# Should I Stay or Should I Go?
# Dutch Evidence on Tax Induced (Return) Migration*

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PRELIMINARY AND INCOMPLETE – PLEASE DO NOT CITE

**Abstract:** This paper investigates the impact on return migration decisions after the 2012 change in the preferential taxation scheme available to foreign workers in the Netherlands. It combines information on all employees receiving this 30 percent salary tax exemption from 2002 to 2019 to administrative population-wide data to estimate migration responses to a radical shortening of its duration that only affected certain groups of individuals. Beneficiaries who had arrived within five years from a destination closer than 150km from the Dutch border were retroactively given only five rather than ten years of preferential tax treatment. Causal estimates of tax induced return migration are obtained by comparing movement patterns of workers coming from across this distance threshold who were affected or not by this change because of time already on the scheme. Our main finding is that taking away tax breaks from migrants, even after they have been in a country for a relatively long time, strongly increases their likelihood to choose to leave. They stay on average 5.8 fewer month (on a baseline of 5.5 years) in the country and were 12% less likely to remain beyond the 5-year end of the preferential tax treatment. Crucially we find that this effect was entirely driven by out-migration from those at the very top of the income distribution with no change in staying on decisions for remaining 99% of workers. This is of high potential policy relevance as it suggests that behavioral responses observed for these very rich and highly mobile individuals may not be generalizable to the rest of the population making tax-induced migration decision

# 1. Introduction

Globalization has reduced the monetary and psychological costs associated with international labor mobility. To benefit from this trend, national governments have increasingly turned to preferential tax schemes to attract specific groups of foreign workers into their labor market. There is now solid evidence of strong elasticities on location decision when these schemes are available to top earners or scientists [see Kleven et al. (2020) for a review]. Much less is known about how such tax breaks may affect out-migrations decision beyond their temporary duration despite longer-term integration of the attracted foreign workers often being a stated primary aim of these policies. This is an important question as the fiscal burden entailed would be politically tangible if they would induce these individuals to stay on to pay the usually high-income tax rates they are usually subject to once the preferential treatment has expired. The difficulty in obtaining credible causal estimates of tax-induced out-migration stems from staying on decisions being impacted by many country and time specific factors that are hard to properly account for. This paper aims to shed light on this issue by making use of administrative data from the Netherlands to investigate the impact of a policy that radically – and retroactively – changed an individual's duration entitlement to a Dutch migrant worker preferential tax scheme on a place of previous residence basis.

Understanding the responsiveness of labor supply to tax rates has been a central question in the optimal taxation literature initiated Mirrlees (1971). More recently, Feldstein (1995, 1999) and others have put forward the impact of tax levels on a much larger set of individual responses including career choices, unobserved effort, timing of compensation, tax avoidance/evasion and factor mobility. These effects provide for a much more comprehensive picture on the consequences of taxation on efficiency and welfare. This shift in focus has engendered a vast and growing literature exploiting administrative tax data to obtain estimates of elasticities for these multiple individual reactions to changes in taxable income. In the extensive review by Saez, Slemrod, and Giertz (2012) is was notable that, despite factor (dis)-location being a potential behavioral response, there was then almost no empirical evidence on the potential effects of taxation on international labor mobility and retention. There have been since then important advances on exploring mobility angle with

strong elasticities documented in various contexts for very specific groups of individuals[1]. Much less is still known however potential retention effects of these preferential tax scheme and, especially, when these are aimed at immigrants from a relatively large range of the skill and income distribution. This paper aims to bridge this gap in knowledge by providing some of the first causal estimates of staying on decisions of migrants originally attracted to the Netherlands by a tax break scheme after it was drastically shortened in duration.

In 2001, the Netherlands introduced a preferential tax scheme aimed at skilled immigrants, in line with many European countries. The four stated main goals of the '30% rule' as it is commonly known and which is described in detail in the next section, were: 1) to attract workers from abroad that have a specific skill which is scarcely available in the Netherlands; (2) make the Dutch settling climate attractive and competitive for companies; (3) decrease the administrative pressure for employers and employees; (4) create incentives for employees to stay in the Netherlands. As reflected in its name, eligible immigrants would see 30% of an employee's gross income is tax exempted for a period of 10 years. The fiscal strain the scheme put on the Dutch taxpayer means that in 2012 is was substantially revised in terms of eligibility criteria, their assessment and its maximum duration. Controversially, a key new criterion for non-eligibility – having originally relocated from a place less than 150km from the Dutch border – was applied retroactively to beneficiaries if they had arrived after 2007 but not for those who had been in the country longer. Those who did not meet this distance and pre-duration threshold would now lose their rights to the 30% tax breaks after 5 years while all others would keep it for 10 years.

To study the effects of this policy change we gained access of administrative data from the Tax Authority (Belastingdienst) about recipients of the scheme and matched it to population-wide administrative data from Statistics Netherlands (CBS) for the years 2002 to 2019. The pool of potentially individuals by this reform is large as in 2012 around 44,000 employees were enrolled in the preferential tax scheme. Their labor market incomes were, as expected given the scarcity skill criteria, higher that than the average Dutch population but

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[1] Kleven, Landais, and Saez (2013) is one of the first attempts trying to understand tax-induced international mobility by studying the labor market of professional football players in 14 European countries. Akcigit, Baslandze, and Stantcheva (2016) shift the focus to scientists and inventors and estimated their mobility responses to changes in tax rates of 8 OECD countries. Finally, Kleven et al. (2014) have focused in only one country to provide evidences on how immigrants that belong to the top 1% of the income distribution react to the introduction of a preferential tax scheme in Denmark.

comparable to the top tercile of the distribution. We can thus look at much more diverse group of affected migrants than in most previous contexts which will be highly relevant when we will consider policy response heterogeneities. Included in the tax data are two crucial pieces of information: the start date and end date of eligibility to the preferential tax scheme and country of previous residence before migration. These enable us to properly identify certain groups as treated individuals. We focus first on those who arrived from Belgium or Luxembourg – the two countries which were entirely covered by the new 150km criterion – to compare their return rate to those arriving from non-affected countries before or after 2007. A second approach consists of looking at out-migration patterns to a partially treated country, Germany, depending on the exact distance to the Dutch border of the municipality where they declare their return to as they leave the Netherlands. Here we check for changes

The analysis from these two difference-in-difference (DiD) approaches yield very similar findings: strong out-migration responses to eligibility loss to the preferential tax break, even after spending substantial time in the host country. The treated Belgians and Luxemburgish stay on average 5.5 months less from a mean baseline of 5.5 years which translates into 9% less time in the country. Looking at this using a different margin in the probability to spend more than 5 years in the Netherlands, i.e. stay beyond the loss of the tax break, we see that this decreases by 12% (a -0.07 estimated DiD coefficient on a 0.46 baseline). Of important policy interest is the fact that all these effects are driven from behavioral responses from treated individuals belonging to the top 95% and especially top 99% of the income distribution. This means that the focus on tax induced responses by such highly mobile individuals, which have been the focus of much of the previous literature (Agrawal and Foremny (2019); Akcigit et al. (2016); Kleven et al. (2014); Martinez (2017)), do not appear shared by more regular workers. Our second approach using returns to Germany clearly shows that loss of the tax break based on the 150km distance was the determinant criterion driving out-migration decision. We find here that the probability of returning to an area below this distance threshold increases by more than half once the policy is implemented.

The rest of the paper is organized as follows. Section 2 describes the institutional background, presenting the eligibility to the Dutch preferential tax scheme, the changes in 2012 and the group of individuals that were treated. Section 3 covers the data and descriptive

statistics. Sections 4 and 5 present the empirical analysis and robustness to different specifications. Section 6 is devoted to the sample of individuals that came from Germany. Section 7 presents the results in terms of elasticities of mobility with respect to the taxable income. Section 8 concludes.

# 2. Institutional Background and Quasi-Experimental Variation

## 2.1. The Dutch Preferential Tax Scheme

Competing governments offer tax break schemes to attract high skill migrants and enjoy the positive externalities they can generate. The design of these public policies aim not only to affect individual incentives to immigrate but also to retain these incoming employees beyond temporary tax break period and collect higher income taxes they would face in the future. From an individual perspective, potential migrants would base their location decisions in order to maximize their income given their moving costs. The tax breaks, therefore, makes a country more attractive by increasing net earnings and the length individuals can benefit from it works to increase future moving costs once they created roots in the new country.

In line with other European countries, in 2001 the Netherlands introduced a preferential tax break for immigrant workers: the '30% rule'[2]. The scheme is aimed at attracting individuals with skills considered in short supply on the Dutch labor market by offering a tax break to compensates the extraterritorial expenses these incoming employees might incur when arriving from abroad[3]. Once granted, 30% of an employee's gross labor income is free of tax for a period of 10 years[4].

## 2.2. Eligibility Criteria and the 2012 Law Change

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[2] This scheme was actually the result of a merger of two older schemes (the 35% ruling and Nedeco) which were. already in place in the country since the mid-1980s, making them some of the oldest in the world Weerepas, M.J.G.A.M. et al. (2013) for more information on the functioning of older schemes

[3] National employees are also covered under strict condition

[4] There were two adjustments in the duration period. The first one in 2012 that decreased the maximum duration to 8 years and a second one in 2019 that decreased further by another 3 years.

The main focus of our analysis covers the period from 2002 to the end of 2011. In order to be eligible to the 30% rule before 2012, the incoming employee needed fulfill certain requirements. First, the employee had to be hired from abroad or assigned to work in the Netherlands, meaning that the 30% rule is a special regime for expatriates. Second, the incoming employee must be employed by a Dutch resident employer or a foreign employer who is a wage tax withholding agent in the Netherlands. Third, the employee must have specific skills not readily available in the Dutch labor market, the scarcity requirement, verified against a specific expertise test. Once all these requirements were met, a maximum of 10 years of tax break would be granted. It is noteworthy that the employee would be assessed against the scarcity requirement in an interim check after 5 years of the start of the benefit. Thus, in theory, the 10 years of duration was divided in 5+5 years. In practice, the requirement that an employee has to have specific expertise that is not readily available on the Dutch labor market was not difficult to meet.

On the 16th of May 2011, the media outlet RTL nieuws brought to the public attention that around 2,000 Dutch citizens were benefiting from the 30%-ruling given that they had worked abroad in the past with an estimated annual cost of at least €25 million to the Dutch treasury[5]. In response to the media coverage and public reaction, the State Secretary of Finance, Frans Weekers, opened discussions with the finance commission in order to tighten up the eligibility criteria and exclude those who he called "pseudo-expats". On the 17th of November 2011, after the Lower House voted for proposed changes in the eligibility criteria and tax break duration, the Dutch State Secretary of Finance announced amendments to the 30% ruling that would be put into effect on the 1st of January 2012. Specifically, five big changes were implemented: 1) The maximum tax break period is now limited to 8 years instead of 10 years; 2) The specific expertise test was replaced by a minimum taxable income and scarcity requirement plays only a marginal role; 3) Employees living within a radius of 150 km from the Dutch borders more than two-thirds of the 24-month period prior to the start of the employment are no longer eligible; 4) Employees should have been living abroad for the past 25 years prior the new employment agreement[6]; 5) University doctorates can obtain the benefit easier.

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[5] https://www.rtlnieuws.nl/nieuws/artikel/3106451/belastingvoordeel-voor-veelverdieners
[6] Prior the law change the look back period was 10 years. This change was introduced to make it harder for Dutch employees to benefit from the tax break

All these changes were brought into force on the 1ˢᵗ January 2012 and contrary to the period between 2001 and 2011 when the specific expertise requirement was checked twice - once in the application process and another in the 5 years interim check - the minimum taxable income requirement is continuously checked through the preferential tax scheme period. Hence, the law change raised questions regarding beneficiaries that had applied to the scheme prior to 2012. Would the specific expertise requirement be continuously assessed by the minimum taxable income or would be assessed only after 5 years in the interim check? Which criteria would then be assessed against in the interim check?

A transitional rule was implemented to deal with individuals that arrived before the 1ˢᵗ of January 2012 depending on pre-period settled in the Netherlands. Pre-period 1: Arrivals from 2001 to 2006 that had their 5 years interim test before 2012 would be entitle to 10 years of tax break independently on the new criteria. Pre-period 2: Arrivals from 2007 and 2011 that had their 5 years interim test after 2012 would have 5 years of tax break guaranteed and 5 more years depending on the new criteria. Interestingly, there was one-time assessment against the 150 km recruitment threshold requirement and a permanent assessment against the minimum taxable income requirement.

## 2.3. Transitional Rule and the Quasi-Experimental Variation

The key new criterion for non-eligibility – having originally relocated from a place less than 150km from the Dutch border – introduced by the 2012 law change and the specific format of the transitional rule retroactively affected the beneficiaries of the 30% ruling depending on their pre-period of settlement in the Netherlands. Those incoming employees that did not meet the distance threshold and pre-duration period would now lose their rights to the 30% tax breaks after 5 years while all others would keep it for 10 years. More specifically, workers recruited from Belgium, Luxembourg, a big part of western Germany and a small part of northern France that arrived from 2007 to 2011, but not those who had been in the country longer, were no longer entitle to 10 years of tax break but 5 years instead. Figure 1 exemplifies the distance threshold that is now in place as a key criterion for non-eligibility.

**Figure 1. New Distance Tax Break Criterion: 150km to Dutch border**



Notes: The red line depicts the 150 km distance threshold from the closest point of the Dutch border. In order to be eligible to the 30% rule after 2012, workers must be recruited from a place that lies outside the red delimitations. That is, incoming employees from Belgium, Luxembourg, a big part of western Germany and a small part of northern France are no longer eligible to the Dutch preferential tax scheme. It is noteworthy that in the end, however, the UK was not affected by the change, despite a small part of the southeast UK lying within the 150 km threshold.

In order to better understand how the 2012 law change and the transitional rule worked in practice, Figure A1 depicts the preferential scheme duration on a time diagram and divide the sample of beneficiaries in 2 different groups: 1) Incoming employees that applied to the scheme prior to 2007 and, hence, were assessed by the 5 years interim check before 1st of January 2012; 2) Incoming employees that applied to the scheme between 2007 and the end of 2011 and, hence, susceptible to the 2012 law change due the format of the transitional rule. We further split these 2 groups on those that meet Vs. not meet the distance threshold criterion introduced in 2012. In this sense we illustrate that only a specific group

of workers – those who arrived from 2007 to 2011 and did not meet the distance criterion introduced in 2012 -  were affected by the policy reform. More importantly, this group of individuals had their tax break duration drastically and unexpectedly reduced and this was orthogonal to other factors that affected past individual location decisions.

# 3. Data, Descriptive Statistics and Wage Dynamics

## 3.1. The 30% Rule Database and Descriptive Statistics

We know turn to the description of the database used in this paper and descriptive statistics. We use data from the Dutch tax office (Belastingdienst Nederland) on the whole population of beneficiaries of the 30%-ruling from the period of 2002 to 2011. We have specific information on the start and end date of the tax break, the employer that made the request as well as monthly taxable wage data. Through the whole analyzed period, 57,921 unique individuals made use of the preferential tax scheme.

We complement our database with administrative data from the Statistics Netherlands (Centraal Bureau voor de Statistiek (CBS)). The data allows us to identify specific immigration and emigration date as well as a full set of background characteristics such as gender, age, municipality of residence, employment information, company sector, citizenship and other household characteristics. One shortcoming of our data is that we are only able to identify the previous country of residency and not the precise municipality. As noted in Figure 1, Germany and France are partially affected by the 150 km distance threshold but we are unable to precisely ascertain if individuals are treated or not. We discuss in the next section how we will deal with this issue.

The recruitment process normally takes place in China, Japan and India, 19%, followed by the UK and Ireland, 16%.  Germany and Belgium/Luxembourg account to 8.6% and 2.8% respectively, see Figure A2.  Regarding the sectors that employs the most beneficiaries are business services and trade, transport and catering 29% and 20% respectively. On the other hand, agriculture, construction, rental and trading of real state represent less than 1.5% altogether. See Figure A3 for more on the sectorial composition. Figure A4 depicts the spatial distribution of workers. A massive 27% of the workers live in

Amsterdam. The Hague, Amstelveen and Rotterdam complete the top four municipalities in the Netherlands accounting to roughly 50% of all incoming employees place of residence.

**Table 1 Descriptive Statistics of Tax Break Recipients by Timing of Arrival**

|  | 2002-2011 | | 2002-2007 | | 2007-2011 | |
|---|---|---|---|---|---|---|
|  | Mean | Std. Dev. | Mean | Std. Dev. | Mean | Std. Dev. |
| **Panel A: Migration** | | | | | | |
| Time in NL (Months) | 60.47 | 38.52 | 60.37 | 37.23 | 60.52 | 39.19 |
| Fraction ≥ 5 years | 0.43 | 0.50 | 0.41 | 0.49 | 0.44 | 0.50 |
| Fraction ≥ 10 years | 0.23 | 0.42 | 0.27 | 0.45 | 0.20 | 0.40 |
| **Panel B: Employment** | | | | | | |
| Monthly Wage (€ of 2012) | €7,079.39 | €12,117.65 | €7,942.81 | €14,967.56 | €6,612.61 | €10,222.07 |
| Top 95% earnings distribution | 0.45 | 0.50 | 0.57 | 0.49 | 0.39 | 0.49 |
| Top 99% earnings distribution | 0.23 | 0.42 | 0.31 | 0.46 | 0.19 | 0.39 |
| Number of Jobs | 1.81 | 1.07 | 1.74 | 1.10 | 1.84 | 1.06 |
| Industry & Energy | 0.12 | 0.32 | 0.14 | 0.35 | 0.11 | 0.31 |
| Trade & Transport | 0.20 | 0.40 | 0.22 | 0.41 | 0.19 | 0.39 |
| Information & Communication | 0.14 | 0.35 | 0.10 | 0.30 | 0.16 | 0.37 |
| Business Services | 0.28 | 0.45 | 0.28 | 0.45 | 0.28 | 0.45 |
| Government & Care | 0.13 | 0.34 | 0.12 | 0.33 | 0.14 | 0.34 |
| Others | 0.13 | 0.33 | 0.14 | 0.34 | 0.12 | 0.33 |
| **Panel C: Background** | | | | | | |
| Age | 33.93 | 8.13 | 34.80 | 8.11 | 33.46 | 8.10 |
| Gender | 0.76 | 0.43 | 0.77 | 0.42 | 0.75 | 0.43 |
| With Kids | 0.13 | 0.34 | 0.15 | 0.36 | 0.12 | 0.32 |
| Without Kids | 0.62 | 0.49 | 0.61 | 0.49 | 0.62 | 0.48 |
| Kinds in NL | 0.25 | 0.43 | 0.24 | 0.42 | 0.26 | 0.44 |
| Single | 0.58 | 0.49 | 0.57 | 0.50 | 0.58 | 0.49 |
| Married | 0.18 | 0.38 | 0.21 | 0.41 | 0.16 | 0.37 |
| Married in NL | 0.25 | 0.43 | 0.22 | 0.42 | 0.26 | 0.44 |
| Highly Mobile | 0.37 | 0.48 | 0.59 | 0.49 | 0.24 | 0.42 |
| **Observations** | **57,576** | | **20,204** | | **37,372** | |

Notes: You can find more information on construction and description of all variables in the Data Appendix

When individuals decide to emigrate they are obliged to report to the local authorities in order to deregister from the municipality. This provides another interesting piece of information, the destination municipality. We are able to identify, for all individuals that left the Netherlands, whether they returned to the country of previous residence or if they went to a third country. This is an important piece of information to our anecdotal evidence presented in the next section, where we can show that the loss of the tax break based on the

150km distance was the determinant criterion driving out-migration decision within a country. The information is summarized in Table A1.

Table 1 depicts the descriptive statistics and can be summarized as following. The incoming employees are relatively young, 34.3 years old when they arrived, and overly represented by men, 76%. More than half of the beneficiaries are single, 58%, and they normally don't have kids, 62%. In more than 35% of the cases, expats come from a country that does not match their main nationality, what we define as highly mobile individuals. The average length of stay is 60 months and 43% of incoming employees stay longer than 5 years in the Netherlands while less than a quarter of them exceeds the maximum scheme duration of 10 years. During their stay in the Netherlands, incoming employees have, on average, 1.8 jobs.

## 3.2. High Skilled Migrants and the Dutch Earnings Distribution

An important feature of the setting we are studying is that the changes introduced in 2012 affected individuals from many levels of the earnings distribution. This allow us to better understand possible heterogeneity responses to the policy reform. The average monthly earnings of beneficiaries is € 6,057.22[7], twice the size of the income threshold implemented in 2012[8]. Around 84% of workers have annualized earnings above this income threshold. Out of the 16% of workers that do not meet the income threshold, 35% of them work on exempted sectors such as Research and Education.

The expats are relatively well paid with around 35% of them belonging to the top 5% of the income distribution of the Netherlands and 16% of them at the top 1%. Their labor market incomes were, as expected given the scarcity skill criteria, higher that than the average Dutch population in 2012 but comparable to the top 50% of the distribution as shown in Figure 2 below.

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[7] The monthly wage is calculated by summing all wages received during the second year of stay in the Netherlands divided by the working days and multiplied by 30.5. By doing this we expect to reduce monthly fluctuations due to bonuses and holiday hours.
[8] All earnings are measured in € of 2012

**Figure 2. Wage Distribution: Dutch Population Vs. Beneficiaries**
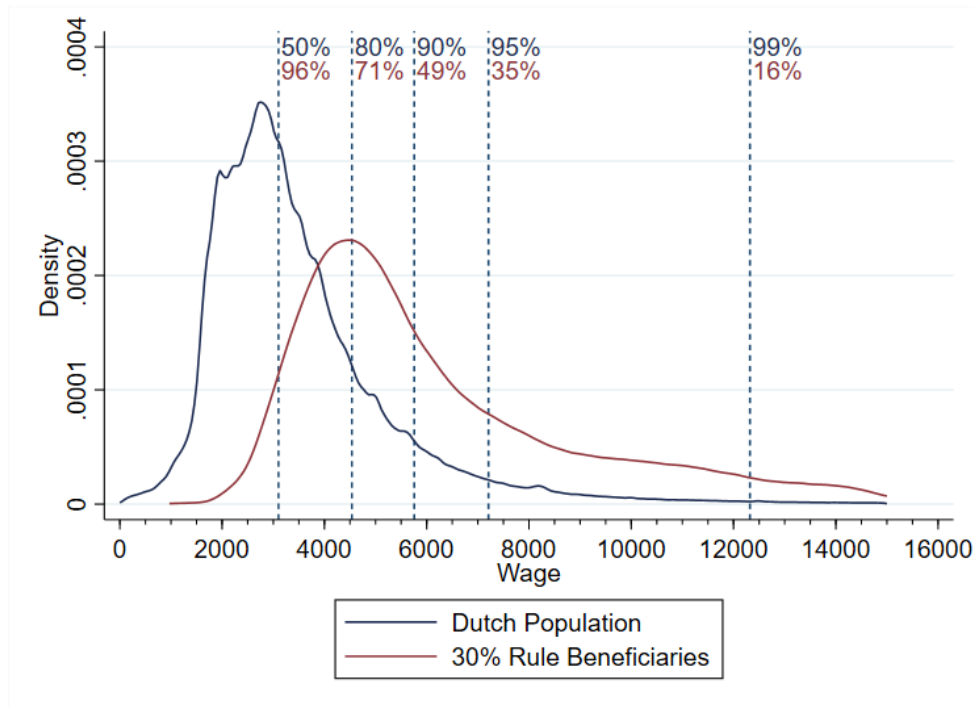


Notes: For the Dutch population, we construct their earnings distribution using their earnings in 2012. For the beneficiaries, we compute their average monthly wage for each year that they were in the country and we select the highest average monthly earnings out of their first two years with positive earnings. To construct their earnings distribution we select only the individuals that had 2012 as their base year when computing their earnings.

## 3.3. The magnitude of the 30% Rule

In practice, the preferential tax scheme reduces substantially the tax burden and can be mathematically described as following:

$$Taxable\ Wage = 0.7(Gross\ Wage)$$
$$Net\ Wage = 0.3(Gross\ Wage) + (1 - Tax\ Rate)\big(0.7(Gross\ Wage)\big) \qquad (1)$$

Assume a hypothetical scenario where two individuals, $i$ and $j$, have the same gross wage from labor and this is their only source of income. Moreover, assume that only

individual $i$ benefits from the tax break, and, without loss of generality, both individuals are taxed under the same tax rate[9]. Then, their net income will be describe as the following:

$$Gross\ Wage_i = Gross\ Wage_j \qquad (2)$$

Individual $i$:

$$Taxable\ Wage_i = 0.7(Gross\ Wage_j)$$

$$Net\ Wage_i = 0.3(Gross\ Wage_j) + (1 - Tax\ Rate)\left(0.7(Gross\ Wage_j)\right)$$

$$Net\ Wage_i = Gross\ Wage_j(0.3 + 0.7 \times (1 - Tax\ Rate))$$

$$Net\ Wage_i \times (0.3 + 0.7 \times (1 - Tax\ Rate))^{-1} = Gross\ Wage_j \qquad (3)$$

Individual $j$:

$$Taxable\ Wage_j = Gross\ Wage_j$$

$$Net\ Wage_j = (1 - Tax\ Rate)(Gross\ Wage_j)$$

$$Net\ Wage_j \times (1 - Tax\ Rate)^{-1} = Gross\ Wage_j \qquad (4)$$

Replacing equation (3) in equation (4) and comparing net wages we have:

$$Net\ Wage_i \times (0.3 + 0.7 \times (1 - Tax\ Rate)^{-1}$$

$$= Net\ Wage_j \times (1 - Tax\ Rate)^{-1}$$

$$\frac{Net\ Wage_i}{Net\ Wage_j} = \frac{0.3 + 0.7 \times (1 - Tax\ Rate)}{(1 - Tax\ Rate)} \gg 1\ if\ 0 < Tax\ Rate\ < 1 \qquad (5)$$

This hypothetical case provides some theoretical insights on the effect that 30% rule tax break has on the net wage of beneficiaries. Now, we turn to the Dutch administrative tax data to produce Figure 3 that depicts the dynamics of taxable and net wages around the end of the preferential tax scheme duration. It is constructed by means of local linear polynomial

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[9] Due the progressivity of the Dutch tax system, if both individuals have the same gross wage but only one is not taxed on 30% of her wage, this automatically leads to a higher average tax rate for the individual that does not benefit from the 30% rule. This means that our final equation is a lower bound of the true size of the benefit.

regression of the average monthly wage of all beneficiaries that arrived in the Netherlands between 2002 and 2011. When the tax break expires the net wage drops substantially from around 8,65 to 8,40, what translates into a reduction in the monthly net wage from $5.710,00 to $4.490,00, or a 21% decrease. The taxable income follows an inverse path. It increases from around 8,65 to around 8,9.

**Figure 3. Taxable and Net Wage dynamics around the end of the tax break**
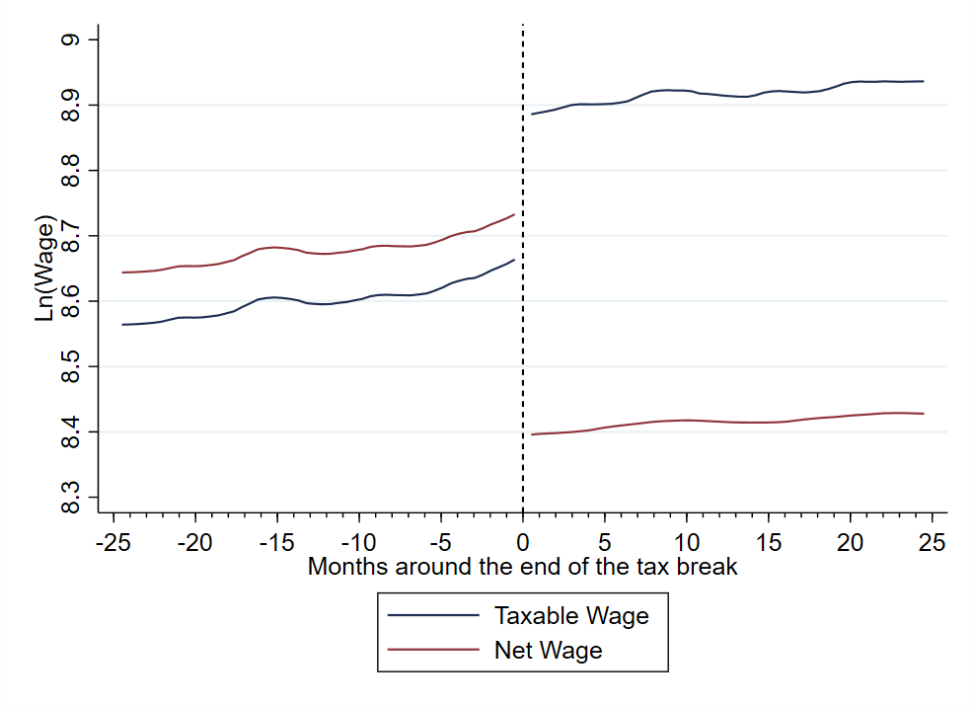


Notes: The wage dynamics is constructed by performing a kernel-weighted local polynomial regression of the taxable and net wage on the months around the end of the tax break for the whole sample of beneficiaries.

# 4. Empirical Specification and Anecdotal Evidence

## 4.1. Empirical Specification

The 2012 change in the 30% ruling allow us to exploit a quasi-experimental variation on the tax rate of a specific group of high skilled migrants and overcome the empirical challenges already discussed. First, the tax break introduced a much lower tax rate to incoming employees by exempting 30% of their income of taxes, as noted in Figure 3. Second, it

unexpectedly increased the tax rate for a specific group of individuals depending on pre-period in the Netherlands and on the country of previous residence. These individuals, that once were entitled to 10 years of tax break, had their benefit revoked after 5 years. Paramount importance is the fact that the policy changes were orthogonal to any other factor that affected past individual location decisions.

We rely on a difference-in-differences estimation to understand migrants decision to leave the Netherlands that originally were attracted by lower tax rates. The main outcomes of interest are the length of stay in the Netherlands, measure in months, and a dummy variable that indicates if the incoming employee stayed in the country for more than 5 years (60 months).

$$Y_{it} = \alpha + \beta_1 PPR_i \times Arrival_t + \beta_2 PPR_i + \beta_3 Arrival_t + \varepsilon_{it} \tag{6}$$

Subscripts $i$ and $t$ denote the beneficiaries, $i$ at arrival years, $t$. $PPR$ is a dummy variable equal to 1 indicating if the previous place of residence of individual $i$, lies within 150km away from the Dutch border and 0 otherwise. Arrival is a dummy variable equal to 1 if individuals arrived from 2007 and 2011 and 0 if they arrived from 2002 to 2006. Therefore, $\beta_1$ is our coefficient of interest that represents the change in policy effect. Finally, $\alpha$ and $\varepsilon$ are, respectively, the constant and error term.

As previously mentioned, we are only able to identify the previous country of residence and, thus, unable to properly assign treatment status to individuals coming from Germany and France. All our empirical analysis will either exclude Germany and France from the sample or include Germany and France in the control groups. Next section we will show that the results are robust irrespective of which two samples we use. Below you will also find some anecdotal evidence about Germany just as an exercise of how the distance threshold works within a country.

## 4.2. Exit Rate

We begin our analysis documenting exit rates by treatment status. Our administrative data allows us to identify precise immigration and emigration dates which we use to construct exit

rate by quarters as shown Figure 4. The figure is divided in two parts, part A that considers Germany and France as control group and part B that excludes these two countries from the sample. In both parts, A and B, the emigration dynamics follow a very alike path with treated and control groups on similar exit rate dynamics up to the moment where they reach 18 quarters (4.5 years) of stay in the Netherlands. Around the $20^{th}$ quarter, then, the dynamics depicts a clear jump, exactly the period when the treated group face a considerably increase in their tax rates.

**Figure 4. Exit Rate Dynamics**
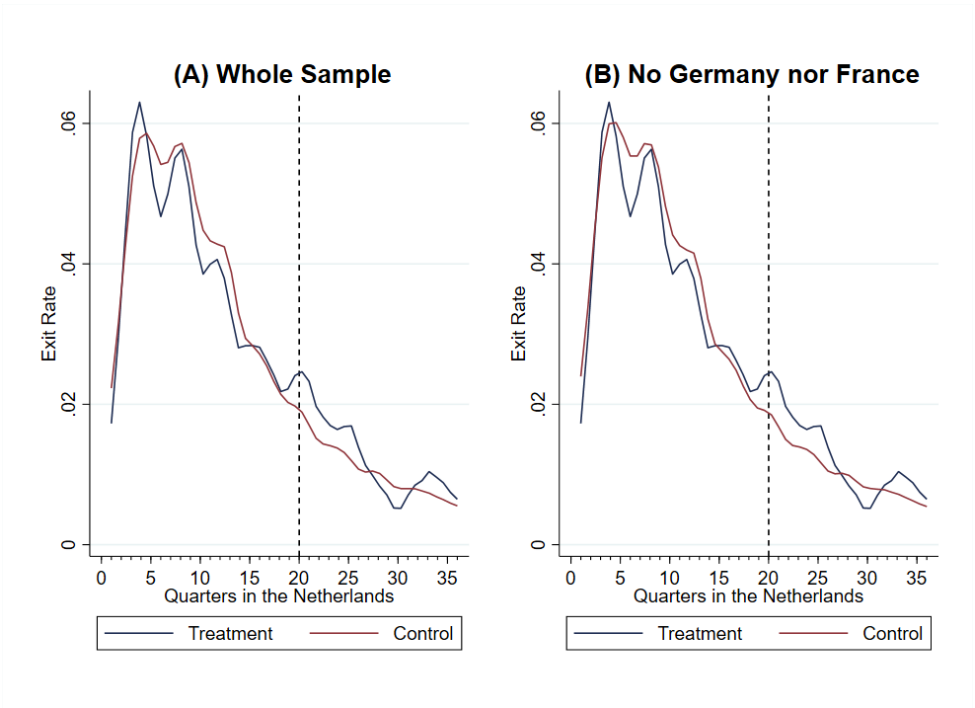


## 4.3. Pre and Post Treatment Dynamics

The main empirical analysis explored in this paper follows the standard difference-in-differences approach defined by equation 6. However, in order to better understand the dynamics of the treatment effect in the post-treatment period and whether our control and treatment group were following comparable paths with respect to our outcomes of interest on the pre-treatment period, we plotted the regression coefficients based on the following equation:

$$Y_{it} = \alpha + \sum_{t=2002}^{2011} \gamma_t D_{it} + \beta_1 PRR_i + \beta_2 Arrival_t + \varepsilon_{it} \qquad (7)$$

Figure 5 displays the results of equation 7 where the omitted category is the difference between treatment and control group that started to benefit from the 30% rule in 2006. The figure is divided in parts A and B, being A associated with the time in the Netherlands measure in months and B whether or not the individual stayed more than 5 years in the country. We find a clear shortening on the length of stay in the Netherlands associated with the policy reform introduced in 2012 specially for the cohort of individuals that arrived in the country between 2007 and 2008. This is also true when we look at whether or not the beneficiaries stayed in the country beyond the 5 years to which their tax break was revoked. The effect appears to be less strong for the cohorts that arrived from 2009 to 2011, although the effect on the length of stay is always negative and significant which is not the case uniquely to the 2010 cohort with respect to staying more than 5 years in the country. The results are also displayed in Table A3 in the Appendix A.

**Figure 5. Pre and Post Treatment Dynamics**



(A) Time in the Netherlands (in Months)

(B) More than 5 years in the Netherlands

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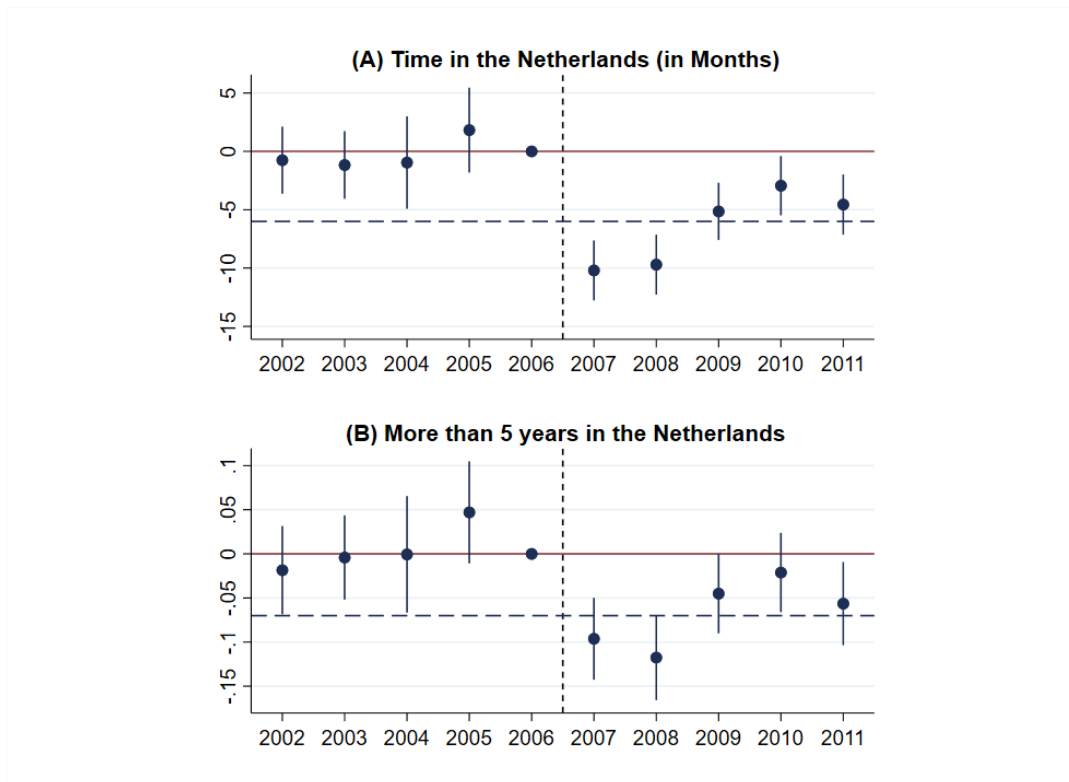
## 4.4. Anecdotal Evidence

As mentioned in our data description, individuals are obliged to deregister from the Dutch municipality when they decide to emigrate and to provide a foreign address for future communication with Dutch authorities. Information on the exact distance from the foreign address to the closest Dutch border is available for Belgium and Germany, thus, we use this information to better understand how the distance threshold works within a country that was partially affected, Germany.

We consider the whole sample of beneficiaries that previously lived in Germany and immigrate to the Netherlands between 2002 and 2019. We start by providing a graphical representation of the distribution of emigrants depending on the distance, in kilometers, to the closest Dutch border. Figure 6 shows a clear change of pattern exactly at 150 km. Individuals that arrived in between the years of 2007 and 2011 and, thus, likely to be treated by the law change in 2012, return more often to municipalities in Germany within 150 km away from the Dutch border when compared to individuals that were not treated.

In this exercise we try to quantify the probability of returning to an area below the distance threshold once the policy change was implemented. We regress a dummy variable on treated years variable. Our outcome of interest equals to 1 if the individual have returned to a municipality in Germany that lies within 150 km away from the Dutch border and 0 otherwise. We control for country of birth and years in the Netherlands fixed effects. The loss of the tax break based on the 150km distance was the determinant criterion driving out-migration location decisions. The probability of returning to a municipality below the 150km distance threshold increases by more than half once the policy is implemented as shown in the results of Table 2.

Columns 1 and 2 from Table 2 show the results of our basic exercise considering beneficiaries that arrived between 2002 and 2019. The distinction between these two columns is that column 1 considers individuals irrespectively of the time they stayed in the Netherlands, while column 2 only considers individuals that emigrate after being in the country no longer than 5 years, the pre-period condition. The probability of individuals, that previously lived in Germany, to return to a German municipality within 150 km of distance to the closest Dutch border varies from 63% to 78%. It is true that beneficiaries that arrived

after 2012 necessarily immigrated from a municipality that lies outside the 150 km threshold and, therefore, we are likely overestimating the effect. Thus, columns 3 and 4 only consider beneficiaries that arrived between 2002 and 2011. The probability to return to a place in Germany within 150 km of distance to the Dutch border remains positive and highly significant although its size decreased ranging from 18% to 21%.

**Figure 6. Returns to Germany by Distance to the Dutch Border Pre and Post-Policy**
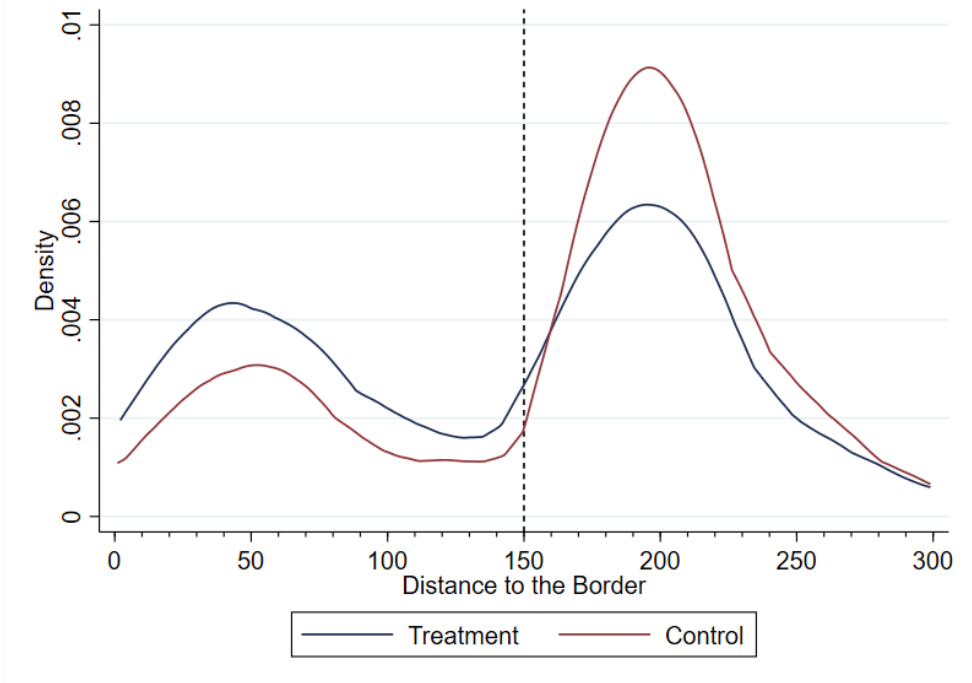


Note: Germans returns if arrived between 2002 and 2019. Control sample 2002-2006 & 2012-2019 Vs treatment sample 2007-201. Figure 6 only considers individuals that stayed no longer than 5 years in the Netherlands. This subgroup division allows us to identify the individuals that emigrate from the Netherlands within one year after reaching the maximum years of benefit for those that belong to the treated group.

## 5. Empirical Analysis

Table 3 show the estimates of how the policy change affected the mobility behavior of highly skilled immigrants where our outcome of interest is the length of stay in the Netherlands measured in months. This Table is divided in panel A, where we exclude Germany and France from the control groups, and Panel B where we consider all beneficiaries of our sample. The most basic specification of equation (6) is presented in

column (1) and we successively add control variables up to our full specification in column (6). All the regressions include country of previous residence and arrival year fixed effects. Our coefficient of interest, *PPR\*Arrival*, is always negative, statistically significant and hardly vary across specifications – inclusion of controls or restriction of the analyzed sample. The point estimate shows that individuals that were affected by the change in the law in 2012 have a relatively shorter length of stay in the Netherlands. Considering our results from panel A, treated beneficiaries stay, on average, 5.8 to 6.26 months less in the country translating to a decrease of 8% to 9.5% from a baseline of 65.5 months.

**Table 2: Change in Returns to Germany by Distance to Dutch Border**

| Dependent Variable | Return to less than 150km (1) | Return to less than 150km (2) | Return to less than 150km (3) | Return to less than 150km (4) |
|---|---|---|---|---|
| Treated Year | 0.07*** | 0.07*** | 0.03*** | 0.03*** |
| | (0.01) | (0.01) | (0.01) | (0.01) |
| Constant | 0.12*** | 0.10*** | 0.16*** | 0.14*** |
| | (0.00) | (0.00) | (0.01) | (0.01) |
| Observations | 6,510 | 4,441 | 3,749 | 2,265 |
| Pop | All | All | 2002-2011 | 2002-2011 |
| Years in NL | All | 5 or less | All | 5 or less |
| Mean Dep. Var. | 0.11 | 0.09 | 0.17 | 0.14 |
| Impact at Mean | 0.63 | 0.78 | 0.18 | 0.21 |
| Country of Birth FE | YES | YES | YES | YES |
| Year in NL FE | YES | YES | YES | YES |

Notes: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1 All regressions include country of birth and year in the Netherlands fixed effects.

Turning to our second outcome of interest, a dummy indication to whether the individual stayed beyond the 5 years end of the preferential tax treatment we can reach the same conclusion: The shortened of preferential tax scheme for our treatment group had a negative effect on the probability to stay longer than 5 years in the Netherlands. Table 4 presents these results and it is divided in Panel A and B as Table 3. The results from our preferred specification, Column 6 of Panel A, indicate that, when evaluated at the mean, beneficiaries that had their tax break revoked after 5 years are 12% less likely to complete 5 years in the Netherlands. The point estimates across the specifications are fairly equal, irrespective of the inclusion of our control variables and different control groups.

## Table 3: Time in NL (in Months)

| Dependent Variable | Time in Country (1) | Time in Country (2) | Time in Country (3) | Time in Country (4) | Time in Country (5) | Time in Country (6) |
|---|---|---|---|---|---|---|
| **Panel A: No Germany or France** | | | | | | |
| PPR*Arrival | -6.26*** | -5.76*** | -5.87*** | -5.87*** | -5.81*** | -5.80*** |
| | (1.38) | (1.30) | (1.14) | (1.16) | (1.16) | (1.19) |
| Constant | 58.12*** | 54.65*** | 65.96*** | 67.55*** | 67.81*** | 68.07*** |
| | (0.18) | (0.66) | (1.39) | (1.34) | (1.37) | (1.38) |
| Observations | 49,894 | 49,894 | 49,572 | 49,572 | 49,572 | 49,572 |
| **Panel B: All Countries** | | | | | | |
| PPR*Arrival | -6.02*** | -5.53*** | -5.59*** | -5.58*** | -5.52*** | -5.51*** |
| | (1.38) | (1.30) | (1.15) | (1.18) | (1.17) | (1.20) |
| Constant | 58.49*** | 55.02*** | 65.74*** | 67.49*** | 67.75*** | 68.01*** |
| | (0.17) | (0.61) | (1.25) | (1.21) | (1.24) | (1.24) |
| Observations | 57,898 | 57,898 | 57,557 | 57,557 | 57,557 | 57,557 |
| Sector | NO | YES | YES | YES | YES | YES |
| Age | NO | NO | YES | YES | YES | YES |
| Gender | NO | NO | NO | YES | YES | YES |
| Married | NO | NO | NO | NO | YES | YES |
| Child | NO | NO | NO | NO | NO | YES |
| Mean Dep. Var. | 65.49 | 65.49 | 65.49 | 65.49 | 65.49 | 65.49 |
| Panel A: Impact at Mean | -0.09 | -0.08 | -0.08 | -0.08 | -0.08 | -0.08 |
| Panel B: Impact at Mean | -0.09 | -0.09 | -0.09 | -0.09 | -0.09 | -0.09 |
| Country of Origin FE | YES | YES | YES | YES | YES | YES |
| Start Year FE | YES | YES | YES | YES | YES | YES |

Notes: Standard errors in parentheses *** $p<0.01$, ** $p<0.05$, * $p<0.1$. All regressions include country of origin and start year fixed effects. Panel A considers all countries as control groups while panel B exclude partially treated countries such as Germany and France from the control groups.

We perform several robustness checks and a placebo test in country and present them in Tables A4-A7 in Appendix A.

**Table 4: Time in NL (More than 5 years)**

| Dependent Variable | Time in Country (> 5 year) (1) | Time in Country (> 5 year) (2) | Time in Country (> 5 year) (3) | Time in Country (> 5 year) (4) | Time in Country (> 5 year) (5) | Time in Country (> 5 year) (6) |
|---|---|---|---|---|---|---|
| **Panel A: No Germany and France** | | | | | | |
| PPR*Arrival | -0.07*** | -0.07*** | -0.07*** | -0.07*** | -0.07*** | -0.07*** |
| | (0.02) | (0.02) | (0.02) | (0.02) | (0.02) | (0.02) |
| Constant | 0.43*** | 0.39*** | 0.53*** | 0.55*** | 0.55*** | 0.55*** |
| | (0.00) | (0.01) | (0.02) | (0.02) | (0.02) | (0.02) |
| Observations | 49,894 | 49,894 | 49,572 | 49,572 | 49,572 | 49,572 |
| **Panel B: All Countries** | | | | | | |
| PPR*Arrival | -0.07*** | -0.06*** | -0.06*** | -0.06*** | -0.06*** | -0.06*** |
| | (0.02) | (0.02) | (0.02) | (0.02) | (0.02) | (0.02) |
| Constant | 0.43*** | 0.39*** | 0.52*** | 0.54*** | 0.54*** | 0.55*** |
| | (0.00) | (0.01) | (0.01) | (0.01) | (0.01) | (0.02) |
| Observations | 57,898 | 57,898 | 57,557 | 57,557 | 57,557 | 57,557 |
| Sector | NO | YES | YES | YES | YES | YES |
| Age | NO | NO | YES | YES | YES | YES |
| Gender | NO | NO | NO | YES | YES | YES |
| Married | NO | NO | NO | NO | YES | YES |
| Child | NO | NO | NO | NO | NO | YES |
| Mean Dep. Var. | 0.51 | 0.51 | 0.51 | 0.51 | 0.51 | 0.51 |
| Panel A: Impact at Mean | -0.14 | -0.12 | -0.12 | -0.12 | -0.12 | -0.12 |
| Panel B: Impact at Mean | -0.14 | -0.14 | -0.14 | -0.14 | -0.14 | -0.14 |
| Country of Origin FE | YES | YES | YES | YES | YES | YES |
| Start Year FE | YES | YES | YES | YES | YES | YES |

Notes: Standard errors in parentheses *** $p<0.01$, ** $p<0.05$, * $p<0.1$. All regressions include country of origin and start year fixed effects. Panel A considers all countries as control groups while panel B exclude partially treated countries such as Germany and France from the control groups.

# 6. Policy response heterogeneities

Our baseline results quite clearly show that beneficiaries that had their tax break revoked after 5 years have shortened their stay in the Netherlands and were less likely to stay beyond

the benefit expiration. One way to get a more comprehensive picture on the policy effect is to analyze the heterogeneity responses of different sub-groups samples. We do this by focusing on beneficiaries from different levels of the earnings distribution to better understand if our results are driven by the behavioral responses from individuals that belong to the top of the distribution, as commonly explored in the literature [see Kleven et al. (2020) for a review], with the exemption of Muñoz (2019) that looked at the top 10% of earners. We also explore how these behavior responses from top earners can be further intensified if these individuals are also lean to be mobile. Lastly, we look at household composition and how family roots can influence retention in the Netherlands.

## 6.1. Top Earners Vs. Other Beneficiaries

The literature on taxation and migration have mainly focused on the behavioral responses of top earners given that the top marginal rates are normally the object of the income tax reforms resulting in substantial variation that allows researchers to study the causal effect of taxes on migration. However, our setting provides us with the opportunity to study the mobility behavior of individuals from a wider range of the earnings distribution. Thus, we extend our analysis by splitting our sample into 3 sub-groups. First we compare the responses from bottom 95%[10] vs top 5%; Secondly we compare bottom 99% vs top 1%; Lastly, the comparison is between bottom 95% Vs. 95-99% Vs. top 1%. We present our results split by income group in the form of impact evaluated at the mean in Figures 6 and 7 and the point estimates are shown in Tables A8 and A9[11] in Appendix A.

For the purpose of comparison, our baseline impact at the mean is shown and extended by the horizontal dashed line at 9.5%. The three sub-groups of comparison are separated by the vertical dashed lines in parts A, B and C. Beneficiaries from the top 5% and, more specifically, the top 1% of the earnings distribution are clearly the most responsive

individuals in the light of the policy reform. Looking at the first group of comparison, part A from Figure 6, we find that the bottom 95% of earners do not react at all. The point estimate is nearly 0 as is its impact evaluated at the mean. Thus, beneficiaries from the top 5% seem to be the ones driving the baseline responses with a point estimate of -10.7 and impact at their mean of the order of 16%.

To deepen our analysis and gain a better sense of where the tax rate increases actually triggers mobility responses we split our sample in bottom 99% Vs. top 1%, part B. The bottom 99% presents a point estimate of -3.75 which translates into an impact at their mean of 6%. The effects are still smaller than our baseline results, although stronger than in our first comparison. The top 1%, however, present a higher absolute point estimate of -11.7 and combined with a smaller baseline mean of our outcome of interest results in a 19% decrease on their length of stay. These results suggest that individuals belonging to the top 1% of the earnings distribution are indeed the ones that react the most to an increase in taxes and our last analysis, the comparison between bottom 95% Vs. 95-99% Vs. top 1%, serves to gain insights on where this increase in taxes actually kicks in. The analysis so far suggested what we confirm in part C. Individuals from the from the top 95-99% do react to an increase in taxes, although in a less responsiveness manner than individuals from the top 1%. These individuals decreased the length of stay in the Netherlands by 13% against 19% of the top 1%.

Figure 7 depicts the results from Table A9 on whether or not the probability of individuals to stay beyond 5 years in the Netherlands was affected. When interpreting coefficients for different sub-groups, it is important to keep in mind that these may not only differ in their responses but also in their baseline probability. This is exactly the case here. Individuals from the top 1% of the earnings distribution have higher absolute point estimates, -0.13, than if compared to top 95-99% and bottom 95%. Concomitantly, they are less likely, on average, to stay more than 5 years in the Netherlands. This, as a consequence, translates into a decrease of 28% probability to stay beyond the period to which their tax break was revoked. The results we find suggest that individuals from the top 1% of the earnings distribution drive our baseline results.

**Figure 6. Income Heterogeneity: Impact at the Mean - Time in NL (in Months)**
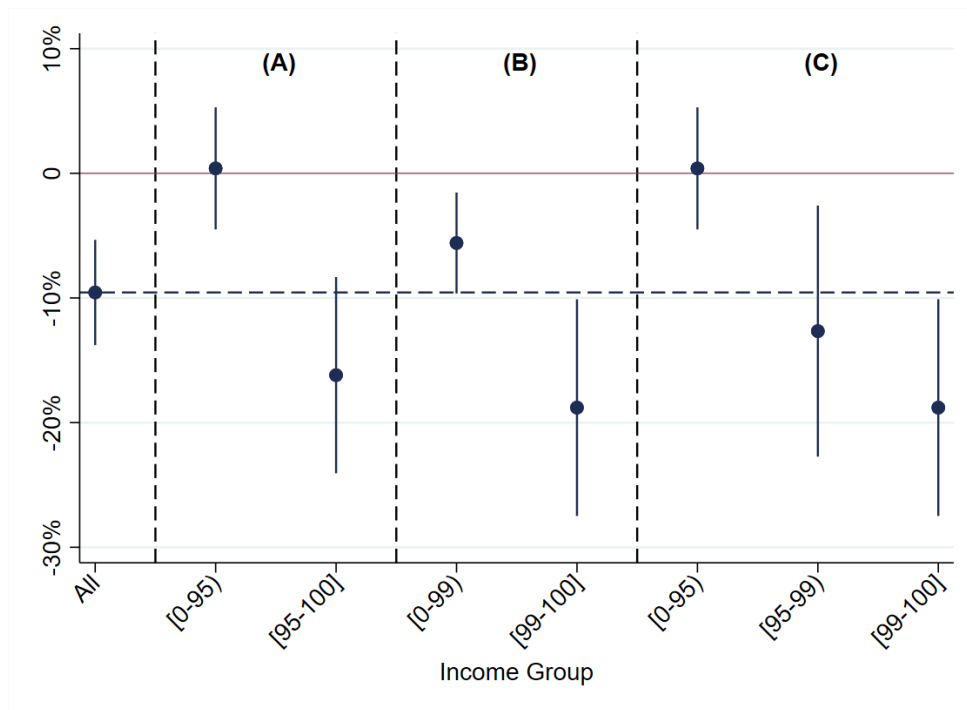


**Figure 7. Income Heterogeneity: Impact at the Mean - More than 5 years in NL**
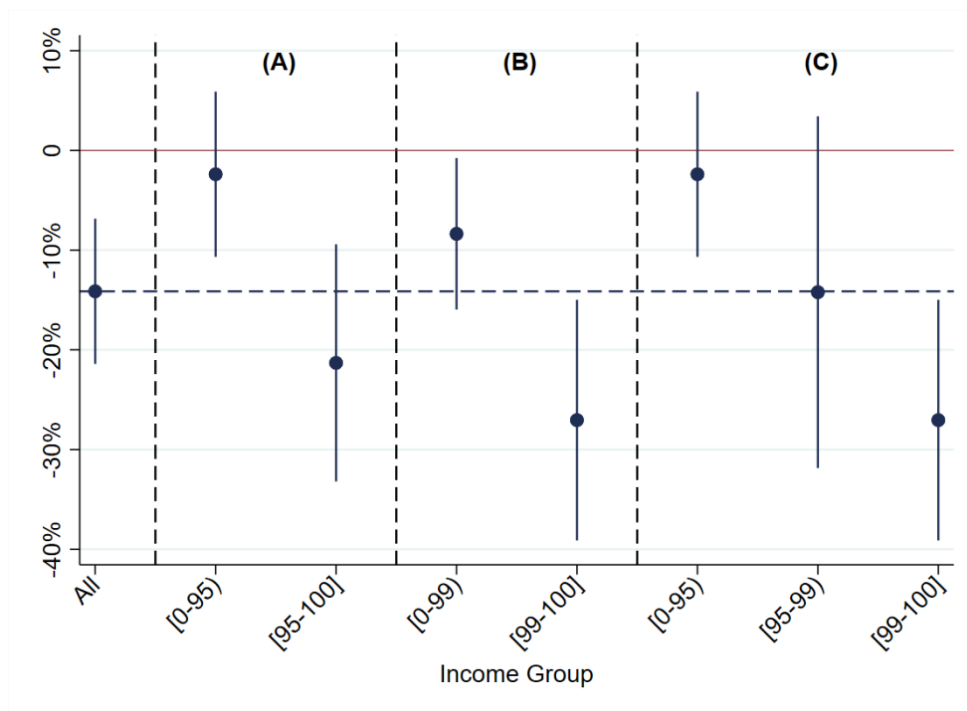
## 6.2. Highly Mobile Individuals

Migrants are naturally not a random selection of the origin population given that migration incentives and costs vary depending on individual characteristics as we just saw on our income level heterogeneity. Furthermore, some individuals have a higher predisposition to be mobile and within a sample of migrants this should not be different. We define beneficiaries as highly mobile those that differ in terms of nationality and country of previous residence, meaning that they were already migrants in the past[12].

You can find the results from our triple interaction in Table 4 that is divided in parts A – length of stay in the Netherlands - and B – probability to stay more than 5 years in the Netherlands. Column 1 shows that being highly mobile does not seen to be a source of sensitivity in neither of our outcomes of interest. However, looking at the whole sample hides important policy response heterogeneities. Thus, Columns 2-4 condition our sample to one of the three groups of income discussed in the previous sub-section. The results are striking. Individuals from the top 5% of the earnings distribution and more specifically the top 1% that are considered highly mobile are extremely responsive to the tax increase. The policy reform have decreased the length of stay of individuals from the 95-99% and top 1% on 22% and 38% respectively. Moreover, the probability of these groups to stay in the Netherlands more than 5 years have decreased, respectively, 50% and 76%.

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[12] We don't consider individuals to be highly mobile if they have Dutch nationality

**Table 4: Highly Mobile Individuals**

| Groups | All (1) | Bottom 95% (2) | 95%-99% (3) | Top 1% (4) |
|---|---|---|---|---|
| **Panel A: Time in Country (in Months)** | | | | |
| PPR*Arrival | 4.85** | 7.67** | 4.22 | 3.96 |
| | (2.09) | (3.87) | (3.68) | (3.19) |
| PPR*Arrival*High Mobile | -8.82 | -4.10 | -11.81* | -17.31*** |
| | (6.39) | (7.97) | (7.03) | (6.34) |
| Constant | 71.06*** | 72.77*** | 71.34*** | 66.05*** |
| | (0.52) | (0.63) | (0.59) | (0.63) |
| | | | | |
| **Panel B: Time in Country (> 5 year)** | | | | |
| PPR*Arrival | 0.06** | 0.08* | 0.08 | 0.05 |
| | (0.02) | (0.04) | (0.05) | (0.05) |
| PPR*Arrival*High Mobile | -0.13* | -0.08 | -0.17** | -0.20** |
| | (0.08) | (0.09) | (0.08) | (0.09) |
| Constant | 0.58*** | 0.60*** | 0.59*** | 0.51*** |
| | (0.01) | (0.01) | (0.01) | (0.01) |
| Observations | 49,894 | 27,359 | 10,842 | 11,640 |
| **Panel A:** Mean Dep. Var. | 49.17 | 48.67 | 53.78 | 46.12 |
| Impact at Mean | -0.20 | -0.10 | -0.22 | -0.38 |
| **Panel B:** Mean Dep. Var. | 0.30 | 0.31 | 0.34 | 0.26 |
| Impact at Mean | -0.43 | -0.29 | -0.50 | -0.76 |
| Country of Origin FE | YES | YES | YES | YES |
| Start Year FE | YES | YES | YES | YES |

Notes: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. All regressions include country of origin and start year fixed effects. Highly mobile individuals are defined as the individuals that do not share the nationality of the previous country of residence.

## 6.3. Family Roots

Family composition is another individual characteristic with potential to trigger policy response heterogeneities and this is what we explore here. We split individuals depending on their marital status - single, married or married in the Netherlands - and on the presence of child in the household – no kids, kids and kids in the Netherlands. We present our results

split by household composition in the form of impact evaluated at the mean in Figures 8 and 9 and the point estimates are shown in Tables A10 and A11 in Appendix A. It is important to start this discussion by pointing to the differences in baseline means. Single individuals stay, on average, considerably less time in the Netherlands, 58 months, than individuals that are married or that married in the Netherlands, 66 and 85 months respectively. This translates into a 10% decrease in their length of stay against 6% decrease for individuals married in the Netherlands that you can see in part A of Figure 8. The decrease might sound counterintuitive, but it is important to note that when we look at the likelihood to stay beyond 5 years, only single individuals seem to react to the period threshold and decrease their probability in 18%, part A of Figure 9.

When we look to our second potential source of heterogeneity, having kids in the household, we also need to mention the differences in baseline means. Individuals with no kids stay in the Netherlands, on average, 55 months, less than households that have kids, 70 months and households that had kids in the Netherlands, 85 months. Thus, although the point estimates of individuals that had kids in the Netherlands being higher in absolute terms than individuals without kids, the reduction in their length of stay in the Netherlands is lower, 6% against 9%, part B of Figure 8. Moreover, individuals that do not have kids seem to drive the results on the probability of stay in the country for more than 5 year. They present an 18% reduction in their probability, part B of Figure 9. Therefore, family composition seem to play an important role on individuals' mobility decisions

**Figure 8. Family Roots: Impact at the Mean - Time in NL (in Months)**
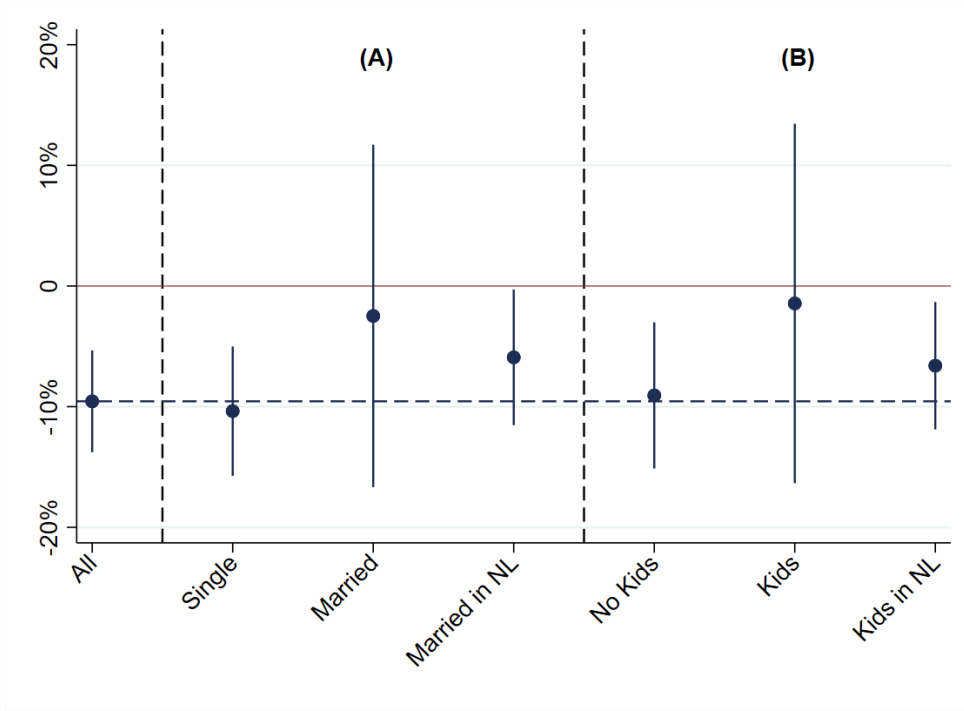


**Figure 9. Family Roots: Impact at the Mean - More than 5 years in NL**
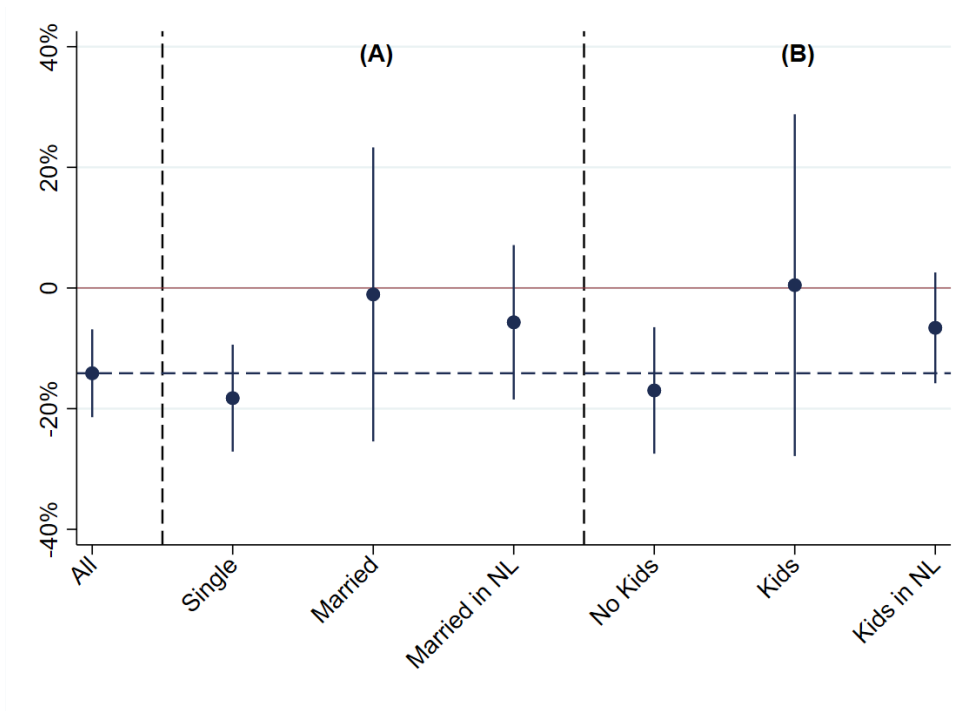
# 7. Potential threats

## 7.1. Working from Abroad?

One potential threat to our research strategy is that individuals do not necessarily need to relocate to the Netherlands in order to benefit from the 30% rule. That is, as long as the incoming employee is recruited from abroad she can choose to live in the Netherlands or in a third country. This is an important concern in the light of the work by Agrawal and Hoyt (2018). In the Netherlands, taxes are levied in the country of employment

Therefore, it is important to understand how workers from abroad can influence our results. We start by showing in Figure 10 that the growth rates in the total number of new beneficiaries that started working from abroad after emigrating from the Netherlands through the years of 2003 to 2017 do not present any clear pattern across treatment status.

**Figure 10. Growth Rates on the Number of New Workers from Abroad**
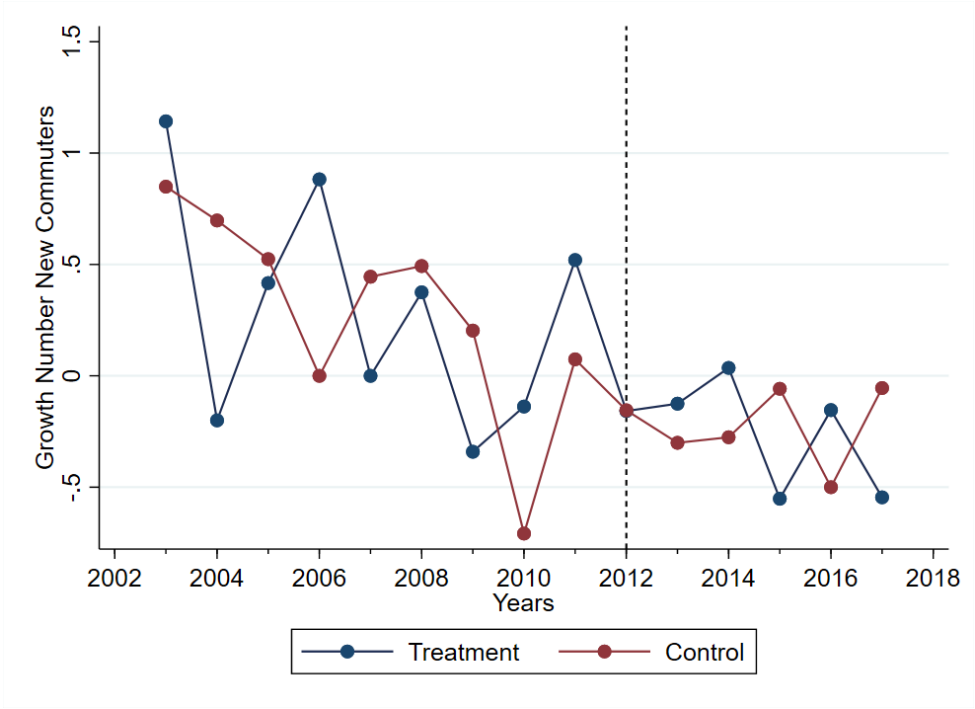
It does seem to be the case that the policy reform have changed individual's incentives to live abroad and continue working in the Netherlands. However, our first impression is based on a graphical representation that only considers the growth rate in the number of new workers from abroad. It is still possible that the length of employment in the Netherlands while living abroad have changed. If this is the case, then we would be studying employment location rather than migration. To rule out this possibility we rely on a difference-in-differences estimation, considering 2 outcomes of interest: 1) employment time from abroad measured in months; and 2) a dummy indication if the individual had ever worked in the Netherlands from abroad. We define an individual as worker from abroad if she had emigrated from the Netherlands but continues to pay taxes in the Netherlands on an average monthly wage of at least €1,000.00. Columns 1 and 2 from Table 5 show the results for our sample excluding Germany and France from the control group and columns 3 and 4 consider the whole sample of beneficiaries. The message is clear: the policy reform has no impact on beneficiaries working from abroad neither at the intensive nor at the extensive margin.

**Table 5: Working from abroad**

| Dependent Variable | Employment time abroad (Months) | Work from Abroad | Employment time abroad (Months) | Work from Abroad |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| PPR*Arrival | -0.06 | 0.03 | -0.06 | 0.02 |
| | (1.10) | (0.02) | (1.10) | (0.02) |
| Constant | -0.91** | 0.04*** | -1.13*** | 0.04*** |
| | (0.40) | (0.01) | (0.40) | (0.01) |
| Observations | 49,572 | 49,572 | 57,557 | 57,557 |
| Sample | No DE FR | No DE FR | Whole Sample | Whole Sample |
| Country of Origin FE | YES | YES | YES | YES |
| Start Year FE | YES | YES | YES | YES |

Notes: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

We perform several robustness checks on our baseline estimates considering employment time instead of residence time in the Netherlands. Results can be found in Tables A12-A14 in Appendix A.

## 7.2. Income or Wealth?

Another concern with our identification and, more specifically, problematic to the estimation of the tax induced migration elasticities is that in addition to 30% of income being free of tax, beneficiaries of the 30% rule can opt for the 'partial non-residency status'. That is, even though the individuals live in the Netherlands and their personal income are taxed as a resident tax payer, they are not subject to income tax on their income from assets, savings and investments.

**Figure 11. Beneficiaries within Dutch Population Wealth Deciles**
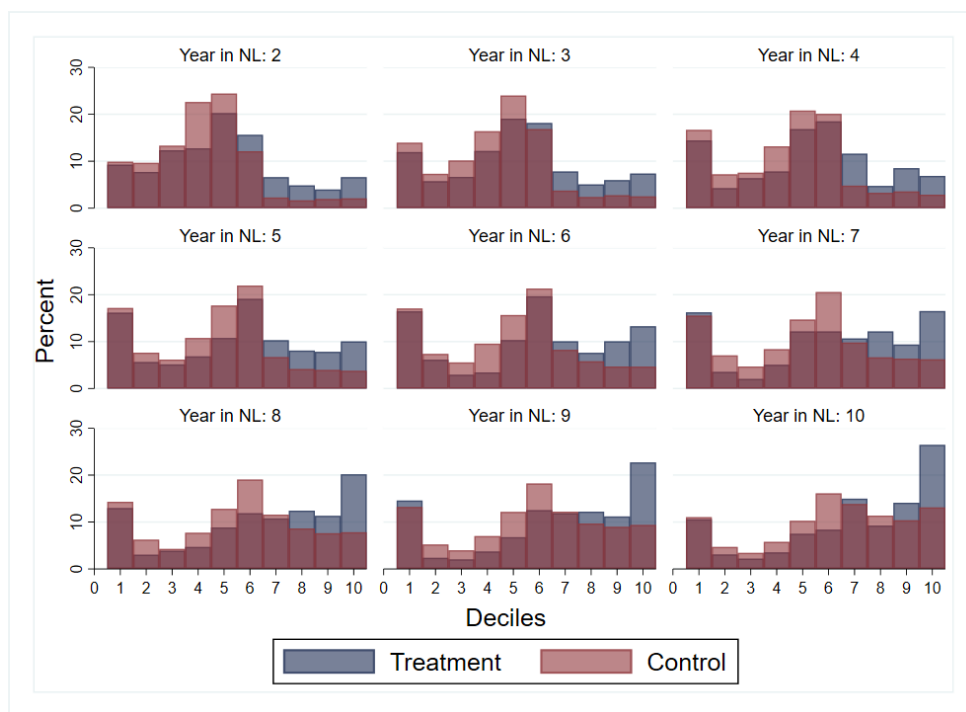


Data on household wealth is available from the years of 2006-2019. Thus, individuals that immigrated to and emigrated from the Netherlands from 2002 to 2006 are not covered by this data, nor all individuals that stayed less than 1 year in the Netherlands. We start by documenting the evolution of wealth deciles by treatment status in Figure 11. Wealth deciles are calculated based on the Dutch household wealth distribution. Thus, it is natural the Dutch population is wealthier than recently arrived immigrants. However, it is noteworthy that the evolution of treatment and control groups follow a similar path with a higher concentration

of beneficiaries in the bottom 5 deciles of wealth in early stages of their stay in the Netherlands, progressing to the top deciles with time. Treatment group is slightly wealthier than control group but this might correlate with lower financial transactions frictions between Belgium, Luxembourg and the Netherlands.

Figure 12 documents the evolution of wage and wealth by group of income defined in our heterogeneity analysis. Naturally beneficiaries from the top 5% of the earnings distribution have higher average monthly wages than the bottom 95%. Interestingly, however, is the fact that the dynamics of wealth accumulation follow extremely similar paths. The pattern is also corroborated with Figures A5 and A6 where we show the evolution of beneficiaries' wealth deciles by group of income. Individuals from the top 5% of the earnings distribution end up in the higher deciles of the Dutch household wealth distribution with time. However, we cannot see any clear distinction on wealth levels upon arrival.

**Figure 12. Beneficiaries Wage and Wealth evolution: Earners from Top 5% vs Bottom 95%**
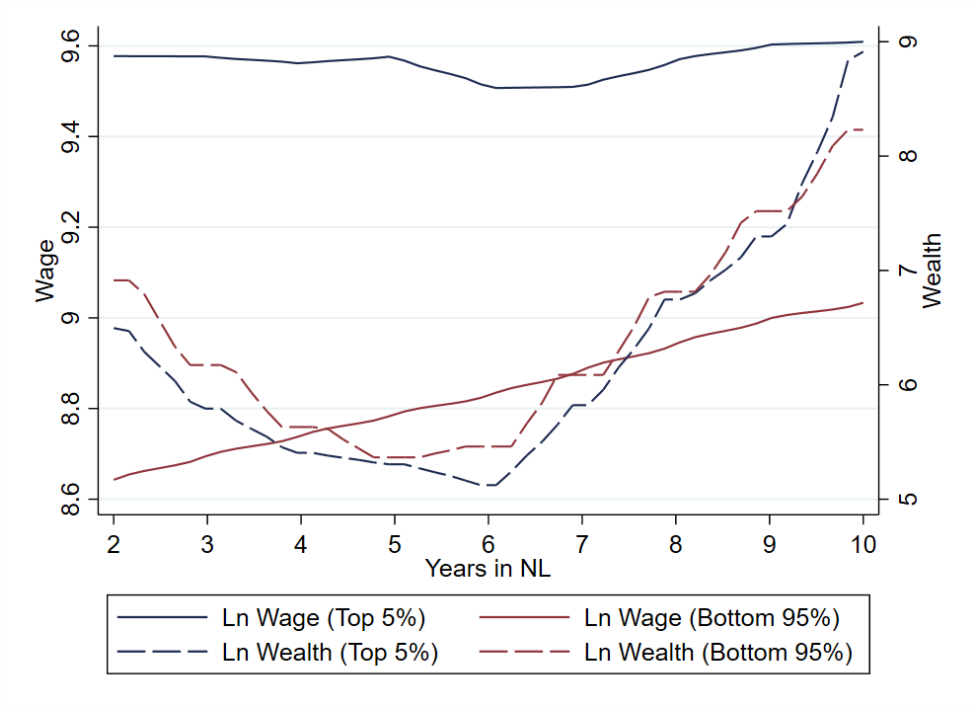


The potential threat to our identification is therefore that our baseline results do not capture the effect of an unexpected increase in tax over taxable income but rather that individuals' different baseline wealth levels triggered mobility responses due to higher

taxation of assets, savings and investments. Moreover, the threat could be extended to our heterogeneity analysis if top earners differ considerably in terms of wealth.

**Table A15: Time in Country: Wealth Heterogeneity**

| Dependent Variable | Time in Country (1) | Time in Country (2) | Time in Country (3) | Time in Country (4) | Time in Country (5) |
|---|---|---|---|---|---|
| | No DE and FR Sample | | | [0-95) Vs. [95-100] | |
| PPR*Arrival | -6.02*** | -6.03*** | -5.38*** | -2.15 | -11.12** |
| | (1.87) | (1.87) | (1.93) | (11.94) | (5.03) |
| Wealth Base Year | | -0.02 | | | |
| | | (0.06) | | | |
| Wealth Decile Base Year | | | 1.26*** | | |
| | | | (0.12) | | |
| PPR*Arrival*Wealth Decile | | | | -0.21 | 0.90 |
| | | | | (1.46) | (0.70) |
| Constant | 61.90*** | 62.02*** | 54.95*** | 58.62*** | 48.84*** |
| | (0.23) | (0.49) | (0.72) | (0.88) | (0.91) |
| Observations | 30,078 | 30,078 | 30,078 | 16,196 | 13,852 |
| Country of Origin FE | YES | YES | YES | YES | YES |
| Start Year FE | YES | YES | YES | YES | YES |

Notes: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1 All regressions include country of origin and start year fixed effects.

**Table A16: Time in NL (More than 5 years): Wealth Heterogeneity**

| Dependent Variable | Time in Country (1) | Time in Country (2) | Time in Country (3) | Time in Country (4) | Time in Country (5) |
|---|---|---|---|---|---|
| | No DE and FR Sample | | | [0-95) Vs. [95-100] | |
| PPR*Arrival | -0.08*** | -0.09*** | -0.08*** | -0.04 | -0.13* |
| | (0.03) | (0.03) | (0.03) | (0.15) | (0.07) |
| Wealth Base Year | | -0.00* | | | |
| | | (0.00) | | | |
| Wealth Decile Base Year | | | 0.01*** | | |
| | | | (0.00) | | |
| PPR*Arrival*Wealth Decile | | | | 0.44*** | 0.31*** |
| | | | | (0.01) | (0.01) |
| Constant | 0.46*** | 0.47*** | 0.39*** | 0.44*** | 0.31*** |
| | (0.00) | (0.01) | (0.01) | (0.01) | (0.01) |
| Observations | 30,078 | 30,078 | 30,078 | 16,196 | 13,852 |
| Country of Origin FE | YES | YES | YES | YES | YES |
| Start Year FE | YES | YES | YES | YES | YES |

# 8. Conclusions

In this paper we analyzed how a quasi-experimental variation in the tax rate of certain individuals have influenced their mobility responses. We do this by exploiting two different approaches. First we look at individuals who arrived from Belgium or Luxembourg – the two countries which were entirely covered by the new 150km criterion – to compare their return rate to those arriving from non-affected countries before or after 2007. Secondly, we look at out-migration patterns to a partially treated country, Germany, depending on the exact distance to the Dutch border of the municipality where they declare their return to as they leave the Netherlands.

The analysis based on our difference-in-difference (DiD) yield very similar findings for the two approaches: strong out-migration responses to eligibility loss to the preferential tax break, even after spending substantial time in the host country. The effects are driven from behavioral responses of the treated individuals belonging to the top 95% and especially top 99% of the income distribution. When we use the returns to Germany we clearly see that the probability of returning to an area below the 150 km distance threshold increases once the policy is implemented.

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# Appendix

**Figure A1: Preferential tax scheme time diagram**
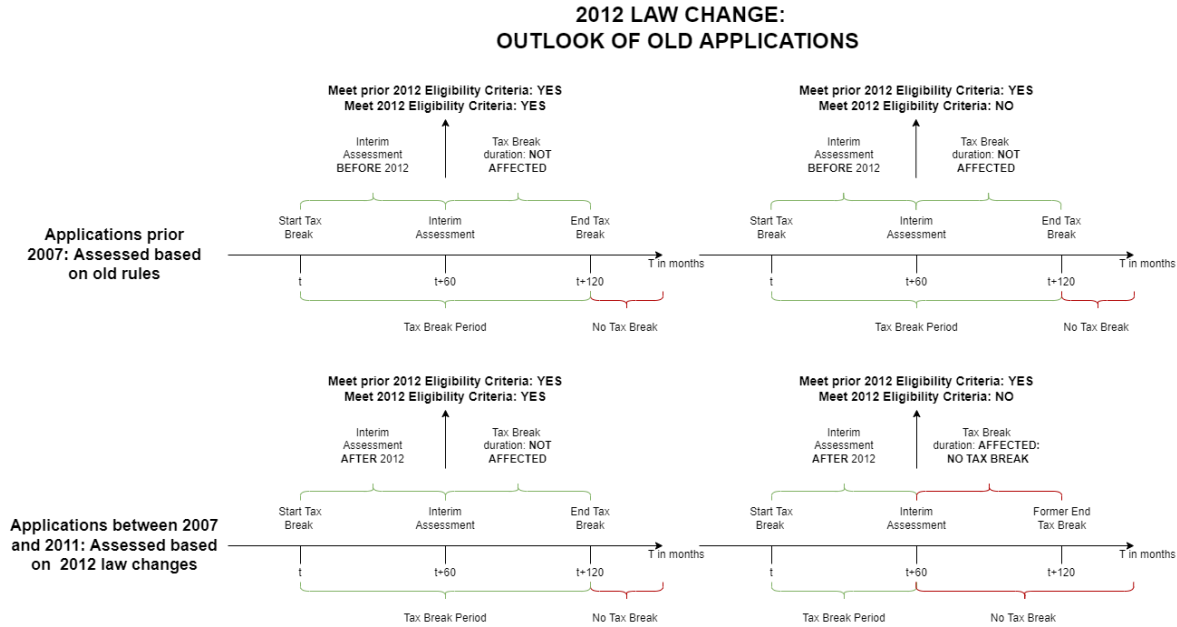


Notes: The time diagram divides the sample of beneficiaries in 3 different groups presented in 3 different rows: Incoming employees that applied to the scheme in the period prior 2007 and, hence, were assessed by the 5 years interim check before 1st of January 2012; Incoming employees that applied to the scheme between 2007 and the end of 2011 and, hence, susceptible to the 2012 law change due the format of the transitional rule; and, incoming employees that applied from 2012 onwards. We further divide the groups into 2 other subgroups, those that meet and do not meet the 2012 eligibility criteria, diagrams in the left and right respectively.

**Figure A2: Country of previous residence**

## Country of previous residence
### 2001 - 2011



- Belgium and Luxembourg
- UK - Ireland
- Germany
- France
- Nordic countries
- US - Canada
- Italy - Spain
- China - Japan - India
- Eastern Europe
- Others
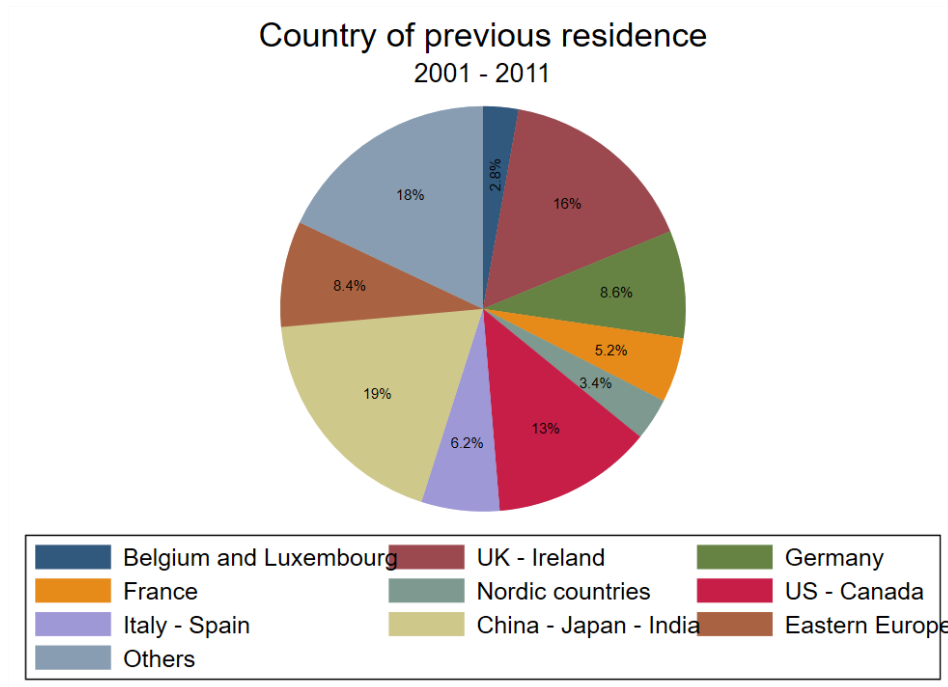
**Figure A3: Sectoral composition of beneficiaries**

## Sectoral Composition
### 2001 - 2011



- Industry and energy
- Trade, transport and catering
- Information and communication
- Financial services
- Business Services
- Government and care
- Culture, recreation, other servi
- Others
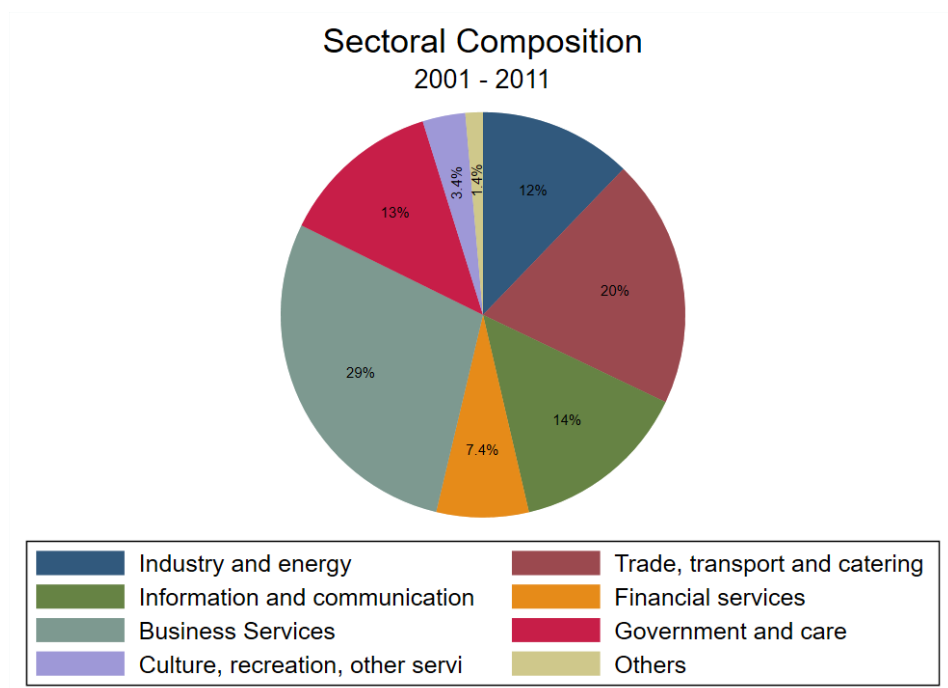
**Figure A4: Dutch Residential location**

Residence location
2001 - 2011

(.059,.27]
(.0093,.059]
(.0029,.0093]
(.00094,.0029]
(.00031,.00094]
[0,.00031]
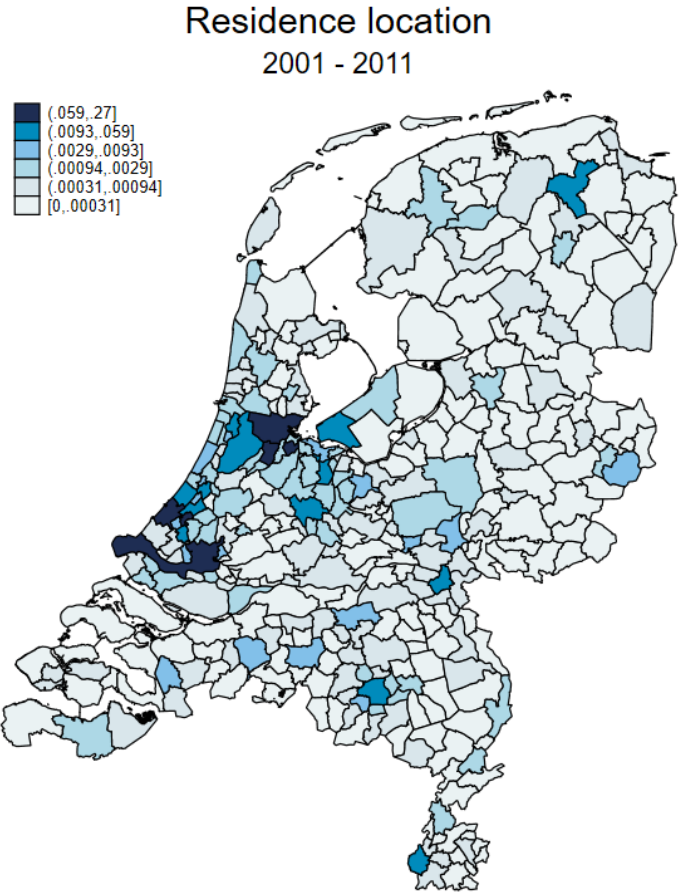
Note: 27% of the workers live in Amsterdam. The Hague, Amstelveen and Rotterdam complete the top four municipalities in the Netherlands accounting to roughly 50% of all incoming employees place of residence

**Figure A5: Beneficiaries within Dutch Population Wealth Deciles – Top 5% Vs. Bottom 95%**



**Figure A6: Beneficiaries within Dutch Population Wealth + Income Deciles – Top 5% Vs. Bottom 95%**

| | Country of Previous Residence | | | | |
|---|---|---|---|---|---|
| | Belgium | UK Ireland | Germany | France | Nordic countries |
| **2002-2006** | | | | | |
| **Belgium** | **0.51** | 0.02 | 0.02 | 0.05 | 0.02 |
| **UK - Ireland** | 0.06 | **0.44** | 0.06 | 0.06 | 0.06 |
| **Germany** | 0.04 | 0.02 | **0.54** | 0.03 | 0.03 |
| **France** | 0.03 | 0.02 | 0.01 | **0.43** | 0.02 |
| **Nordic countries** | 0.03 | 0.02 | 0.01 | 0.02 | **0.54** |
| **US - Canada** | 0.05 | 0.05 | 0.04 | 0.03 | 0.04 |
| **Italy - Spain** | 0.03 | 0.02 | 0.02 | 0.02 | 0.02 |
| **China - Japan - India** | 0.02 | 0.02 | 0.04 | 0.03 | 0.01 |
| **Eastern Europe** | 0.02 | 0.01 | 0.01 | 0.01 | 0.01 |
| **Others** | 0.20 | 0.39 | 0.24 | 0.32 | 0.27 |
| **2007-2011** | | | | | |
| **Belgium** | **0.48** | 0.01 | 0.01 | 0.03 | 0.02 |
| **UK - Ireland** | 0.06 | **0.49** | 0.04 | 0.04 | 0.06 |
| **Germany** | 0.04 | 0.03 | **0.62** | 0.03 | 0.03 |
| **France** | 0.04 | 0.02 | 0.01 | **0.50** | 0.01 |
| **Nordic countries** | 0.02 | 0.01 | 0.02 | 0.01 | **0.56** |
| **US - Canada** | 0.03 | 0.05 | 0.03 | 0.05 | 0.04 |
| **Italy - Spain** | 0.03 | 0.02 | 0.02 | 0.03 | 0.01 |
| **China - Japan - India** | 0.03 | 0.02 | 0.03 | 0.02 | 0.02 |
| **Eastern Europe** | 0.03 | 0.01 | 0.01 | 0.02 | 0.02 |
| **Others** | 0.24 | 0.34 | 0.20 | 0.27 | 0.22 |

Destination Country

**Background characteristics by percentile group**

| | Control Year Mean | Treat Year Mean | Control Countries Mean | Treat Countries Mean |
|---|---|---|---|---|
| | | | **BOTTOM 99%** | |
| **Panel A: Employment** | | | | |
| Wage | € 4,058.75 | € 4,090.06 | € 4,072.83 | € 4,343.16 |
| Industry & Energy | 0.12 | 0.09 | 0.10 | 0.10 |
| Trade & Transport | 0.20 | 0.16 | 0.18 | 0.16 |
| Information & Communication | 0.12 | 0.19 | 0.17 | 0.08 |
| Business Services | 0.27 | 0.28 | 0.28 | 0.24 |
| Government & Care | 0.16 | 0.16 | 0.16 | 0.26 |
| Others | 0.12 | 0.12 | 0.12 | 0.16 |
| **Panel B: Background** | | | | |
| Gender | 0.72 | 0.72 | 0.72 | 0.69 |
| Age | 32.79 | 31.92 | 32.17 | 33.18 |
| With Kids | 0.11 | 0.09 | 0.10 | 0.13 |
| Without Kids | 0.64 | 0.64 | 0.64 | 0.62 |
| Kids in NL | 0.25 | 0.27 | 0.26 | 0.25 |
| Single | 0.61 | 0.60 | 0.60 | 0.65 |
| Married | 0.17 | 0.14 | 0.15 | 0.13 |
| Married in NL | 0.22 | 0.26 | 0.25 | 0.22 |
| Highly Mobile | 0.57 | 0.23 | 0.33 | 0.49 |
| Observations | 13870 | 30,365 | 43,023 | 1,212 |
| | Control Year Mean | Treat Year Mean | Control Countries Mean | Treat Countries Mean |
| | | | **TOP 1%** | |
| **Panel C: Employment** | | | | |
| Wage | € 16,444.10 | € 17,541.90 | € 17,022.86 | € 16,962.04 |
| Industry & Energy | 0.19 | 0.18 | 0.19 | 0.15 |
| Trade & Transport | 0.26 | 0.31 | 0.29 | 0.22 |
| Information & Communication | 0.06 | 0.05 | 0.05 | 0.05 |
| Business Services | 0.30 | 0.27 | 0.29 | 0.19 |
| Government & Care | 0.03 | 0.02 | 0.03 | 0.07 |
| Others | 0.16 | 0.16 | 0.16 | 0.31 |
| **Panel D: Background** | | | | |
| Gender | 0.88 | 0.87 | 0.87 | 0.88 |
| Age | 39.22 | 40.11 | 39.69 | 39.65 |
| With Kids | 0.24 | 0.22 | 0.23 | 0.22 |
| Without Kids | 0.54 | 0.55 | 0.55 | 0.59 |
| Kids in NL | 0.21 | 0.23 | 0.22 | 0.19 |
| Single | 0.47 | 0.49 | 0.48 | 0.61 |
| Married | 0.30 | 0.26 | 0.28 | 0.22 |

| | | | | |
|---|---|---|---|---|
| Married in NL | 0.23 | 0.25 | 0.24 | 0.17 |
| Highly Mobile | 0.66 | 0.28 | 0.46 | 0.54 |
| Observations | 6,336 | 7,009 | 12,867 | 478 |

## Table A3: Pre and Post Treatment Dynamics

| Dependent Variable | Time in Country (Months) (1) | Time in Country (> 5 year) (2) |
|---|---|---|
| Cohort 2002 | -0.75 | -0.02 |
| | (1.46) | (0.03) |
| Cohort 2003 | -1.17 | -0.00 |
| | (1.48) | (0.02) |
| Cohort 2004 | -0.96 | -0.00 |
| | (2.02) | (0.03) |
| Cohort 2005 | 1.83 | 0.05 |
| | (1.85) | (0.03) |
| Cohort 2006, omitted | 0 | 0 |
| Cohort 2007 | -10.20*** | -0.10*** |
| | (1.31) | (0.02) |
| Cohort 2008 | -9.71*** | -0.12*** |
| | (1.31) | (0.02) |
| Cohort 2009 | -5.15*** | -0.05** |
| | (1.25) | (0.02) |
| Cohort 2010 | -2.94** | -0.02 |
| | (1.29) | (0.02) |
| Cohort 2011 | -4.56*** | -0.06** |
| | (1.31) | (0.02) |
| Constant | 58.13*** | 0.43*** |
| | (0.18) | (0.00) |
| Observations | 49,894 | 49,894 |
| Country of Origin FE | YES | YES |
| Start Year FE | YES | YES |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

## Table A4: Time in NL: Nordic Countries and UK as controls

| Dependent Variable | Time in Country (Months) (1) | Time in Country (> 5 year) (2) | Time in Country (Months) (3) | Time in Country (> 5 year) (4) | Time in Country (Months) (5) | Time in Country (> 5 year) (6) |
|---|---|---|---|---|---|---|

|  | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| PPR*Arrival | -5.25*** | -0.05*** | -4.75*** | -0.05*** | -7.71*** | -0.08*** |
|  | (1.33) | (0.02) | (1.32) | (0.02) | (1.83) | (0.02) |
| Constant | 68.63*** | 0.55*** | 72.14*** | 0.60*** | 62.07*** | 0.47*** |
|  | (2.37) | (0.03) | (2.51) | (0.04) | (3.73) | (0.05) |
| | | | | | | |
| Observations | 12,783 | 12,783 | 10,834 | 10,834 | 3,639 | 3,639 |
| Control | UK + Nordic | UK + Nordic | UK | UK | Nordic | Nordic |
| Mean Dep. Var. | 65.49 | 0.51 | 65.49 | 0.51 | 65.49 | 0.51 |
| Impact at Mean | -0.08 | -0.10 | -0.07 | -0.10 | -0.12 | -0.16 |
| Country of Origin FE | YES | YES | YES | YES | YES | YES |
| Start Year FE | YES | YES | YES | YES | YES | YES |

Notes: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1 All regressions include country of origin and start year fixed effects. The control groups here are composed by individuals that previously lived in the UK and Nordic countries. At this stage we do not control to any individual background characteristic, although the results remain negative and statistically significant to the inclusion of controls such as gender, age and household composition.

### Table A5: Robustness wage threshold and Researchers

| Dependent Variable | Time in Country (Months) | Time in Country (> 5 year) | Time in Country (Months) | Time in Country (> 5 year) | Time in Country (Months) | Time in Country (> 5 year) |
|---|---|---|---|---|---|---|
|  | (1) | (2) | (3) | (4) | (5) | (6) |
|  | Exclude Exempted Sectors | | Exclude Below Wage | | Exclude Below Wage non Exempted Sectors | |
| PPR*Arrival | -5.91*** | -0.06*** | -5.74*** | -0.07*** | -5.80*** | -0.07*** |
|  | (1.82) | (0.02) | (1.50) | (0.02) | (1.16) | (0.02) |
| Constant | 68.73*** | 0.56*** | 67.58*** | 0.54*** | 67.90*** | 0.54*** |
|  | (1.36) | (0.02) | (1.40) | (0.02) | (1.42) | (0.02) |
| | | | | | | |
| Observations | 43,741 | 43,741 | 41,853 | 41,853 | 44,471 | 44,471 |
| Country of Origin FE | YES | YES | YES | YES | YES | YES |
| Start Year FE | YES | YES | YES | YES | YES | YES |

Notes: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1 All regressions include country of origin and start year fixed effects. The Robustness tests are divided in three groups, placebo in wage threshold, exempted sectors and a combination of both. The regressions consist in excluding individuals that: do not meet the income threshold - 18% of the sample; work in exempted sectors from the income threshold – 13% of the sample; and, exclude individuals that do not work on exempt sectors and do not meet wage threshold (the ones that would be treated by the wage criterion) - 12% of the sample.

### Table A6: Other Robustness

| Dependent Variable | Time in Country (Months) | Time in Country (> 5 year) | Time in Country (Months) | Time in Country (> 5 year) | Time in Country (Months) | Time in Country (> 5 year) | Time in Country (Months) | Time in Country (> 5 year) |
|---|---|---|---|---|---|---|---|---|
|  | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|  | Stayed more than 1 | | Immigration year | | Immigrated before | | Immigration year | |

|  | year in NL | | same as 30% Rule year | | 2012 | | same 30% Rule year and before 2012 | |
|---|---|---|---|---|---|---|---|---|
| PPR*Arrival | -6.70*** | -0.07*** | -5.51*** | -0.07*** | -5.67*** | -0.06*** | -5.51*** | -0.07*** |
|  | (1.20) | (0.01) | (1.72) | (0.02) | (1.21) | (0.02) | (1.72) | (0.02) |
| Constant | 73.20*** | 0.60*** | 60.64*** | 0.47*** | 67.35*** | 0.54*** | 60.64*** | 0.47*** |
|  | (1.30) | (0.02) | (1.49) | (0.02) | (1.37) | (0.02) | (1.49) | (0.02) |
|  |  |  |  |  |  |  |  |  |
| Observations | 45,758 | 45,758 | 39,104 | 39,104 | 48,936 | 48,936 | 39,104 | 39,104 |
| Mean Dep. Var. | 67.48 | 0.53 | 62.57 | 0.47 | 66.09 | 0.51 | 62.57 | 0.47 |
| Impact at Mean | -0.10 | -0.13 | -0.09 | -0.15 | -0.08 | -0.12 | -0.09 | -0.15 |
| Country of Origin FE | YES | YES | YES | YES | YES | YES | YES | YES |
| Start Year FE | YES | YES | YES | YES | YES | YES | YES | YES |

Notes: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1 All regressions include country of origin and start year fixed effects. The control groups here are composed by individuals that previously lived in the UK and Nordic countries. At this stage we do not control to any individual background characteristic, although the results remain negative and statistically significant to the inclusion of controls such as gender, age and household composition.

### Table A7: Placebo Tests

| Dependent Variable | Time in Country (Months) (3) | Time in Country (> 5 year) (4) |
|---|---|---|
|  | **Placebo Country** | |
| PPR*Arrival | 2.04 | 0.01 |
|  | (1.58) | (0.02) |
| Constant | 67.79*** | 0.55*** |
|  | (1.42) | (0.02) |
|  |  |  |
| Observations | 47,882 | 47,882 |
| Country of Origin FE | YES | YES |
| Start Year FE | YES | YES |

Notes: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1 All regressions include country of origin and start year fixed effects. The Placebo tests are divided in two groups, placebo in time (Panel A) and placebo in place (Panel B). We defined placebo in time by considering the years of 2005-2007 as treated years. We defined placebo in place by considering the Nordic countries as treat countries.

### Table A8: Time in NL (in Months): Income Heterogeneity

| Dependent Variable | Time in Country (Months) (1) | Time in Country (Months) (2) | Time in Country (Months) (3) | Time in Country (Months) (4) | Time in Country (Months) (5) | Time in Country (Months) (6) | Time in Country (Months) (7) |
|---|---|---|---|---|---|---|---|
|  | [0-95) vs [95-100] | | [0-99) vs [99-100] | | [0-95) vs [95-99) vs [99-100] | | |
| PPR*Arrival | 0.26 | -10.70*** | -3.75*** | -11.71*** | 0.26 | -8.92** | -11.71*** |
|  | (1.58) | (2.60) | (1.36) | (2.71) | (1.58) | (3.55) | (2.71) |
| Constant | 61.86*** | 53.50*** | 60.50*** | 50.24*** | 61.86*** | 56.97*** | 50.24*** |
|  | (0.21) | (0.27) | (0.20) | (0.31) | (0.21) | (0.41) | (0.31) |
|  |  |  |  |  |  |  |  |
| Observations | 27,359 | 22,506 | 38,233 | 11,640 | 27,359 | 10,842 | 11,640 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mean Dep. Var. | 64.49 | 66.09 | 67.09 | 62.28 | 64.49 | 70.48 | 62.28 |
| Impact at Mean | 0.00 | -0.16 | -0.06 | -0.19 | 0.00 | -0.13 | -0.19 |
| Country of Origin FE | YES | YES | YES | YES | YES | YES | YES |
| Start Year FE | YES | YES | YES | YES | YES | YES | YES |

Notes: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1 All regressions include country of origin and start year fixed effects.

### Table A9: Time in NL (More than 5 years): Income Heterogeneity

| Dependent Variable | Time in Country (> 5 year) (1) | Time in Country (> 5 year) (2) | Time in Country (> 5 year) (3) | Time in Country (> 5 year) (4) | Time in Country (> 5 year) (5) | Time in Country (> 5 year) (6) | Time in Country (> 5 year) (7) |
|---|---|---|---|---|---|---|---|
| | [0-95) Vs. [95-100] | | [0-99) Vs. [99-100] | | [0-95) Vs. [95-99) Vs. [99-100] | | |
| PPR*Arrival | -0.01 | -0.11*** | -0.04** | -0.13*** | -0.01 | -0.08 | -0.13*** |
| | (0.02) | (0.03) | (0.02) | (0.03) | (0.02) | (0.05) | (0.03) |
| Constant | 0.48*** | 0.36*** | 0.46*** | 0.32*** | 0.48*** | 0.42*** | 0.32*** |
| | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) |
| Observations | 27,359 | 22,506 | 38,233 | 11,640 | 27,359 | 10,842 | 11,640 |
| Mean Dep. Var. | 0.51 | 0.51 | 0.53 | 0.47 | 0.51 | 0.55 | 0.47 |
| Impact at Mean | 0.02 | 0.22 | 0.07 | 0.28 | 0.02 | 0.15 | 0.28 |
| Country of Origin FE | YES | YES | YES | YES | YES | YES | YES |
| Start Year FE | YES | YES | YES | YES | YES | YES | YES |

Notes: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1 All regressions include country of origin and start year fixed effects.

### Table A10: Time in NL (in Months): Family Root Heterogeneity

| Dependent Variable | Time in Country (Months) (1) | Time in Country (Months) (2) | Time in Country (Months) (2) | Time in Country (Months) (1) | Time in Country (Months) (2) | Time in Country (Months) (2) |
|---|---|---|---|---|---|---|
| | Single | Married | Married in NL | Kids | No Kids | Kids in NL |
| PPR*Arrival | -6.06*** | -1.65 | -5.07** | -4.99*** | -1.02 | -5.64** |
| | (1.57) | (4.70) | (2.41) | (1.67) | (5.26) | (2.26) |
| Constant | 48.78*** | 58.97*** | 78.42*** | 47.94*** | 60.47*** | 81.69*** |
| | (0.21) | (0.37) | (0.27) | (0.20) | (0.43) | (0.29) |
| Observations | 28,299 | 8,977 | 12,564 | 30,831 | 6,432 | 12,571 |
| Mean Dep. Var. | 58.42 | 66.33 | 85.70 | 55.07 | 70.63 | 85.42 |
| Impact at Mean | -0.10 | -0.02 | -0.06 | -0.09 | -0.01 | -0.06 |
| Country of Origin FE | YES | YES | YES | YES | YES | YES |
| Start Year FE | YES | YES | YES | YES | YES | YES |

Notes: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1 All regressions include country of origin and start year fixed effects.

### Table A11: Time in NL (More than 5 years): Family Root Heterogeneity

| Dependent Variable | Time in | Time in | Time in | Time in | Time in | Time in |
|---|---|---|---|---|---|---|

| | Country (> 5 year) (1) | Country (> 5 year) (2) | Country (> 5 year) (3) | Country (> 5 year) (4) | Country (> 5 year) (5) | Country (> 5 year) (6) |
|---|---|---|---|---|---|---|
| | Single | Married | Married in NL | Kids | No Kids | Kids in NL |
| PPR*Arrival | -0.08*** | -0.01 | -0.04 | -0.07*** | 0.00 | -0.05 |
| | (0.02) | (0.06) | (0.05) | (0.02) | (0.08) | (0.03) |
| Constant | 0.33*** | 0.43*** | 0.66*** | 0.32*** | 0.44*** | 0.70*** |
| | (0.00) | (0.01) | (0.00) | (0.00) | (0.01) | (0.00) |
| Observations | 28,299 | 8,977 | 12,564 | 30,831 | 6,432 | 12,571 |
| Mean Dep. Var. | 0.43 | 0.51 | 0.73 | 0.39 | 0.55 | 0.75 |
| Impact at Mean | -0.18 | -0.02 | -0.05 | -0.18 | 0.00 | -0.07 |
| Country of Origin FE | YES | YES | YES | YES | YES | YES |
| Start Year FE | YES | YES | YES | YES | YES | YES |

Notes: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1 All regressions include country of origin and start year fixed effects.

**Table A12: Employment Time Robustness**

| Dependent Variable | Time in Country (Months) (1) | Time in Country (> 5 year) (2) | Time in Country (Months) (3) | Time in Country (> 5 year) (4) |
|---|---|---|---|---|
| PPR*Arrival | -4.99*** | -0.05** | -4.75*** | -0.05** |
| | (1.45) | (0.02) | (1.42) | (0.02) |
| Constant | 66.32*** | 0.53*** | 66.13*** | 0.52*** |
| | (1.37) | (0.02) | (1.24) | (0.02) |
| Observations | 49,572 | 49,572 | 57,557 | 57,557 |
| Control | No DE FR | No DE FR | Whole Sample | Whole Sample |
| Mean Dep. Var. | 72.45 | 0.60 | 72.45 | 0.60 |
| Impact at Mean | | | | |
| Country of Origin FE | YES | YES | YES | YES |
| Start Year FE | YES | YES | YES | YES |

Notes: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

**Table A13: Employment Time in NL: Heterogeneities**

| Dependent Variable | Time in Country (Months) (1) | Time in Country (Months) (2) | Time in Country (Months) (3) | Time in Country (Months) (4) | Time in Country (Months) (5) | Time in Country (Months) (6) | Time in Country (Months) (4) | Time in Country (Months) (5) | Time in Country (Months) (6) |
|---|---|---|---|---|---|---|---|---|---|
| | [0-95) | [95-99) | [99-100] | Single | Married | Married in NL | Kids | No Kids | Kids in NL |
| PPR*Arrival | 0.92 | -6.53* | -12.09*** | -6.10*** | -0.39 | -3.07 | -5.19*** | 3.87 | -5.63*** |
| | (1.59) | (3.71) | (3.08) | (2.22) | (5.36) | (2.70) | (2.00) | (4.92) | (2.16) |
| Constant | 62.72*** | 58.48*** | 53.11*** | 50.47*** | 60.68*** | 79.23*** | 49.59*** | 62.40*** | 82.49*** |
| | (0.21) | (0.42) | (0.32) | (0.22) | (0.38) | (0.27) | (0.21) | (0.44) | (0.29) |

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| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Observations | 27,359 | 10,842 | 11,640 | 28,299 | 8,977 | 12,564 | 30,831 | 6,432 | 12,571 |
| Mean Dep. Var. | 70.86 | 76.52 | 70.69 | 67.51 | 71.87 | 87.70 | 63.90 | 76.32 | 89.04 |
| Impact at Mean | | | | | | | | | |
| Country of Origin FE | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Start Year FE | YES | YES | YES | YES | YES | YES | YES | YES | YES |

Notes: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1 All regressions include country of origin and start year fixed effects.

### Table A14: Employment Time in NL (More than 5 years): Heterogeneities

| Dependent Variable | Time in Country (> 5 year) | Time in Country (> 5 year) | Time in Country (> 5 year) | Time in Country (> 5 year) | Time in Country (> 5 year) | Time in Country (> 5 year) | Time in Country (> 5 year) | Time in Country (> 5 year) | Time in Country (> 5 year) |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (4) | (5) | (6) |
| | [0-95) | [95-99) | [99-100] | Single | Married | Married in NL | Kids | No Kids | Kids in NL |
| PPR*Arrival | 0.01 | -0.05 | -0.14*** | -0.08*** | 0.01 | -0.00 | -0.07** | 0.08 | -0.05 |
| | (0.02) | (0.04) | (0.04) | (0.03) | (0.06) | (0.05) | (0.03) | (0.07) | (0.03) |
| Constant | 0.49*** | 0.43*** | 0.35*** | 0.35*** | 0.45*** | 0.67*** | 0.33*** | 0.47*** | 0.71*** |
| | (0.00) | (0.01) | (0.00) | (0.00) | (0.01) | (0.00) | (0.00) | (0.01) | (0.00) |
| Observations | 27,359 | 10,842 | 11,640 | 28,299 | 8,977 | 12,564 | 30,831 | 6,432 | 12,571 |
| Mean Dep. Var. | 0.58 | 0.63 | 0.58 | 0.55 | 0.59 | 0.75 | 0.50 | 0.62 | 0.79 |
| Impact at Mean | | | | | | | | | |
| Country of Origin FE | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Start Year FE | YES | YES | YES | YES | YES | YES | YES | YES | YES |

Notes: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1 All regressions include country of origin and start year fixed effects.