** (0.049)	0.047 (0.040)
Central and South America	-0.119*** (0.014)	-0.063*** (0.013)	0.153*** (0.012)	0.144*** (0.010)
Australia and Oceania	-0.065 (0.066)	-0.026 (0.064)	-0.041 (0.056)	0.071 (0.052)
Observations	15,698	19,685	15,698	19,685

Notes: *p<0.1; **p<0.05; ***p<0.01
 Robust standard errors (in parentheses) are reported.
 'Host country effects' are integrated in the regressions, but not reported.

(Source: EU LFS ad-hoc module 2014 data, author's calculations)

In line with expectations, a higher educational achievement substantially increases the probability for an active labour market participation. This applies to both genders almost equally. Especially for female

migrants, the negative effect of having more children at home on employment probability is high. Compared to first-generation immigrants from EU15 and EFTA countries, particularly male and female migrants from Central and South America, Africa and the Near and Middle East have a much lower probability to be in paid work.

The effect of language problems on the probability to be overqualified is only significant for first-generation female migrants in the European Union, and that unexpectedly negative (-2.6%). For those male migrants who report less local language skills and participated in a language course, the probability increases by 3.6% on average that current job and qualification does not match. An increasing age as well as higher educational achievements of both male and female immigrants have a significant positive effect on the probability to be overqualified. And mainly for those men and women migrants originate from Central and South America, the probability that current job and qualification does not match increases, while for male migrants from North America the probability decreases, compared to those from EU15 and EFTA countries.

5.2 Instrumental Variable Approach

Addressing the effects of self-reported language skills on labour market participation as well as on job matches inevitably involves endogeneity issues, which very likely leads to biased and inconsistent parameter estimates. Endogeneity may arise because unobserved characteristics like cognitive and non-cognitive abilities affect both language skills as well as labour market performance. Individual's with distinct cognitive and non-cognitive abilities usually acquire local language skills more quickly, and at the same time they are more likely to be in paid work that coincide with their qualifications. In addition, reverse causality is an issue, because active labour market participation very likely affects local language proficiency positively. Migrant workers, who are in paid work, interact more often with members from the native society and through that, they learn the local language faster and more efficient. Finally, as mentioned above, the indicator for language skills is based on self-reported local language knowledge, and, therefore, potentially suffer from measurement errors.

To counter these problems, an instrumental variable (IV) approach similar to Yao and van Ours (2015) is applied. I start with a slight modification of equation (1) and employ the following model framework:

$$Y_i = X_i' \beta_X + \beta_{IV} ar_i * lc_i + \varepsilon_i \quad (2)$$

Compared to equation (1), only one thing has changed. In equation (2), I now explain language problems (lp_i) within the labour market performance system, by using the interaction between age-at-arrival (ar_i) and a dummy indicating whether or not a respondent participated in a language course (lc_i) as an identifying instrument. Age-at-arrival is a well-established determinant of language skills of migrants

in various studies (see e.g. Zorlu and Hartog 2018 or Miranda and Zhu 2013). Younger individuals learn a new language much easier (Zorlu and Hartog 2018). By interacting the age-at-arrival variable with the language course dummy, I imply that only for those migrants who attend a language course, there is an age-at-arrival effect on language problems, which is particularly true for male attendees (cf. the first-stage regression results of the IV approach in the *Appendix*). Of course, I cannot rule out that arriving early in the host country also contributes to language proficiency of immigrants, who have not attended a language course. Moreover, language course participation very likely has a direct influence on language skills. However, by using the interaction between these two factors, I additionally control for their potential independent effects on local language skills.

Besides, the validity of the used instrument requires that non-language age-at-arrival effects on labour market outcomes are the same for both, those who participated in a language course, and those who did not. Although I use in a robustness check language course participation as an additional right-hand side variable, it is still possible that immigrants who arrive at an earlier age integrate socioeconomically faster and less costly than those who arrive later. However, in a further sensitivity analysis, I add years-since-residence as an additional right-hand side variable in the labour market performance equations to control for the possibility that age at arrival can have a significant influence on labour market outcomes through non-language channels.²

Table 2 shows the results of the instrumental variable approach. As it can be observed, the direction of impact of the included exogenous covariates (age, age², living with a partner, number of children at home, educational attainment, living in an urbanised area and region-of-origin) for both the labour market participation as well as the job match investigations have not changed compared to the general approach above. They only differ slightly in their magnitude. However, a different picture emerges for the language problem coefficient.

Within the instrumental variable approach, language problems are endogenized by using the interaction between age-at-arrival and a dummy for participating in a language course as an identifying instrument. It shows that, in the European Union, local language problems reduce the probability to be in paid work on average by 23% for first-generation male migrants, and by 30% for first-generation female migrants. So, it becomes apparent that the impact of language knowledge on employment prospects is substantially underestimated when applying OLS regressions only, where language problems are considered to be exogenously given. Furthermore, the IV approach shows that local language problems significantly affects the probability to be overqualified for both male and female migrants. In contrast to the OLS estimates, if male migrants report less local language skills, the probability increases by 10% on average that their current job and qualifications does not coincide, while for female migrants the probability increases by around 5%.

² Clearly, the younger a migrant when he/she arrives in the host country, the longer the period of time he/she lives there.

Table 2 IV estimation results by gender

	Employment		Overqualification	
	<i>Males</i>	<i>Females</i>	<i>Males</i>	<i>Females</i>
Language problems	-0.230*** (0.026)	-0.300*** (0.023)	0.100*** (0.022)	0.054*** (0.019)
Age	0.081*** (0.002)	0.081*** (0.002)	0.021*** (0.002)	0.022*** (0.001)
Age ²	-0.001*** (0.00003)	-0.001*** (0.00002)	-0.0003*** (0.00002)	-0.0003*** (0.00002)
Living with a partner	0.093*** (0.009)	-0.081*** (0.008)		
Number of children at home	-0.012*** (0.003)	-0.041*** (0.003)		
ISCED level 3-4	0.035*** (0.009)	0.023*** (0.009)	0.109*** (0.008)	0.136*** (0.007)
ISCED level 5-8	0.085*** (0.011)	0.064*** (0.011)	0.224*** (0.009)	0.174*** (0.009)
Living in an urbanised area	0.005 (0.007)	0.069*** (0.007)	-0.001 (0.006)	0.028*** (0.005)
Eastern and other Europe	-0.025*** (0.013)	-0.0005 (0.012)	0.002 (0.010)	0.050*** (0.010)
Africa	-0.097*** (0.012)	-0.098*** (0.012)	0.022** (0.010)	-0.015 (0.010)
Near and Middle East	-0.065*** (0.025)	-0.057** (0.029)	-0.030 (0.021)	-0.051** (0.023)
Asia	0.118*** (0.018)	0.104*** (0.019)	0.025 (0.015)	-0.014 (0.015)
North America	0.014 (0.058)	0.013 (0.050)	-0.120** (0.049)	0.046 (0.040)
Central and South America	-0.153*** (0.015)	-0.080*** (0.013)	0.167*** (0.013)	0.153*** (0.010)
Australia and Oceania	-0.088 (0.067)	-0.024 (0.064)	-0.029 (0.056)	0.071 (0.052)
Weak Instruments	2e ⁻¹⁶ ***	2e ⁻¹⁶ ***	2e ⁻¹⁶ ***	2e ⁻¹⁶ ***
Wu-Hausman	2.82e ⁻⁰⁶ ***	1.22e ⁻⁰⁶ ***	0.0266**	0.00402***
Sargan-Hansen Test	0.114	0.125	0.0754*	2.15e ⁻⁰⁵ ***
Observations	15,698	19,685	15,698	19,685

Notes: *p<0.1; **p<0.05; ***p<0.01
 Robust standard errors (in parentheses) are reported.
 'Host country effects' are integrated in the regressions, but not reported.

(Source: EU LFS ad-hoc module 2014 data, author's calculations)

For all IV estimations, the test for weak instruments indicate that the used instrument is strong and has sufficient explanatory power. Moreover, I test whether the IV results are more efficient than the simple OLS estimates by applying a *Hausman test for endogeneity*. The test demonstrates that for both the employment as well as the job match analysis, the IV approach is consistent and the OLS estimation is not. Finally, I apply a *Sargan-Hansen test*, which is used for testing over-identifying restriction in statistical models. It reveals that I cannot reject the null hypothesis that over-identifying restrictions are valid, at least for the investigation on employment prospects, and therefore I have a reliable instrument. A rejection would mean that the instrument is either correlated with the error term or that it is an omitted

variable in the baseline model. This issue arises though for the analysis on job matches. Here, it seems that the used instrument either correlates with the error term or that it is an omitted explanatory factor of the baseline model. Therefore, the IV parameter estimates of the job match analysis are possibly also biased.

5.3 Robustness Checks

To investigate the results' robustness, I apply a few sensitivity checks. Above, I mentioned several problems regarding the assumptions on age-at-arrival effects. One of them refers to the possibility that age at arrival does affect labour market outcomes through other channels than language. Therefore, I introduce years-since-residence as an exogenous right-hand side variable in the labour market performance equations. This allows to control for the direct impact of the time a migrant spent in the host country on labour market outcomes through non-language channels. *Table 3a* reveals that the parameter estimates of this first robustness check differ slightly within the employment prospects analysis, and substantially within the job match investigation, compared to the baseline IV estimations. So, it seems that the direct effect of the years a migrant spent in the host country on the probability to be in paid work is rather limited, whereas for the probability to be overqualified it is inconclusive. It appears quite likely that the applied instrument still correlates with the error term of the job match equation.

For all previous calculations, so-called *Linear Probability Models* are estimated, which poses a remarkable problem. It is possible to get predicted probabilities below 0 or above 1. Therefore, I use in a further robustness check a *Probit Model*. This regression technique is specifically made for binary dependent variables and always results in estimated probabilities within the range [0,1]. With the exception of the language course participation variable, which is now used as an exogenous explanatory factor, the remaining included variables are kept exactly the same as in the baseline equation of the general approach. This is to additionally examine the direct effect of language course participation on labour market outcomes. The estimated marginal effects of language problems using probit regressions (*Table 3b*) are quite similar to those in *Table 2*. Although a significant effect of language course participation on employment prospects can be detected, this does not change the extent of impact of language problems on the probability to be in paid work. However, significant differences within the job match investigation for first-generation male migrants can be identified. This could be due to the interaction effects between language problems and language course participation, which is not included in the probit regressions for technical reasons.

In a final sensitivity analysis, I restrict the sample to prime-aged individuals (i.e. between 25 and 54 years old), since this age group is more relevant from a policy point of view. The parameter estimates of the language problem coefficient are quiet the same for employment prospects, but again not for the job match analysis (*Table 3c*).

Table 3: Robustness checks

		Employment		Overqualification	
		Males	Females	Males	Females
<i>a. 'Years since residence' as an additional RHS variable</i>	Language problems	-0.281*** (0.062)	-0.257*** (0.043)	0.232*** (0.053)	-0.049 (0.034)
	Weak Instruments	2e ⁻¹⁶ ***	2e ⁻¹⁶ ***	2e ⁻¹⁶ ***	2e ⁻¹⁶ ***
	Wu-Hausman	0.00797***	0.0208**	0.02052**	0.764
	Sargan-Hansen Test	0.15555	0.0238**	0.00279***	2e ⁻¹⁶ ***
<i>b. Probit estimates + 'Language course' as an additional RHS variable</i>	Language problems	-0.033*** (0.025)	-0.113*** (0.022)	0.018*** (0.028)	-0.029*** (0.026)
	Language course	-0.042*** (0.029)	-0.035*** (0.024)	0.026*** (0.032)	-0.003 (0.028)
Observations		15 698	19 685	15 698	19 685
<i>c. Prime age (25-54 years) estimates</i>	Language problems	-0.272*** (0.030)	-0.374*** (0.028)	0.106*** (0.027)	0.028 (0.023)
	Weak Instruments	2e ⁻¹⁶ ***	2e ⁻¹⁶ ***	2e ⁻¹⁶ ***	2e ⁻¹⁶ ***
	Wu-Hausman	9.14e ⁻⁰⁸ ***	7.76e ⁻⁰⁸ ***	0.09549*	0.06169*
	Sargan-Hansen Test	0.546	0.0598*	0.00464***	0.00128***
Observations		11 201	14 228	11 201	14 228

Notes: *p<0.1; **p<0.05; ***p<0.01
 Robust standard errors (in parentheses) are reported.
 'Host country effects' are integrated in the regressions, but not reported.

(Source: EU LFS ad-hoc module 2014 data, author's calculations)

Overall, it seems that the findings of the baseline IV estimations for the probability to be in paid work are robust, and for the investigation on the probability to be overqualified they are not. In order to be able to draw reliable conclusions regarding the impact of language problems of first-generation male and female immigrants on job match probabilities, both more suitable instrumental variables are required, which the data set used here unfortunately does not provide, but also additional exogenous explanatory factors.

6 Discussion and Policy Implications

This paper examined the role of language skills within socioeconomic integration processes of male and female migrants in the European Union. In the first part of the paper, it is worked out how language as a communication tool and an instrument of thought helps to develop and serves to share mental models. Shared mental models emerge out of evolutionary individual and social learning and are essential cognitive resources to interpret complex problem situations arising in a society. Given the case that two

or more individuals originate from the same sociocultural background and share a common language, the better the acquisition, division and distribution of mental models, which in turn considerably facilitates social and economic interactions. If they do not, as in case of migration, immigrants as well as natives are confronted with a certain intercultural learning stress. This appears, among other things, in the labour market, which is shown in the second part of the paper. By applying data from the European Union Labour Force Survey, it is empirically tested to what extent language problems affect labour market integration. Potential endogeneity issues, which precede the analysis of the effects of language skills on employment outcomes, have also been addressed. First, language skills and labour market outcomes are correlated through unobserved characteristics, which lead to biased and inconsistent parameter estimates. Second, reverse causality is an issue, since active labour market participation improve local language knowledge.

By applying different estimation techniques, I can confirm that an endogenous treatment of language knowledge effects on employment prospects provides more efficient and consistent results than an exogenous treatment. I show, by relying on an instrumental variable approach, where I use the interaction between age-at-arrival and a dummy for participating in a language course as an identifying instrument, that reported language problems have a significant negative influence on the probability to be in paid work. While for first-generation male migrants within the European Union the probability is reduced by 23% on average to participate active in the labour market, it is reduced by 30% for first-generation female migrants. I apply various sensitivity tests that demonstrate that these results are quite robust. However, this is not the case for the analysis of the impact of language problems on the probability to be overqualified. Although the estimation results, which show that if male migrants report less local language skills, the probability increases by 10% on average that their current job and qualifications do not coincide, and for female migrants the probability increases by around 5%, tend in the presumed direction, they do not pass the robustness checks. Especially the findings for first-generation female migrants. The Sargan-Hansen tests reveal that the applied instrument is either correlated with the error term or that is an omitted explanatory factor of the job match equation. Here are further investigations necessary with more suitable instruments as well as additional exogenous explanatory factors in order to be able to make valid statements.

In summary, the paper has demonstrated that language is crucial for a sustainable socioeconomic integration of migrants. But their role goes far beyond the empirically demonstrated influence on labour market outcomes. A common language base not only enables more effective communication, but also a more efficient transformation and decryption of expectations, opinions and ideas. This is essential for intercultural learning, which should be, from a political point of view, a main goal regarding the current migration and integration dynamics in the European Union.

Appendix

First-stage estimation results by gender

	Language problems (employment)		Language problems (overqualification)	
	<i>Males</i>	<i>Females</i>	<i>Males</i>	<i>Females</i>
Age at arrival (AA)	0.011*** (0.0003)	0.011*** (0.0003)	0.011*** (0.0003)	0.011*** (0.0003)
Language course (LC)	0.033 (0.024)	0.188*** (0.020)	0.032 (0.024)	0.196*** (0.020)
AA:LC	0.004*** (0.001)	0.0003 (0.001)	0.004*** (0.001)	0.0001 (0.001)
Age	0.010*** (0.002)	0.002 (0.002)	0.009*** (0.002)	0.008*** (0.002)
Age ²	-0.0001*** (0.00002)	-0.0001*** (0.00002)	-0.0001*** (0.00002)	-0.0001*** (0.00002)
Living with a partner	-0.006 (0.008)	0.063*** (0.006)		
Number of children at home	-0.006** (0.002)	0.012*** (0.002)		
ISCED level 3-4	-0.138*** (0.008)	-0.178*** (0.007)	-0.138*** (0.008)	-0.183*** (0.007)
ISCED level 5-8	-0.235*** (0.009)	-0.253*** (0.008)	-0.234*** (0.009)	-0.258*** (0.008)
Living in an urbanised area	0.025*** (0.007)	0.017*** (0.006)	0.026*** (0.007)	0.011* (0.006)
Eastern and other Europe	0.083*** (0.011)	0.098*** (0.010)	0.082*** (0.011)	0.091*** (0.010)
Africa	0.066*** (0.011)	0.140*** (0.010)	0.064*** (0.011)	0.143*** (0.010)
Near and Middle East	0.086*** (0.023)	0.179*** (0.025)	0.085*** (0.023)	0.183*** (0.025)
Asia	0.322*** (0.015)	0.346*** (0.014)	0.321*** (0.015)	0.344*** (0.014)
North America	0.027 (0.054)	-0.058 (0.044)	0.024 (0.054)	-0.057 (0.044)
Central and South America	-0.246*** (0.013)	-0.173*** (0.011)	-0.248*** (0.013)	-0.181*** (0.011)
Australia and Oceania	-0.129** (0.062)	0.006 (0.056)	-0.132** (0.062)	0.002 (0.056)
Observations	15 698	19 685	15 698	19 685

Notes: *p<0.1; **p<0.05; ***p<0.01
 Robust standard errors (in parentheses) are reported.
 'Host country effects' are integrated in the regressions, but not reported.

(Source: EU LFS ad-hoc module 2014 data, author's calculations)

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Code availability

For purposes of inspection etc., the R source code generated to analyse the dataset is available from the author upon request.

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