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Abstract

Embedded in the “dual labour market” theory which focuses on the role of structural characteristics of national labour markets in determining the demand for foreign labour force, this report intends to contribute to the debate on drivers of the demand for foreign labour force and on mechanisms of labour market integration of immigrants in host countries. In specific, the report aims to assess whether in segmented labour markets foreign workforce has higher probability of being allocated on specific segments, and associated jobs, than natives. The analysis was carried out in reference to the EU-15 area (AT, BE, DE, DK, ES, FI, FR, GR, IE, IT, LU, NL, PT, SE, and UK) using the 2015 EU LFS data. The results identified three distinct segments on the EU labour market describing the coexistence of “good” jobs on one side and “bad” jobs on another. In such labour market structure, the estimates show that non-EU immigrants have higher probability than natives of being employed in “bad” jobs, although the immigrants-natives gap varies significantly among MS. These estimates are confirmed even when the sample is limited to more recent immigration waves.

1 Introduction

The topic of this research touches upon two important issues that currently represent European Union's key policy priorities, on one side, the labour market segmentation and, on another, migrant's labour market integration. Reducing the labour market segmentation is one of the main priorities under the framework of the 2015 EU New employment guidelines (European Union, 2015) considering that *"the implications and costs of segmentation are multiple, in both economic and social terms: they include wage gaps between segments, differences in access to training and social security, as well as in working conditions or tenure. Moreover, segmentation implies limited transitions to better jobs. The consequences of segmentation also have macroeconomic implications, such as lower productivity and higher employment volatility"* - as ILO has emphasized in its foreword to Garibaldi (2013). At the same time, fostering the integration of migrants into the labour market is considered to be one of the essential elements for creating more prosperous, cohesive and inclusive societies as highlighted in the 2016 Council Conclusions on the integration of third-country nationals legally residing in the EU (European Union, 2016).

These two phenomena are closely interlinked as, according to the dual labour market theory (Piore, 1979), the segmentation of the labour market is on the drivers of the demand for foreign labour force that consequently determines the allocation mechanism of immigrants on specific segments of the national labour market. This allocation mechanism in turn affects the labour market integration outcomes of the foreign labour force (Kogan, 2011; Constant & Massey, 2005; Kogan 2004).

In light of these considerations, this report aims at testing the hypothesis that in segmented labour markets immigrants are more likely to be allocated on specific segments and associated jobs than natives. In doing so, the report provides important insights on two questions: firstly, in which labour market segments the demand for immigrant labour force is mainly concentrated?; and, secondly, could the current allocation pattern of the workforce into segments hinder the foreigner's integration process?

Building upon the current state of the art in the literature, the report proposes a multifaceted approach to identify labour market segments that takes into account three different job dimensions that include occupational skills, returns to human capital and the "flexicurity" aspect. The analysis was carried out on the EU-15 area (AT, BE, DE, DK, ES, FI, FR, GR, IE, IT, LU, NL, PT, SE, and UK) using the 2015 EU LFS cross-sectional data.

Within the member states' labour markets, the research singled out three distinct segments. There is a primary segment associated with high-skilled jobs with higher returns to human capital and better working conditions. Diametrically opposed to this, a secondary segment is made of least-skilled jobs which yield lowest returns to human capital and poor working conditions. This report also identified an intermediate segment, whose features however are closer but not identical to those associated to the secondary labour market segment. The distinctive element of the intermediate segment lies in relatively higher social prestige scores and relatively more stable working conditions that associated jobs yield in comparison to the secondary segment.

Furthermore, for each member state (henceforth, MS), the report estimated the likelihood of Extra-EU Third Country Nationals (henceforth, TCN) being employed in the primary (or secondary) segment in comparison to natives, against a baseline scenario represented by the intermediate segment. Controlling for individual and country specific characteristics, the estimates show that TCNs have a greater probability of working in secondary jobs and lower probability of being employed on primary segments than natives. Although our report did not test directly the hypothesis of segmentation as pull factor for migration¹, it suggests that the demand for immigrant labour force is concentrated mainly in the secondary

¹ JRC KCMD's project "Migration inclination indexes" currently in progress aims in particular to quantify the push and pull factors of international migration. For some of project's outputs cfr.: The relationship between inequality in the origin country and emigration, Maestri V., Migali S., Natale F., 2017, JRC 106311; The determinants of migration to the EU: evidence from residence permits data, Migali S., Natale F., 2017, JRC 107078.

segment. Moreover, the results point out the difficulties of TCNs in accessing primary jobs, that is high-skilled jobs that yield higher income, higher social prestige, are more stable and less affected by negative aspects of job flexibility. Finally, these two aspects might play an important role for future prospects of migrants' integration.

This report is structured as follows: section 2 provides a brief literature review of the relationship between labour market segmentation and migration; section 3 identifies and defines labour market segments in a multidimensional perspective; section 4 tests the hypothesis that migrants tend to be employed in certain segments more than natives; finally, section 5 concludes with possible implications on the future migrant's integration process.

2 Literature review: existing evidence on the relation between labour market segmentation and migration

The growing literature on the labour market integration of immigrants goes mainly in two directions: one stream which puts focus on individual characteristics of immigrants as determinants of immigrant's labour market outcomes and the second one which stresses out the role of structural country characteristics. Within the latter perspective, this report adopts as its starting point of analysis one of the persistent features of EU's labour market structure, that is its segmentation (European Commission, 2017; European Commission, 2015; European Commission, 2010).

The first conceptualizations of labour market segmentation originate from the so called "dual labour market" theory (Doeringer & Piore, 1971; Cain 1976; Piore, 1979) according to which the market consists of two separate segments: there is a "primary" segment characterized by relatively high-paid and stable jobs and a "secondary" segment with low salaries and high turnover jobs. In addition, in such markets, the mobility between one segment and another appears as rather limited. Since the theory was posited, the labour market segmentation/dualization and its theorization has continued evolving as an outcome of intertwined processes such a technological change (Autor et al., 2003; Goos & Manning, 2007), (de)regulation of labour market institutions (Deakin, 2013; Oesch & Rodriguez, 2010) and skill supply evolution (McCollum & Findlay, 2015; Goldin and Katz, 2007)². Essentially the segmentation/dualization in itself represents an unobservable trait of the labour market which is not determined by worker's individual features, but by job characteristics (Battisti, 2008). As such, there is no consensus on the most adequate empirical measures for identifying segments which led to the adoption of a wide range of proxy variables, such as variables in the domain of returns to human capital, occupational skills, atypical and precarious employment arrangements and other job characteristics (Hudson, 2006). In general, the selection of specific variables for measuring the extent of labour market divisions depends on the theoretical framework applied: e.g. variables describing nonstandard working arrangements are typically used in analytical debates assessing the role of deregulation as driver of segmentation.

Within the EU, the persistence of labour markets segmentation/duality has been recognized as an important issue (European Commission, 2017; European Commission, 2015; European Commission, 2010) becoming thus, under the framework of new employment guidelines, the target of specific interventions:

"Guideline 7: Enhancing the functioning of labour markets

Member States should reduce labour market segmentation. Employment protection rules and institutions should provide a suitable environment for recruitment while offering adequate levels of protection to those in employment and those seeking employment or employed on temporary contracts or independent work contracts. Quality employment should be ensured in terms of socio-economic security, education and training opportunities, working conditions (including health and safety) and work-life balance. [...] Member States should promote inclusive labour markets open to all and also put in place effective anti-discrimination measures" (Council of European Union, 2015).

More recent empirical researches – comparative and non – also provided strong evidence of the segmentation hypothesis of EU MS's labour markets both when such divisions were assessed in terms of returns to investments in human capital (Yoon & Chung, 2015; Oesch & Rodriguez Menes, 2010; Dustman et al., 2009; Goos et al. 2009; Battisti, 2008; Goos & Manning, 2007) or with regards to job stability (Passaretta & Wolbers. 2016; Barbieri &

² On theoretical evolution of the "dual labour market" theory and the "new labour market segmentation" theory cfr.: Rueda (2014), Davidsson & Naczyk (2009) and Hudson (2006).

Cutuli, 2016; Garibaldi & Taddei, 2013; García-Serrano & Malo, 2013; Häusermann & Schwander, 2012).

It is such segmented nature of labour markets that, according to Piore (1979), generates the demand for immigrant labour force, acting thus as an actual “pull factor” for migration. The underlying mechanism of this relationship acts both on the employer and employee side. In the employer perspective, immigration allows filling in labour shortages with relatively low costs since in the absence of foreign workers the employers would either need to raise wages as incentive for native workers to fill in such jobs or to replace labour with capital. On the other hand, in order to understand the employee perspective, it is first necessary to address the concept of “occupational hierarchies” according to which the employment does not only yield an income to an individual but the accumulation of social prestige as well. These two elements represent key motivations that drive individuals into engaging in a working activity. Consequently, jobs at the bottom of the occupational hierarchy are less pursued by individuals as they provide low social prestige and low social mobility. Immigrants, however, shows a greater propensity of accepting such jobs since their quest for economic security prevails over the quest for social status at least at the initial stage of migration path and/or under the temporary nature of the movement, e.g. seasonal worker in agriculture. Nowadays this segmentation driven demand for foreign workers has been gaining even more weight because the importance of other factors like gender or race, e.g. women and black in the USA, for allocating on employees into certain segments has relatively declined due to increased labour costs of this workforce and less open discriminatory practices than in the past (Hudson, 2006).

According to the theory, the first effect of the segmentation therefore lies in its influence to determine the demand for the foreign labour force and its consequent allocation on the domestic labour market, but it does not stop there as this allocation process, in turn, affects the migrant’s labour market integration process. Indeed, the segmented nature of the labour market which sorts migrants into the secondary type of jobs appears to be a greater determinant of foreigner’s higher risk of holding precarious and instable jobs (Kogan, 2011; Kogan 2004) with initial lower wages and limited job mobility (Constant & Massey, 2005), than immigrant’s individual characteristics are. In front of such allocation mechanism, the understanding of migrant’s integration process should start from evaluating firstly the migrants’ odds to transition toward higher occupational classes or, in other terms, their likelihood of remaining confined to the secondary tier as opposed to native population. Albeit limited to some MS, there is evidence, that foreign labour force is currently less likely than natives to reach the highly-skilled segments as opposed to semiskilled and unskilled segments (Muñoz de Bustillo & Antón, 2012; Reyneri & Fullin, 2011; Fleischmann, 2007). Moreover, Reyneri & Fullin (2011) found also that migrants’ probability of transition toward upper class jobs has been reducing over time (IT, ES, DK, DE, NL), with exception of migrants in the UK. Our aim is to expand these studies by incorporating in our analysis various aspects of segmentation – thus going beyond occupational skills dimension – and by offering a wider comparative framework.

3 Defining labour market segments

3.1 Data and methodology

This report relies on cross-sectional micro data from the 2015 EU Labour Force Survey (EU LFS). This data set is the main instrument available at EU level for carrying out in depth analyses of the labour market conditions of both native and immigrant populations. The analysis focuses on the EU-15 area³, that is on the populations of AT, BE, DE, DK, ES, FI, FR, GR, IE, IT, LU, NL, PT, SE, and UK, whose sample has been narrowed down to dependent employees⁴ in the working age (15 – 64). The final weighted sample is representative of a population of 171 million units.

The first part of the analysis represents a preliminary exercise which aims to identify the labour market segments by combining different job dimensions (i.e. observable job characteristics) that could capture the multifaceted nature of the segmentation phenomenon. In reference to the state-of-the-art in the literature, we included the following job dimensions as representative of factors underlying the labour market segmentation: occupational skills required by the job, returns to human capital and the dimension of job stability and flexibility. Taking into account these three dimensions, jobs were then clustered using individual level data. Table 1 gives the overview of variables used as proxy for each one of these dimensions with a brief description provided in the following paragraphs.

Table 1. Proxy variables of job dimensions

Job dimensions (observable job characteristics)	Variable
Occupational skills	<ul style="list-style-type: none"> • ISCO-08 3-digit scale (<i>continuous</i>)
Returns to human capital	<ul style="list-style-type: none"> • Income in the lowest 20% of the distribution (<i>dummy</i>) • SIOPS prestige scores at ISCO-08 3-digit level (<i>continuous</i>)
Job stability and flexibility, the "flexicurity"	<ul style="list-style-type: none"> • Person is looking for another job because of risk or certainty of loss or termination of present job (<i>dummy</i>) • Share of persons that transitioned from employment in ISCO-08 3-digit occupation to unemployment in the country (<i>continuous</i>) • Involuntary part-time work (<i>dummy</i>) • Person is looking for another job because of wish to have better working conditions, e.g. pay, working or travel time, quality of work (<i>dummy</i>)

The occupational skills were considered using the ISCO-08 three-digit classification of occupations which mirrors the skill level and skill specialization of each occupation (ILO, 2012). In other terms, the ISCO-08 three-digit classification was used as a proxy of skill level and skill specialization required by the job x and entered into the clustering exercise as a scale ranging from 111 – highest level of skills – to 962 - lowest level of skills.

Returns to human capital were evaluated both as pecuniary returns, measured with a dummy equal to 1 if a person belongs to the two lowest deciles of the income distribution,

³ The exclusion of the remaining MS was guided by the consideration that the small sample size of TCNs within each segment and at the level of single MS would yield low reliability estimates in analysis in the paragraph 4.

⁴ The exclusion of the self-employed individuals was determined by the fact that the data does not allow distinguishing between false self-employment, as an 'atypical' form of employment, and the regular form of self-employment.

and non-pecuniary returns, assessed using the SIOPS prestige scores at ISCO-08 3-digit (Ganzeboom, 2010; Ganzeboom & Treiman, 2003). The inclusion of a less traditional non-pecuniary variable, represented by SIOPS prestige scores which evaluate the occupational social standing, aims at reflecting Piore's (1979) concept of "occupational hierarchies".

The inclusion of the job stability and flexibility dimension in the analysis appears as a more difficult task especially due to the fact that evidence regarding the impact of (de)regulation on the segmentation is less clear (Rubery & Piasna, 2016; EC, 2016). In the presence of different theoretical stands concerning such impact, our analysis was grounded on the European Commission (2016) view that "*High protection against dismissals for open-ended contracts coupled with loose protection for temporary or other non-standard contracts induces labour market segmentation*" and the following concept of "flexicurity" defined as "*An integrated strategy for enhancing, at the same time, flexibility and security in the labour market. It attempts to reconcile employers' need for a flexible workforce with workers' need for security – confidence that they will not face long periods of unemployment*".

Bearing in mind that among the EU MS there is a relevant difference in the level of Employment protection legislation (EPL) that governs open-ended, temporary and atypical contracts, this report has opted to select and include measures that could describe the *flexicurity* aspect in a more comparable way among Member States⁵.

In specific, the mix of following measures was considered, in the domain of job stability:

- a subjective measure constructed as a dummy variable equal to 1 if a person has declared that he/she is looking for another job because of risk or certainty of loss or termination of present job;
- an objective measure computed as the share of individuals that have transitioned from an employed status in the occupation x into an unemployed status in the same country and in the same year;

and, in the area of job flexibility:

- a dummy of involuntary part-time was constructed to be equal to 1 if a person works part-time but has reported a wish to work more hours than actual ones;
- and, finally, a subjective dummy variable was included if the person has declared to be looking for another job because of a wish to have better working conditions (e.g. pay, working or travel time, quality of work).

The presence of a set of subjective variables has a purpose to address the issue of self-confinement of individuals into a specific segment.

3.2 Clustering types of jobs

Using the described set of variables, we run a K median squared Euclidean on individual records of the EU LFS. The optimal clustering was evaluated on the basis of index of Calinski and Harabasz and produced a solution of 3 labour market segments. Although theory contends that labour market is split into essentially two segments, primary and secondary, the research has provided evidence that also multiple segments could coexist (Yoon & Chung, 2015) with some even claiming that the new segmentation is assuming a 'tripartition' form (Jessoula et al. 2010).

The occupations belonging to each of 3 identified segments are listed in Table 3 while Figures 6 and 7 give a description of the characteristics of the segments along each of the variables used for clustering.

⁵ The OECD Employment Protection Legislation Index was not used in this analysis since its latest values date back to 2013 and thus do not take into account relevant labour market reforms put in act since then. In the following revisions, we do intend to include updated EPL indexes as well.

At the EU-15 level, the primary segment is the most consistent with 42.8% of dependent employees while the secondary segment represents the smallest cluster by employing one fourth of the population of interest.

The most relevant characteristics of 3 identified segments are the following:

- *Primary segment.* This cluster includes highly-skilled occupations ranging from managers, professionals to technicians and associate professionals. It is characterized by the most modest share of individuals with income in the lowest two deciles (equal to 8.1%) together with the highest social prestige scores. This aspect is, in addition, accompanied by the highest job stability as very few employees have transitioned from these occupations into unemployment in the reference year. Regarding the job flexibility, this cluster is the least affected by the involuntary part-time phenomenon with only 3.6% of all the employees declare to be in such condition. On the other side, it registers a slightly higher share of workers (42.0%) that have declared to be looking for a new job due to dissatisfaction with present working conditions.
- *Intermediate segment.* The second identified segment absorbs mainly middle skilled jobs, that is occupations such as clerical support workers, service and sales workers, skilled agricultural, forestry and fishery workers and only the building and related trade workers of the "craft and related trade worker" class. Despite the denomination "intermediate", the features of this cluster resemble much more those related to the secondary segment. On one hand, this segment shows similar values with the secondary segment for all the variables – excluding SIOPS prestige scores and objective job stability – but it should be considered that these values are associated with occupations on a higher skills scale than in those of the secondary segment. Another more evident distinction between the secondary and intermediate segments is related to higher return in terms of social prestige and a relatively major job stability of intermediate jobs in comparison to the secondary one.
- *Secondary segment.* This segment includes the least skilled occupations such as craft and related trade workers (excluding building and related trade workers), plant, machine operators and assemblers and elementary occupations. As an opposite segment to primary jobs, this cluster is characterized by the lowest returns in term of income - with almost one third of employees in this segment having the income in the lowest two deciles - as well as by the lowest social prestige scores associated to it. These lowest pecuniary and non-pecuniary returns come together with the highest job instability as this segment registers highest shares of individuals that transitioned into unemployment from one of its occupations. In the domain of job flexibility, the involuntary part-time results to be three times higher than in primary jobs (equal to 8.2% as opposed to 3.6%) while the dissatisfaction with working conditions as reason for seeking a new employment is only marginally smaller than in the primary segment (equal to 40.0% versus 42.0%).

Furthermore, an alternative cluster analysis was carried out in which the pecuniary returns to skills were measures on the basis of the entire income distribution in deciles - instead of the income in lowest 20% of the distribution as in the baseline case – while maintaining the same remaining variables. The baseline results were confirmed as the alternative analysis has generated the same type of tripartitioned labour market segmentation.

3.3 Distribution of TCN in labour market segments

The initial step of our exercise consisted in defining different segments underlying the EU labour market and for that purpose the overall working population of all the EU-15 countries was considered – that is natives, immigrants from other EU countries and non-EU immigrants from.

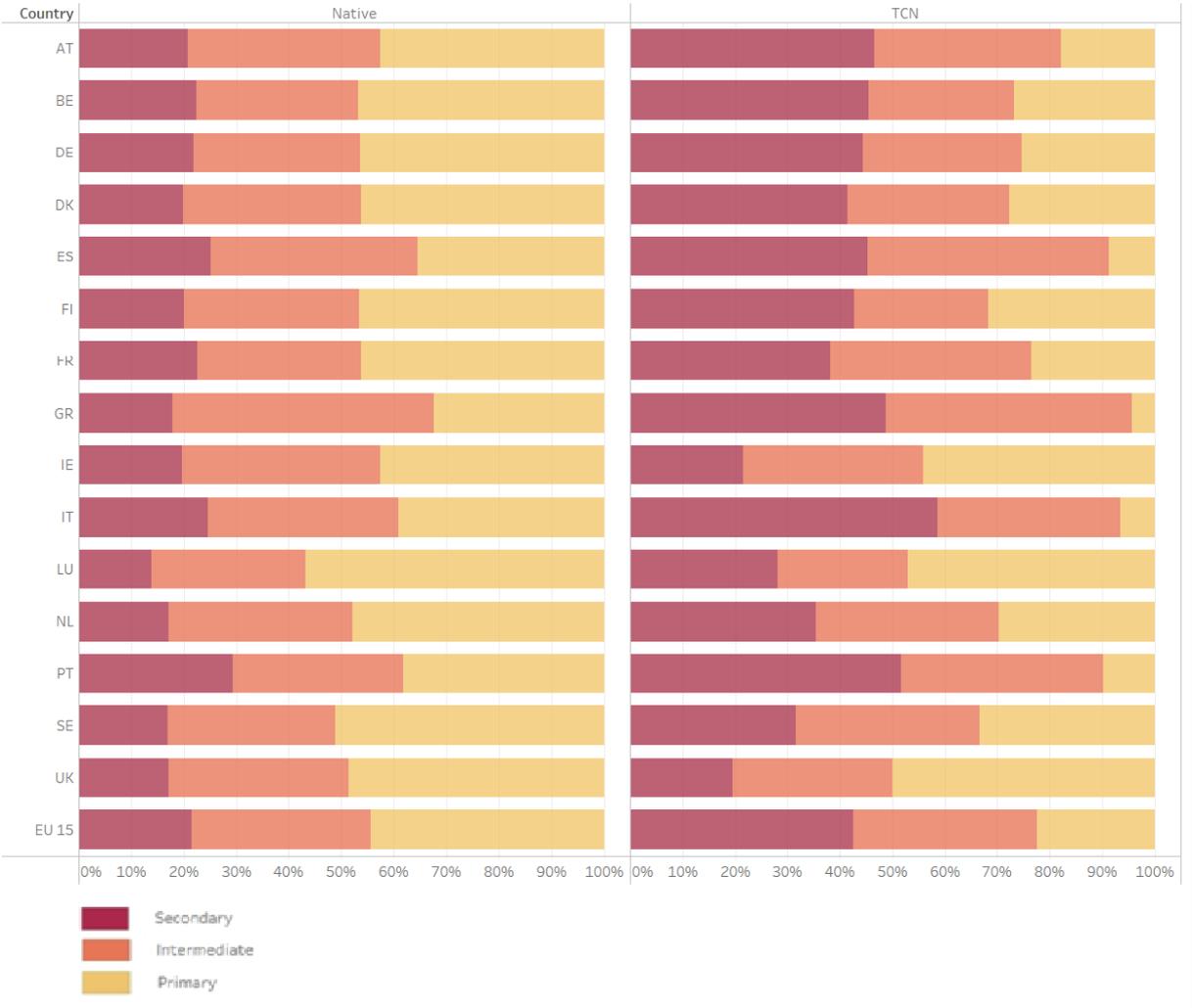
The aim of this report, however, is to assess the labour market integration of TCNs and therefore the remainder of our analysis will put focus in particular on the condition of TCNs, i.e. citizens of a Third country, as compared to the condition associated to native population, i.e. the citizens of the reporting country.

On the aggregate level, our sample represents 7.8 million of TCN dependent employees and 155 million of native dependent employees. Therefore, the relative share of TCNs among all dependent employees is rather small being equal to 8.4% in secondary segment, 4.6% in intermediate and 2.3% in the primary segment.

Figure 1 offers some insights on the distributional pattern reporting the share of TCNs and natives, in respect to their population of reference, by segments. The major difference is easily observed: native population is predominantly working in primary segment while TCNs are mainly concentrated in the secondary segment. In specific, at the EU-15 level 22.3% of all TCNs were employed in primary jobs in comparison to 44.4% of the total of native population. At the same time, 42.5% of all the TCNs were hired in the secondary segment in respect to one fifth of the total of all natives.

At the country level, Southern European MS (GR, IT, ES, PT) registered the lowest shares (lower than 10.0%) of the overall TCN population working in the primary segment. At the same time, IT, PT and GR reported the highest concentration of TCNs on the secondary segment which absorbs in these MS more than a half of all TCNs. On the opposite side, countries like UK, LU and IE registered, in comparison to other MS, highest shares of TCNs in primary jobs (with the share higher than 40.0%) and, at the same time, lowest concentration of TCNs in secondary jobs (>30.0%).

Figure 1. Distribution of TCNs and native population by segment



Source: JRC KCMD’s elaborations of EU LFS 2015

However, these country disparities at descriptive level should be interpreted considering, in first place, the different specialization pattern among MS, i.e. if a country has a high degree of specialization in high-skilled sectors, the demand for highly-skilled workers will be higher and vice versa. In the second place, it is also necessary to consider that MS are characterized by a different distribution of skills that characterize their labour force. For that reason, it is necessary to turn to multivariate analysis that could allow controlling for both country specific features and labour supply characteristics in order to provide a more accurate pattern of the TCNs’ distribution on MS’ labour markets.

4. What type of jobs for TCNs?

4.1 Data and methodology

Once the labour market segments have been identified, representing our dependent variable, a multinomial logistic regression was carried out with an aim of estimating the TCNs' probability compared to natives of being employed in primary and secondary segments relative to the intermediate segment set as the reference category. This probability was estimated as a function of labour supply and country specific characteristics.

Three coefficients $\beta_{(1)}$, $\beta_{(2)}$, $\beta_{(3)}$ corresponding to each outcome category in the model (primary vs. intermediate vs. secondary segment respectively) were estimated setting the intermediate segment outcome as the reference/base category of the model, thus $\beta_{(2)}=0$. Country specific characteristics (country dummies, share of EU nationals residing in the country, sector of economic activity and firm size) together with individual workers' characteristics (sex, age, years of education, years of residence) are contained in X which is allowed to be country-varying c .

The multinomial logistic equations are thus given as:

$$P_{(Y=1)} = \frac{\exp\{X_c\beta_1\}}{\exp\{X_c\beta_1\} + 1 + \exp\{X_c\beta_3\}}$$

$$P_{(Y=2)} = \frac{1}{\exp\{X_c\beta_1\} + 1 + \exp\{X_c\beta_3\}}$$

$$P_{(Y=3)} = \frac{\exp\{X_c\beta_3\}}{\exp\{X_c\beta_1\} + 1 + \exp\{X_c\beta_3\}}$$

Table 2 describes the independent variables that enter the multinomial logit model.

Table 2. Description of independent variables in the model

<i>Variable name</i>	<i>Description</i>
TCN	15 dummy variables equal to 1 if individual is a TCN and equal to 0 if it is native for each of the EU-15 MS
EU nationals	Share of migrants from other EU MS residing in the reporting country
Sector	Agriculture, industry, construction, trade and services
Size of firm	Categories: firms with 1-10 employees, 11-19 employees, 20-49 employees and over 50 employees
Gender	Female vs. male
Age	Specific age 15-64 years of age
Education	Years of schooling
Years of residence	Categories: born in the reporting country, residing more than 5 years and residing less than 5 years
Country	EU-15 MS (AT, BE, DE, DK, ES, FI, FR, GR, IE, IT, LU, NL, PT, SE, UK)

4.2 Baseline results: on what type of jobs do TCNs work?

For each of the 15 EU MS, the relative risk ratios (RRR) of TCN compared to native of being employed in primary or secondary segment jobs relative to intermediary segment are reported in Figures 2-4 and Table 4 in the annex. The values of RRR higher than 1 indicate that TCNs have higher probability of being employed in the specific segment than native; vice versa the values lower than 1 imply that TCNs have a lower likelihood than natives of working in the specific segment.

Looking at the relative risk ratio (RRR) of TCNs compared to native of being employed in **primary jobs** relative to intermediary jobs, it can be observed that:

- in 12 MS TCNs registered *lower likelihood* of working on a primary job in respect to natives (green coloured coefficients in Figure 2);
- in some countries (BE, DE, DK, IE, SE) this difference in probability between TCN and natives in reaching the primary jobs is less marked - with the RRR ranging between 0.4-0.7 - and the divide appears lowest in the UK - with RRR=0.8;
- in the Mediterranean European countries (ES, FR, GR, IT, PT) and AT the likelihood for TCNs of working on primary jobs is extremely low registering factors below 0.4;
- in three countries - FI, LU and NL - no statistically significant difference is reported.

On the other hand, the likelihood of TCNs versus natives of being employed in **secondary jobs**, shows that:

- in 14 MS TCNs have a *greater probability* of being employed in secondary jobs than natives (red coloured coefficients in Figure 2);
- in most of the countries (BE, FI, DK, ES, IT, PT) the likelihood of being employed in a secondary job is particularly high, more than 2 times higher for a TCN than for a native or, or moderately high as in AT, GR and SE;
- the lowest difference between two groups of population remain in DE, NL, IE and UK, with coefficients lower than 1.6;
- in FR the coefficient is not statistically significant

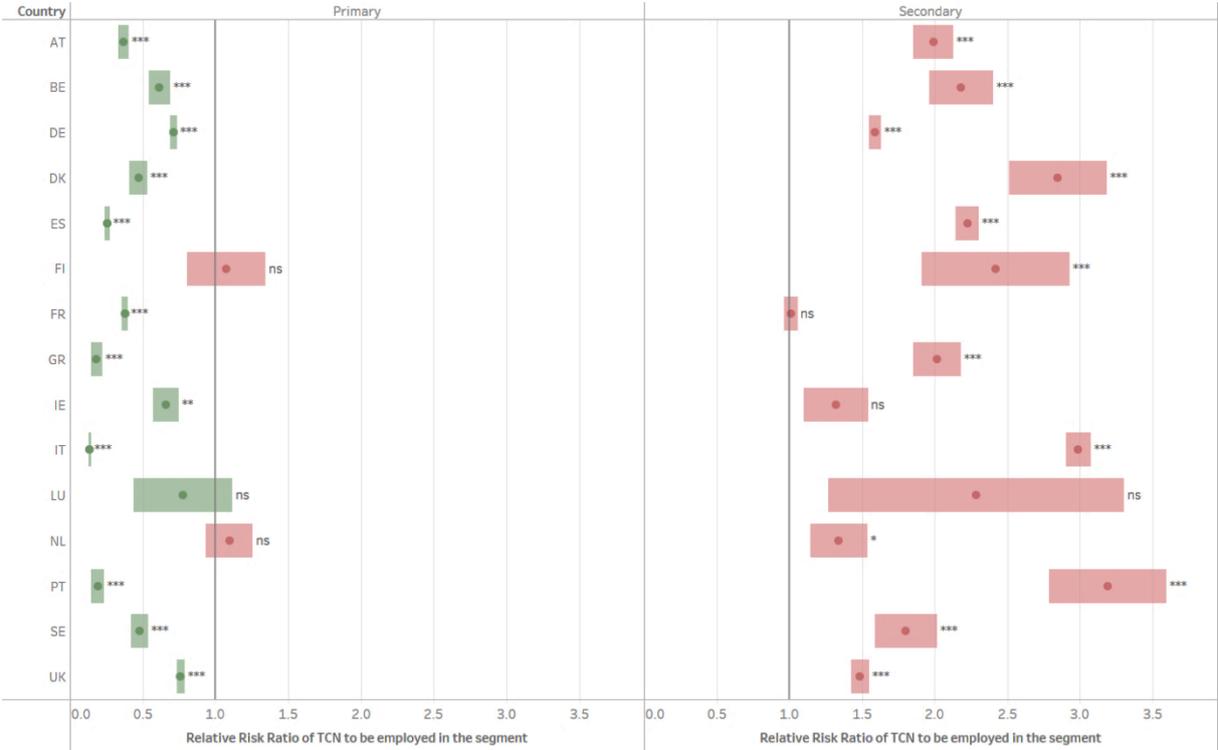
It should be added that all the individual characteristics (age, gender, education and years of residence) are significant in affecting the probability that a worker in general will be employed in one of the 3 segments.

These cross-country differences that remain even after controlling for individual and country level characteristics, could in part be interpreted in light of different admission and integration policies among MS which represent a tool that can potentially affect the composition of the labour force supply. This influence can be exerted by MS policies at two complementary levels: firstly by granting access to the national labour market to certain categories of migrants - e.g. immediate access to migrants with refugee status or restricted access to other categories of migrants; and secondly by linking this access to specific occupations - e.g. highly-skilled occupations or, in general, professions labelled as shortage occupations⁶.

All the country specific (share of EU nationals residing in the country, sector of economic activity and firm size) and individual variables (sex, age, years of education, years of residence) appeared to be statistically significant affecting thus the individual's likelihood of being allocated on a specific labour market segment. Further tests were carried in respect to the baseline model which pointed out that, specifically in relation to TCNs, educational level and years of residence influence migrant's sorting in segments.

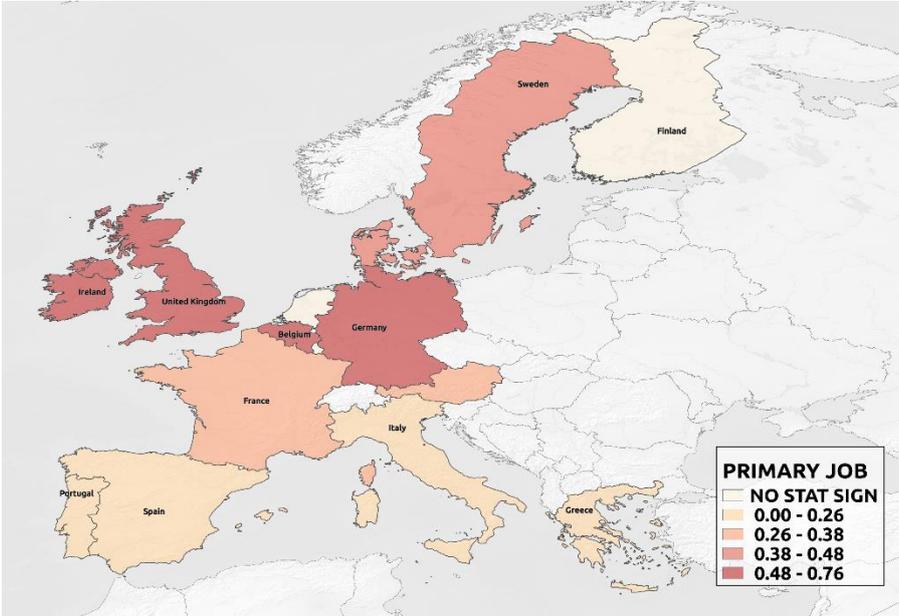
⁶ For detailed practices of MS in linking migration policies to labour market needs cfr.: EMN, Determining labour shortages and the need for labour migration from third countries in the EU Synthesis Report for the EMN Focussed Study 2015.

Figure 2. Probability that TCNs are employed in one of the labour market segments compared to natives



Note: Reference category: **intermediate jobs**; Controls include age, sex, years of schooling, years of residence, number of EU nationals in the MS, economic sector, firm size, country fixed effects. ***, **, * significant at, respectively, 1%, 5% and 10%; ns coefficients not statistically significant.

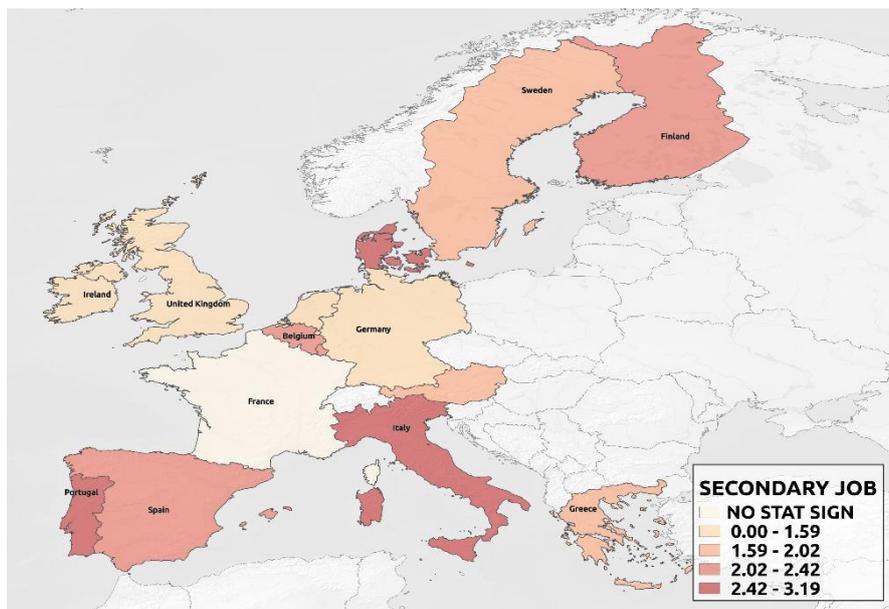
Figure 3. Probability that TCNs are employed in **primary jobs** compared to natives



Note: Reference category: **intermediate jobs**; Controls include age, sex, years of schooling, years of residence, number of EU nationals in the MS, economic sector, firm size, country fixed effects.

Source: JRC KCMD’s elaborations of EU LFS 2015.

Figure 4. Probability that TCNs are employed in **secondary jobs** compared to natives



Note: Reference category: **intermediate jobs**; Controls include age, sex, years of schooling, years of residence, number of EU nationals in the MS, economic sector, firm size, country fixed effects.

Source: JRC KCMD's elaborations of EU LFS 2015.

4.3 Robustness checks: the results hold also for more recent immigrants?

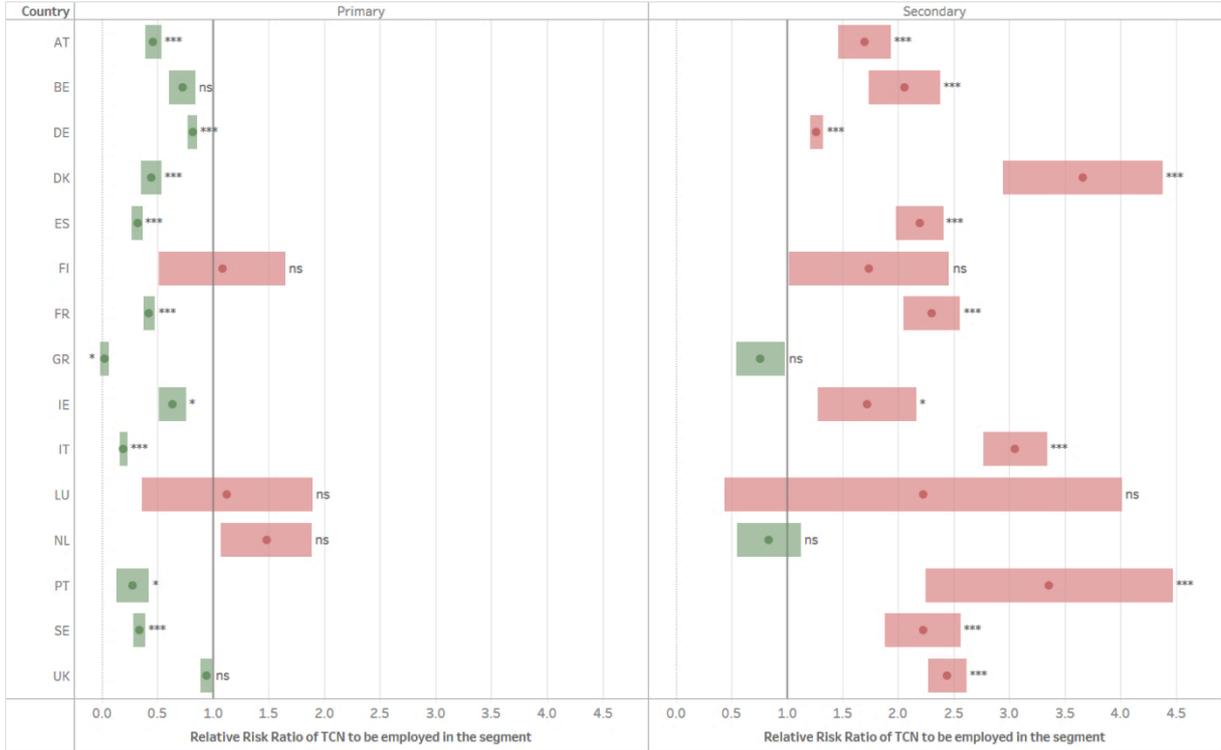
As Reyneri & Fullin (2011) have highlighted, the old wave of EU immigration was characterized by low-skilled immigrants whose recruitment was aimed at filling labour market shortages, especially unskilled occupations. In our model, unskilled occupations are represented in the secondary segment and - although our baseline model controls for years of residence - this feature of old immigration patterns might have emphasized the effect in particular in traditional countries of immigration. In order to test whether such old immigration effect exist, an additional model was run narrowing down the sample of TCNs to contemporary immigrants, defined as those residing in the EU for less or equal to 5 years.

Overall, there are no major differences in respect to the baseline model: in most of the cases, TCNs continue to hold higher probability than natives of being employed in secondary while the access to the primary segment remains mainly reserved for natives.

In relation to primary jobs, in the Southern European countries (ES, GR, IT, PT) the difference in probabilities between TCNs and natives remain to be the largest ones, where as in BE, DE and IE the TCN-native gap continues to be the smallest. The coefficients related to the UK and NL are no longer statistically significant implying thus the TCN-native difference in RRR in the baseline model is, in fact, determined by the composition of older immigration waves.

Furthermore, the difference between TCNs and natives in likelihood of being employed in secondary jobs still remain highest in DK, IT and PT while this coefficient is no longer significant for recent immigrants in FI. At the same time, the differences remain smallest in DE. In the second model, also in case of GR, LU and NL the RRR the statistical significance was lost. In addition, whereas in the baseline model we found no statistically significant difference in FR, in the model for recent immigrants the significance appeared as being very high.

Figure 5. Probability that TCNs residing less or equal to 5 years in the EU MS are employed in one of the labour market segments compared to natives



Note: Reference category: **intermediate jobs**; Controls include age, sex, years of schooling, years of residence, number of EU nationals in the MS, economic sector, firm size, country fixed effects. ***, **, * significant at, respectively, 1%, 5% and 10%; ns coefficients not statistically significant.

Conclusions

This report is embedded in one of the most persistent features of EU's labour market, its segmentation, and explores how TCNs are allocated in that context. Building upon the available empirical evidence on this topic, our first contribution consists in providing a multidimensional analysis of the segmentation phenomenon. In other terms, the segmentation was assessed in all of its three dimensions jointly: occupational skills, returns to human capital and, finally, dimension of job stability and flexibility. The results showed a "tripartitioned" division of the labour market in a primary, intermediate and secondary segment. The primary segment is characterized by highly-skilled occupations, highest returns to human capital, and better working conditions. At the opposite side of the spectrum, the secondary segment composed of jobs that are least skilled, least paid with poorer working conditions. In addition, an "intermediate" segment was identified whose characteristics appear to be very similar to the ones of the "secondary" segment with main differences related to relatively higher social prestige returns and relatively higher stability of jobs associated to the "intermediate" segment. In a labour market with these characteristics, we observe that largest part of the demand for the foreign labour force is concentrated in the secondary segment. More precisely, our estimates show that in almost all countries TCNs registered in 2015a lower probability of being employed in primary jobs in respect to natives as well as higher probability of being employed in secondary jobs. However, there are major differences among MSs in the extent of these TCN-native gaps, e.g. in Southern European countries, the TCN-native gap appears to be the largest, while in countries such as UK, IE and DE, this gap is the smallest.

The implications of these results on the future of migrant's labour market integration are twofold.

The convergence between native and immigrant population in labour market integration has long been a EU priority (European Commission, 2007). To that purpose, the report's results underline the need for more effective policy interventions for reducing the gaps in terms of TCN's access to the primary segment. More in general, labour market integration policies for TCNs should be designed considering the possible interplay with migrant admission policies and general labour market policies. Achieving this, however, is far from straightforward. Indeed, it implies designing policies to foster labour migrant integration of migrants that are, first, complementary and integrated into labour admission schemes as well as into broader MSs' interventions aiming to tackle the overall labour market segmentation. This is a daunting coordination task imposed on government and public administrations.

Secondly, the future prospects of migrants' integration are also strongly linked to the nature of jobs that migrants are most likely to perform. As it has been shown in this report, migrants are mainly excluded from accessing highly skilled jobs, thus performing middle-skilled or low-skilled jobs which, according to the OECD (2016), are more likely to be the object of potentially adverse effects of automation and digitalization processes. In order to avoid the risk of increased vulnerability of immigrant population, policies on retraining and upskilling of migrant workforce – such as those currently foreseen under the New Agenda on Skills – become essential policy tools in adapting to technologically-induced labour market changes (OECD, 2017).

It is in particular on the second aspect of how the automation process will affect the labour market integration of migrants that the following stages of our research will be developed upon. In doing so, we also acknowledge the need to broaden our analyses and add the dimension of the country of origin, according to data availability.

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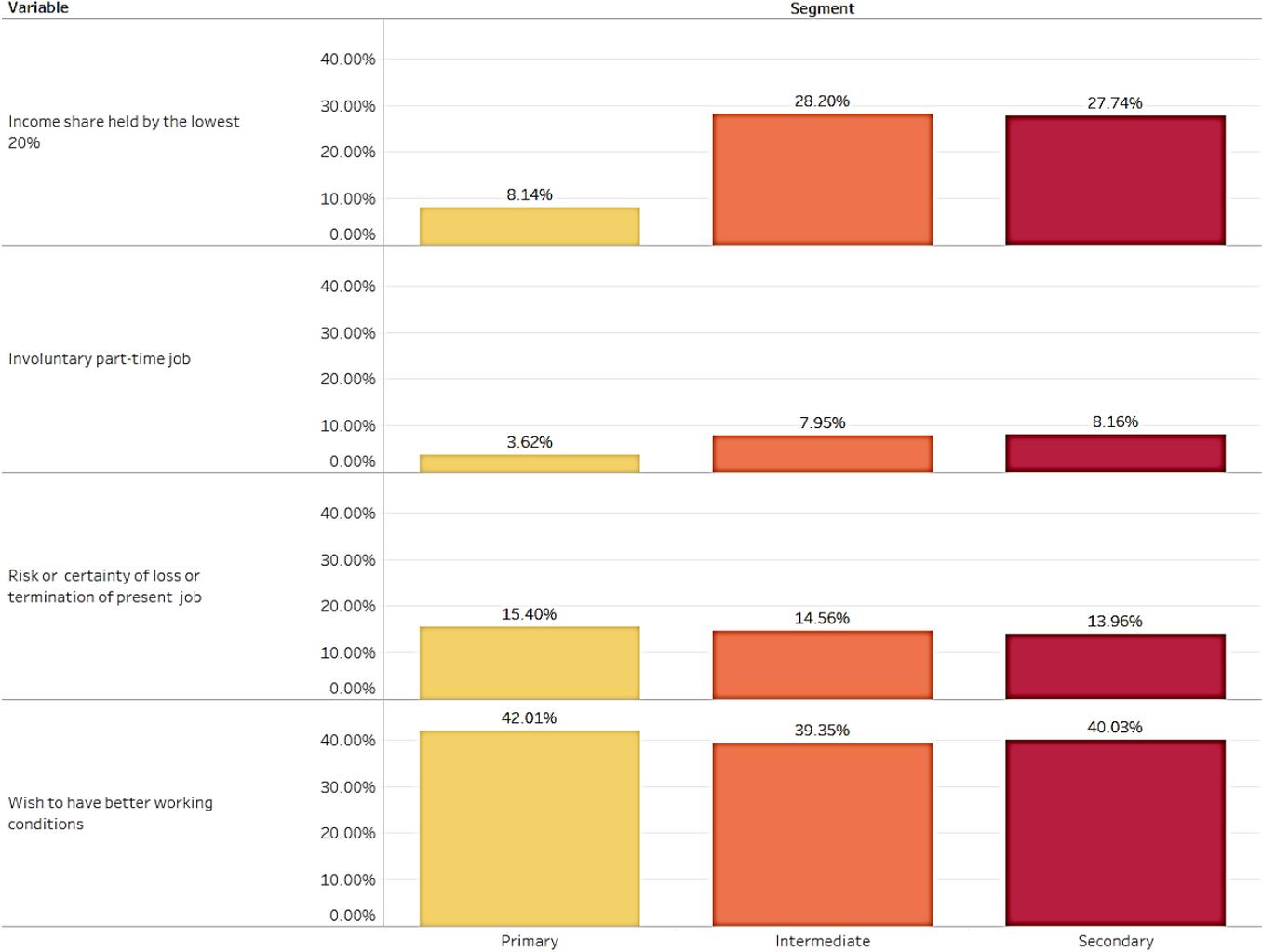
Annexes

Table 3. Clustering of ISCO-08 3-digit occupations

Segment	ISCO 1 digit	
Primary	1	Business services and administration managers Chief executives, senior officials and legislators Hotel and restaurant managers Information and communications technology service managers Legislators and senior officials MANAGERS Managing directors and chief executives Manufacturing, mining, construction, and distribution managers Other services managers Production managers in agriculture, forestry and fisheries Professional services managers Retail and wholesale trade managers Sales, marketing and development managers
	2	Administration professionals Architects, planners, surveyors and designers Authors, journalists and linguists Creative and performing artists Database and network professionals Electrotechnology engineers Engineering professionals (excluding electrotechnology) Finance professionals Information and communications technology professionals Legal professionals Librarians, archivists and curators Life science professionals Mathematicians, actuaries and statisticians Medical doctors Nursing and midwifery professionals Other health professionals Other teaching professionals ...
	3	Administrative and specialised secretaries Artistic, cultural and culinary associate professionals Business services agents Financial and mathematical associate professionals Information and communications technology operations and user support technicians Legal, social and religious associate professionals Life science technicians and related associate professionals Medical and pharmaceutical technicians Mining, manufacturing and construction supervisors Nursing and midwifery associate professionals Other health associate professionals ...
Intermediate	4	Client information workers General and keyboard clerks General office clerks Keyboard operators Material-recording and transport clerks Numerical clerks Other clerical support workers Secretaries (general) Tellers, money collectors and related clerks
	5	Building and housekeeping supervisors Cashiers and ticket clerks Child care workers and teachers' aides Cooks Hairdressers, beauticians and related workers Other personal services workers Other sales workers Personal care workers in health services Protective services workers Shop salespersons Street and market salespersons Travel attendants, conductors and guides Waiters and bartenders
	6	Animal producers Fishery workers, hunters and trappers Forestry and related workers Market gardeners and crop growers Mixed crop and animal producers
	7	Building finishers and related trades workers Building frame and related trades workers CRAFT AND RELATED TRADES WORKERS Painters, building structure cleaners and related trades workers
Secondary	7	Blacksmiths, toolmakers and related trades workers Electrical equipment installers and repairers Electronics and telecommunications installers and repairers Food processing and related trades workers Garment and related trades workers Handicraft workers Machinery mechanics and repairers Other craft and related workers Printing trades workers Sheet and structural metal workers, moulders and welders, and related workers Wood treaters, cabinet-makers and related trades workers
	8	Assemblers Car, van and motorcycle drivers Chemical and photographic products plant and machine operators Drivers and mobile plant operators Food and related products machine operators Heavy truck and bus drivers Locomotive engine drivers and related workers Metal processing and finishing plant operators Mining and mineral processing plant operators Mobile plant operators Other stationary plant and machine operators Rubber, plastic and paper products machine operators Ships' deck crews and related workers ...
	9	Agricultural, forestry and fishery labourers Domestic, hotel and office cleaners and helpers Food preparation assistants Manufacturing labourers Mining and construction labourers Other elementary workers Refuse workers Street and related service workers Street vendors (excluding food) Transport and storage labourers Vehicle, window, laundry and other hand cleaning workers

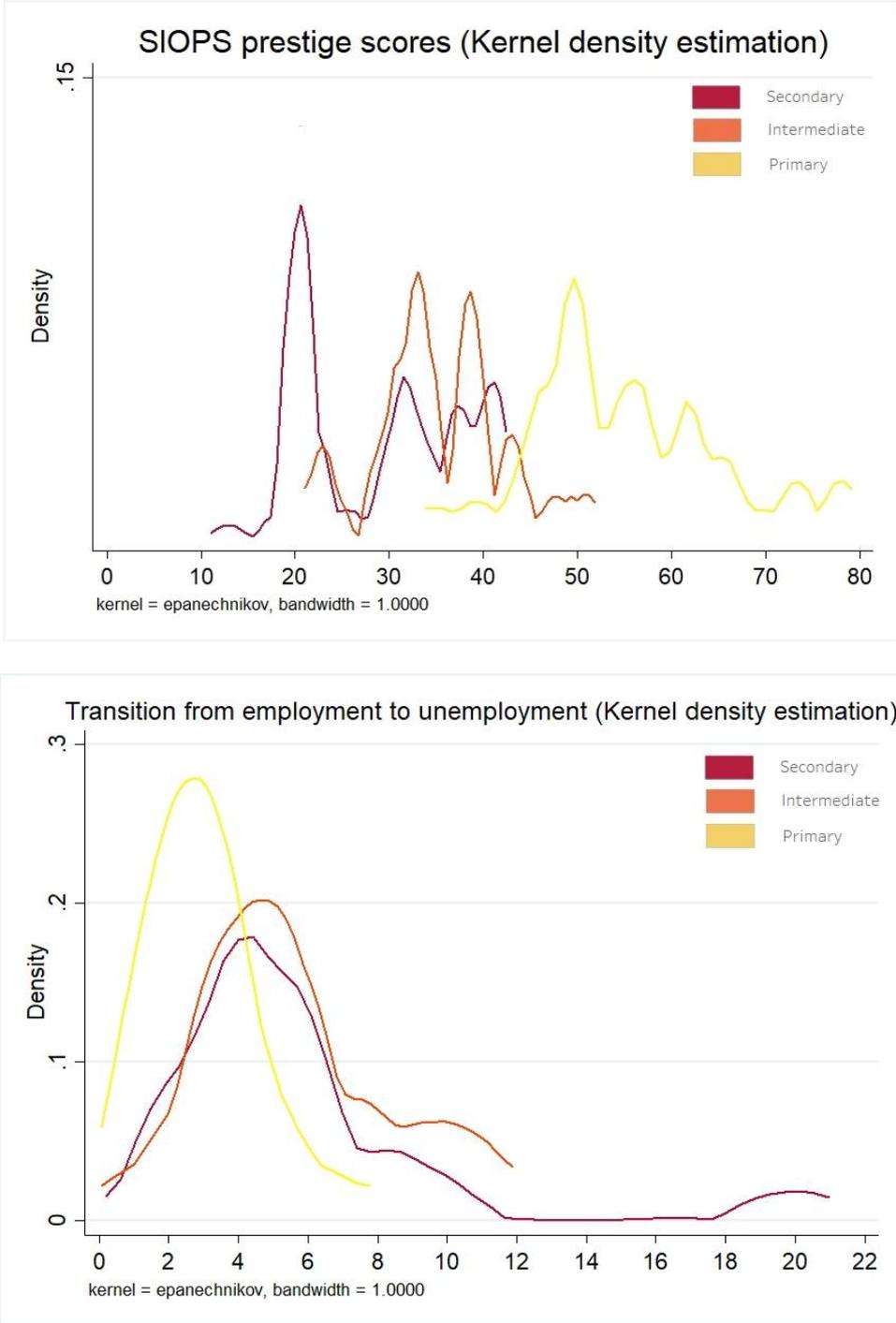
Source: JRC KCMD's elaborations of EU LFS 2015.

Figure 6. Job characteristics associated to 3 segments – dummy variables



Source: JRC KCMD’s elaborations of EU LFS 2015.

Figure 7. Job characteristics associated to 3 segments – continuous variables



Source: JRC KCMD's elaborations of EU LFS 2015.

Table 4. Probability that TCNs are employed in one of the labour market segments compared to natives

	Primary jobs (RRR)	Secondary jobs (RRR)
Austria TCN vs. native	.370***	1.991***
Belgium TCN vs. native	.615***	2.183***
Finland TCN vs. native	1.072	2.419***
Germany TCN vs. native	.713***	1.590***
Denmark TCN vs. native	.470***	2.850***
Spain TCN vs. native	.257***	2.225***
France TCN vs. native	.377***	1.011
Greece TCN vs. native	.183***	2.015***
Ireland TCN vs. native	.661***	1.321*
Italy TCN vs. native	.135***	2.987***
Luxembourg TCN vs. native	.778	2.284*
Netherlands TCN vs. native	1.097	1.339**
Portugal TCN vs. native	.190***	3.192***
Sweden TCN vs. native	.478***	1.800***
United Kingdom TCN vs. native	.760***	1.486***
Controls	yes	
Controls: age, sex, years of schooling, years of residence, number of EU nationals in the MS, economic sector, firm size, country fixed effects		
No. of observations	827,781	
<i>Reference category: intermediate jobs</i>		
***, **, * significant at, respectively, 1%, 5% and 10%		

Source: JRC KCMD's elaborations of EU LFS 2015.

Table 5. Probability that TCNs residing less or equal to 5 years in the EU MS are employed in one of the labour market segments compared to natives

	Primary jobs (RRR)	Secondary jobs (RRR)
AT TCN vs. native	.462***	1.701***
BE TCN vs. native	.724*	2.060***
FI TCN vs. native	1.083	1.741
DE TCN vs. native	.828***	1.248***
DK TCN vs. native	.454***	3.446***
ES TCN vs. native	.321***	2.194***
FR TCN vs. native	.426***	2.304***
GR TCN vs. native	.024**	.765
IE TCN vs. native	.599***	1.620*
IT TCN vs. native	.185***	3.019***
LU TCN vs. native	1.073	2.015
NL TCN vs. native	1.408	.823
PT TCN vs. native	.276**	3.354***
SE TCN vs. native	.340***	2.214***
UK TCN vs. native	.935	2.284***
Controls	yes	
Controls: age, sex, years of schooling, number of EU nationals in the MS, economic sector, firm size, country fixed effects		
No. of observations	751,602	
<i>Reference category: intermediate jobs</i>		
***, **, * significant at, respectively, 1%, 5% and 10%		

Source: JRC KCMD's elaborations of EU LFS 2015.

List of abbreviations and definitions

EPL	Employment protection legislation
EU LFS	European Union Labour Force Survey
KCMD	Knowledge Centre on Migration and Demography
MS	Member state
RRR	Relative risk ratio
TCN	Third Country National

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