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Return versus onward migration: Go back or move on?

100 WORKING PAPER APRIL 2022

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Improving knowledge on population change

cpc.ac.uk

ISSN 2042-4116

UKRI Economic and Social Research Council

ABSTRACT

This paper examines the impact of unemployment on out-migration by distinguishing between return and onward migration and controlling for total earnings. We use Timing-of-Events models and control for the endogeneity of total earnings, unemployment and out-migration using administrative data from the Netherlands, Our findings suggest that unemployment triggers return migration more than on-ward migration. When total earnings are low unemployment increases the hazard of return migration. When total earnings are high the hazard rate of onward migration for unemployed immigrants increases. Thus, these findings highlight that out-migration is affected both by unemployment and by total earnings as well as by the interaction between the two.

JEL classification: F22, J61, C41

KEYWORDS

Migration dynamics; temporary migration; target savers; unemployment

EDITORIAL NOTE

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ESRC Centre for Population Change

The ESRC Centre for Population Change (CPC) is a joint initiative between the Universities of Southampton, St Andrews and Stirling, in partnership with the Office for National Statistics (ONS) and the National Records of Scotland (NRS). The Centre is funded by the Economic and Social Research Council (ESRC) grant numbers RES-625-28-0001, ES/K007394/1, ES/R009139/1 and ES/W002116/1.

This working paper series publishes independent research, not always funded through the Centre. The views and opinions expressed by authors do not necessarily reflect those of the CPC, ESRC, ONS or NRS.

The ESRC Centre for Population Change Working Paper Series is edited by Teresa McGowan; t.mcgowan@southampton.ac.uk

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RETURN VERSUS ONWARD MIGRATION: GO BACK OR MOVE ON?

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1 Introduction

Many migration moves are not one-way movements. Indeed, many migration moves are not permanent, and involve further re-migration decisions. In many cases, out-migration rates are very high and can be up to 50 percent of an arrival cohort.[1] However, out-migration does not always consist of return moves to the country of origin, for many migrants move on to a third country (onward migration). For example, Bratsberg et al. (2007) find that more than 500,000 immigrants arrived in Norway between 1967-2003, but by 2004 about 50 percent of them have left Norway and around 14 percent of those out-migrants moved onward to a third country. Similarly, Artuc and Özden (2018) find that 9% of recent immigrants to the US between 2001 and 2012 arrived from a third country and not from their country of birth and King and Newbold (2007) document that 37% of Canadian immigrants between 1995 and 2000 moved onward to the USA. Despite a growing body of literature on the determinants and impact of out-migration, very few studies have examined onward migration and thus little is known about what determines whether a migrant returns or moves on to a third country.[2]

This paper examines the determinants of return versus onward migration. In particular we study the impact of unemployment on the out-migration intensity differentiating between return and onward migration and controlling for the total cumulative earnings of immigrants since arrival in the host country. We use unemployment as a trigger for out-migration and investigate whether an unemployment episode pushes a migrant to return home or to move to another country, whilst controlling for their total earnings in the host country. In other words, we investigate whether total accumulated earnings in the host country influence the choice of an unemployed migrant to return home or to move to another country; i.e. do total earnings have a different impact on unemployed migrants' intensity (hazard rate) of returning and of onward migration? Total earnings are used as a proxy for total savings. We argue that if migrants experience unemployment and they have low total earnings, they are more likely to return as they have failed to maximise their earnings and cannot afford the cost of onward migration. However, if migrants experience an unemployment episode and they have already managed to accumulate high total earnings, they are more likely to move onward. We assume that onward migration is more costly compared to return migration, so credit constraints would be a hurdle for onward migration. Thus, although target saver immigrants might be enticed to move to a third country, if they become unemployed, to accumulate more savings, when they are low earners, they will not be able to afford an onward move and therefore will return to their origin country.

This paper makes two contributions to the migration literature. First, we study the impact of unemployment on the out-migration decision distinguishing between return migration (to country of origin) and onward migration (to another country). Secondly, we focus on the role played by total (cumulative) earnings in the out-migration decision whilst controlling for the potential endogeneity of total earnings and the out-migration decision. To our knowledge this is the first paper that examines the impact of total earnings on unemployed migrants' intensity (hazard rate) of returning or of onward migration.

Almost none of the previous studies on return migration have been able to distinguish

[1] See Dustmann and Görlach (2016) for evidence on Europe, Bijwaard (2010) for evidence on the Netherlands and Jasso and Rosenzweig (1982) for evidence on the US.

[2] See for example Constant (2020) and Dustmann and Görlach (2016) for recent reviews.

between return and onward migration.[3] Only a few studies account for the difference between return and onward migration. For example, Nekby (2006) examines the determinants of return versus onward migration in Sweden and focuses on the selectivity of out-migration. She finds that onward migrants are more positively selected than return migrants. Similarly, Aydemir and Robinson (2008) examine return and onward migration in Canada and also find significant variations in the selectivity of return and onward migration depending on migrant characteristics, country of origin and migration duration. On the other hand, DaVanzo (1983), examining inter-regional migration in the US, finds that people who are unemployed are more likely to return to their state of origin rather than to move onward to a third state. However, none of these studies examined the impact of total earnings, nor dealt with the endogeneity challenge of both unemployment and total earnings with respect to out-migration. Indeed, total earnings are not random, and are potentially correlated with the out-migration decision.

There are a few studies such as Bijwaard et al. (2014), Kırdar (2009) and Constant and Massey (2003) who study the impact of unemployment on out-migration, and find that unemployment increases the odds of out-migration. Also, closer to the current paper, Bijwaard and Wahba (2014) and Bijwaard and Wahba (2019) who study the selectivity of out-migration and take into account the endogeneity of labour transitions and the wage growth. Nonetheless, these papers do not distinguish between return and onward migrations, nor control for the impact of total earnings when studying the out-migration decision.

We use a unique administrative panel for the entire population of recent labour immigrants to the Netherlands covering the years 1999-2007 (before the onset of the financial crisis) with information on the timing of out-migration, the destination of out-migration and the exact detailed information on their labour market status and earnings. We rely on duration analysis to estimate the hazard rate of out-migration, distinguishing return-, non-EU onward- and, EU onward migration, and address the endogeneity of unemployment and total earnings, using a Timing-of-Event model (Abbring and van den Berg, 2003). The model not only allows for interdependence amongst the out-migration hazards and in the transition rates of the labour market process, but also allows for potential endogeneity of unemployment and total earnings with respect to out-migration. Given the heterogeneity of labour immigrants and the different costs for onward migration, for example due to migration restrictions, faced by the migrants, we distinguish between immigrants from four different regions of origin. Through this model it is possible to show the role played of total earnings in the return vs onward migration decision and how this is affected by unemployment. The model identifies the effect of total earnings separately from the effect of migration duration, the time spend in the country, on the out-migration hazards.

Controlling for the endogeneity of unemployment and total earnings with respect to out-migration, we find evidence that unemployment triggers return migration more than onward migration. When total earnings are low unemployment increases the hazard of return migration. When total earnings are high the hazard rate of onward migration for unemployed immigrants increases. Our findings highlight that out-migration is affected both by unemployment and total earnings, as well as their interaction, which have differential impacts on return versus onward migration. Although our findings suggest that total

[3]See Constant (2020) for a very recent comprehensive review of return, onward and circular migration.

earnings mainly play a role in the stay/return/onward migration through their impact on the cost of migration, we also discuss other possible interpretations for our findings.

Understanding the determinants of return migration and the role played by earnings in this decision is of paramount importance to policymakers who are interested in immigrants' economic performance in the host country. Furthermore, providing evidence on onward migration, in particular to other EU countries, is very valuable given the limited knowledge of such migration behaviour. Finally, building the knowledge base on return migration is useful for countries of origin that seek to incorporate their returnees in the development of their economies.

The remainder of this paper is structured as follows. Section 2 discusses the conceptual framework. In Section 3 we summarize the institutional background and main characteristics of migration to the Netherlands during the period of study. Section 4 describes the estimation method used, while Section 5 discusses the findings. Finally, the last section summarises the main conclusions.

2 Conceptual Framework

Many people migrate to maximise their expected earnings. Individuals move from low to high wage locations because the expected net value of their lifetime earnings is higher in the high-wage region (Harris and Todaro, 1970). Within this framework temporary, or return migration, is explained by a number of theories. First, migrants might be target savers who prefer consumption at home and their main objective is to save as much as possible when overseas and then return home to enjoy consumption, see e.g., Djajic and Milbourne (1988), Yang (2006) and Dustmann and Weiss (2007). As such, temporary migration allows the migrant to take advantage of high wages abroad and low prices at home. Return migration may be induced by a higher purchasing power of the host-country's currency in the home country. Secondly, as shown by Borjas and Bratsberg (1996), return migration can also be triggered by failure to fulfil the migration plans in terms of target savings or earnings due to imperfect information about the host country's labour market prospects or the cost of living. Hence, within this literature, temporary migration is a function of savings/earnings and labour market experience in the host country.

Within the theoretical migration literature, out-migration is driven by the same optimisation process that characterises the original immigration decision.[4] Migrants aim to maximise their life time utility, and might plan to migrate for a period to a high earning country where they accumulate savings and skills but then return to their home country because of locational preferences (Djajic and Milbourne, 1988) and/or lower purchasing power (Djajic, 1989). Although most of this theoretical literature focuses on the motives behind return migration, onward migration can be seen as another (initial) migration decision. It could also be seen as a step migration: where the initial migration to a host country increases the information available concerning employment and earnings opportunities in other destinations. In essence, unemployment could lead to out-migration, depending on the migrant's labour market success in the host country (proxied by total earnings) and this could trigger either return or onward migration. Low total earnings

[4]See Dustmann and Görlach (2016) for a comprehensive review on the theoretical motives for temporary migration.

would be associated with higher return migration whilst high total earnings would be likely to lead to onward migration as migrants can afford to try to maximise their income somewhere else. We differentiate between onward migration to another EU country and onward migration to a non-EU destination, as it is likely that, because of free mobility within the EU, the cost associated with moving to a third EU country is lower than moving to a third non-EU country.

We argue that total earnings are a good proxy for savings, albeit a noisy measure, as total earnings also capture credit constraints faced by the migrant. It is not uncommon in the migration literature to refer to target earnings and target savings as the same objective, see for example, Yang (2006) and Abarcar (2017). There is also a sizeable literature examining the role of savings accumulation in driving emigration and return migration. This literature provides evidence that return migrants tend to have accumulated savings abroad, which they then use for investment and entrepreneurial activities when they return Wahba (2014). We are also able to separate the effect of total earnings from the effect of the migration duration (length of stay). In addition, there is ample evidence in support of credit constraints being a major hurdle for migration, see Angelucci (2015), Bazzi (2017). Although there might be various determinants of out-migration, we focus on the interaction between unemployment and total earnings in particular, controlling for individual characteristics, economic conditions in both the host and the origin country. To capture ability and possibly country specific skills, we control for initial wage in the Netherlands. We restrict our sample to labour immigrants (i.e. those who moved to the Netherlands for work reasons). It is important to underscore that, despite total earnings being a good measure of credit constraints, there are, potentially, other interpretations for why total earnings affects out-migration. We discuss some of those potential alternative interpretations with robustness analyses in Section 5.4. In the remainder of the paper, we test our hypothesis on the effects of unemployment and the role played by total earnings on the hazard rate of return versus onward migration.

3 Administrative panel data on the immigrant population in the Netherlands

This paper exploits the unique feature of the administrative data in the Netherlands where all legal immigration by non-Dutch citizens to the Netherlands is registered in the Central Register of Foreigners (Centraal Register Vreemdelingen, CRV), using information from the Immigration Police (Vreemdelingen Politie) and the Immigration and Naturalization Service (Immigratie en Naturalisatie Dienst, IND). It is mandatory for every immigrant to notify the local population registrar immediately upon arrival in the Netherlands if he or she intends to stay for at least two-thirds of the forthcoming six months. The data comprise the entire *population* of immigrants who entered during our observation window of 1999-2007. These data are linked to other administrative registers that contain basic demographic characteristics of the migrants, such as age, gender, marital status and country of origin and information (on a monthly basis) on the labour market position, income and, industry sector.

Statistics Netherlands distinguishes the following migration motives: labour-migrants, family migrants, student immigrants, asylum seekers (and refugees), and immigrants for

other reasons.[5] In particular, about 23% of all non-Dutch immigrants in the age group 18 - 64 are labour migrants. We excluded migrants born in the former Soviet Union because it is difficult to assess whether they returned to their home country. We focus exclusively on labour migrants who are employed in the Netherlands within three months of their entry, giving us a population sample of 90,340 labour immigrants.

Although, in principle, the exact date of out-migration is known, some migrants do not officially inform the authorities when they leave. The departure of these non-complying individuals is registered as an 'administrative removal' after the authorities have assessed that the migrant has left the municipality without showing up in the files of another municipality in the Netherlands or as an out-migrant. These administrative removals are included among out-migration and they add up to about 34% of all out-migrations and 73% of these administratively removed migrants have no observed income in the country at the moment of removal. We conjecture that the majority of these migrants have left the country shortly after they stopped receiving income (either earnings or benefits). For those who still have income until they are administratively removed we assume that they left on that exact date. For those who are both administratively removed and have "zero income at the last observed time", we assume that the migrant has left *before* the date the administrative removal is recorded, and *after* the last date of any observed change in the observed characteristics (e.g. labour market status, housing and marital status). Such limited information is equivalent to *interval-censored* data. For interval-censored data the exact end of duration is unknown, but it is known that the duration ended in some time period. We have explicitly addressed the issue of administrative removals in the formulation of the likelihoods below.

For most (89%) of the migrants who registered their out-migration we know the destination country, but naturally there is no way to know the destination country of the administrative removal. If a migrant's next destination country is equal to his/her country of birth, we label this migration as return migration. If the migrant out-migrates to another country, we label this as onward migration. Of all observed out-migrations (including administrative removals) 43% are return migrations, 16% are onward migration and, 41% have unknown destinations (34% are administratively removed and 7% officially emigrated to an unknown destination).

The immigration register is linked by Statistics Netherlands to the Municipal Population Registry (Gemeentelijke Basisadministratie, GBA) and the Dutch Social Statistical Database (SSD). The GBA contains basic demographic characteristics of the migrants, such as age, gender, marital status and country of origin. From the SSD we have monthly information on the labour market status, earnings and, industry sector. To capture the economic conditions of the country of origin, we use annual GDP per capita and annual GDP growth rate by country of origin from the World Bank, World Development Indicators.

[5]Migration motive/type of visa is based on administrative data. Labour migrants are those who entered with a labour visa and were employed within three months of entry. This information is provided by the Statistics Netherlands. See Bijwaard (2010) for an extensive descriptive analysis of the various migration motives.

3.1 Descriptive statistics

First, we describe the characteristics of labour immigrants at the time of arrival to the Netherlands. We distinguish between labour immigrants by region of origin, as follows (*i*) EU15, (*ii*) new EU (countries that joined the EU in 2004: Poland, Czech Republic, Slovakia, Slovenia, Hungary, Estonia, Latvia, Lithuania, Malta and Cyprus and in 2007: Bulgaria and Romania[6] (*iii*) DCs (Developed countries excluding EU) and (*iv*) LDCs (Developing countries), as seen in Table 1. The largest group of labour immigrants originates from EU15, followed by immigrants from LDCs, then new EU countries and finally from DCs. The majority of labour immigrants are single men in their early 30s. Labour immigrants from the DCs have on average the highest monthly earnings, at time of arrival amongst all immigrant groups.

Interestingly, 48% of all labour immigrants who arrived between 1999 and 2007 have left the Netherlands. Among the EU15, 52% have out-migrated, of whom three times as many returned rather than moved onward- 22% have returned and 7% have moved to a third country (4.0% to another EU country and 3.3% to a non-EU country). The new EU immigrants were the group least likely to have left as almost 71% were still in the Netherlands. Moreover, new EU immigrants were more likely to move to another EU country rather than to a non-EU destination. About 44% of immigrants from LDCs have out-migrated: 16% have returned compared to 11% moving to a third country (6% to EU and 5% to non-EU countries).

Table 2 presents the average total earnings of the different immigrant groups by out-migration status. Overall, the total earnings of onward migrants are higher than for return migrants, and onward migrants to non-EU nations have the highest average and median total earnings. This table also suggests that the average duration of stays in the Netherlands before departure is higher for onward migrants than for return migrants. Similarly Table 3 presents the employment status at the end of 2007, or when last observed for all out-migrants. Overall, 84% of labour migrants who did not leave were employed, but among return and onward migrants roughly a third were unemployed before leaving, suggesting a positive correlation between unemployment and out-migration.

3.2 Unknown destinations

Table 2 also displays the characteristics of out-migrants who did not disclose their destination or were administratively removed. It appears that those migrants were on average similar in demographics to the other out-migrants but had much lower average and median total earnings. Table 3 shows that these out-migrants with unknown destinations have been employed for a shorter duration and have been unemployed for much longer duration compared to both return migrants and onward migrants.

[6] Almost 30% of those new EU labour immigrants have arrived before 2004.

Table 1: Descriptive statistics at time of arrival

	EU15	new EU	DCs	LDCs	All
Female	33%	30%	22%	22%	29%
Married	17%	26%	42%	29%	24%
			Monthly earnings[c]		
Average	2517	1481	5487	2694	2776
Median	1680	1332	3391	1773	1691
1st quartile	561	530	1325	482	603
3rd quartile	2837	1810	7465	3182	3034
			Main industry sectors		
Services	43%	44%	34%	46%	42%
Trade	13%	10%	20%	10%	13%
Industry	12%	10%	13%	9%	11%
Education	6%	6%	7%	10%	7%
Transportation	5%	3%	7%	4%	5%
Catering	6%	2%	4%	4%	5%
Fin. services	3%	2%	6%	5%	4%
Average age	31.3	30.3	35.0	31.6	31.7
Average GDP per capita[a]	26.8	8.0	34.2	4.2	20.7
Average GDP growth[b]	-0.4%	2.1%	-0.4%	2.8%	0.6%
Number of migrants	48,258	12,809	11,700	17,573	90,340

Notes.

[a] In country of origin in entry year in thousand dollars.

bIn country of origin in entry year (averaged over migrants).

[c] In Euros. Monthly earnings at time of entry.

Table 2: Descriptive statistics by migration status at last observation by region

		EU15	new EU	DCs	LDCs	All
			Censored			
Female		36%	32%	25%	25%	32%
Married		32%	35%	49%	40%	36%
Average age		31.8	30.4	35.2	31.3	31.7
Average time in NL[a]		51.4	27.1	37.0	37.7	42.4
Total earnings[b]	average	156,836	54,618	229,819	134,055	139,382
	median	103,736	24,734	123,293	64,149	76,255
Total		48.2%	70.9%	40.9%	56.0%	52.0%
			Return migration			
Female		34%	22%	18%	20%	28%
Married		24%	28%	56%	35%	32%
Average age		30.9	29.8	35.8	30.2	31.8
Average time in NL[a]		29.9	20.3	30.9	24.0	28.6
Average time in NL (1999)[c]		36.7	30.8	37.4	34.8	36.5
Total earnings[b]	average	104,421	41,853	245,894	95,893	124,527
	median	56,246	21,974	152,077	48,395	59,297
Total		21.7%	12.3%	31.5%	15.6%	20.5%
			Onward migration (EU)			
Female		33%	39%	18%	29%	30%
Married		30%	33%	52%	31%	35%
Average age		32.3	28.9	34.7	32.5	32.3
Average time in NL[a]		34.0	30.8	30.2	33.1	32.8
Average time in NL (1999)[c]		40.3	42.9	40.8	41.1	40.8
Total earnings[b]	average	146,409	110,003	218,686	124,106	149,781
	median	81,959	41,895	131,796	71,142	80,939
Total		4.0%	2.6%	6.3%	6.2%	4.5%
			Onward migration (non EU)			
Female		26%	27%	20%	21%	24%
Married		43%	35%	55%	52%	46%
Average age		33.5	31.1	36.7	33.8	33.6
Average time in NL[a]		36.2	33.2	32.5	32.6	34.5
Average time in NL (1999)[c]		41.8	52.5	37.8	38.5	44.5
Total earnings[b]	average	220,780	131,875	276,013	197,469	209,783
	median	128,266	80,612	171,495	118,947	120,408
Total		3.3%	0.8%	4.6%	4.8%	3.4%
			Unknown emigration[d]			
Female		26%	22%	25%	19%	24%
Married		11%	23%	28%	21%	16%
Average age		30.2	30.3	32.7	32.1	30.8
Average time in NL[a]		34.2	25.2	37.2	35.1	33.8
Average time in NL (1999)[c]		44.7	42.8	43.3	44.9	44.5
Total earnings[b]	average	54,796	35,368	121,819	65,850	61,890
	median	26,375	18,076	61,584	36,199	29,451
Total		4.2%	2.6%	2.6%	3.4%	3.6%
Admin. removal		18.7%	10.9%	14.2%	14.8%	16.2%
Total Number of Migrants		48,258	12,809	11,700	17,573	90,340

Notes. [a] Time is measured in months. [b] In Euros. Total cumulative earnings in the Netherlands. [c] Only those who arrived in 1999 (with the longest potential time, measured in months, in NL). [d] Excluding administrative removed (exit time unknown).

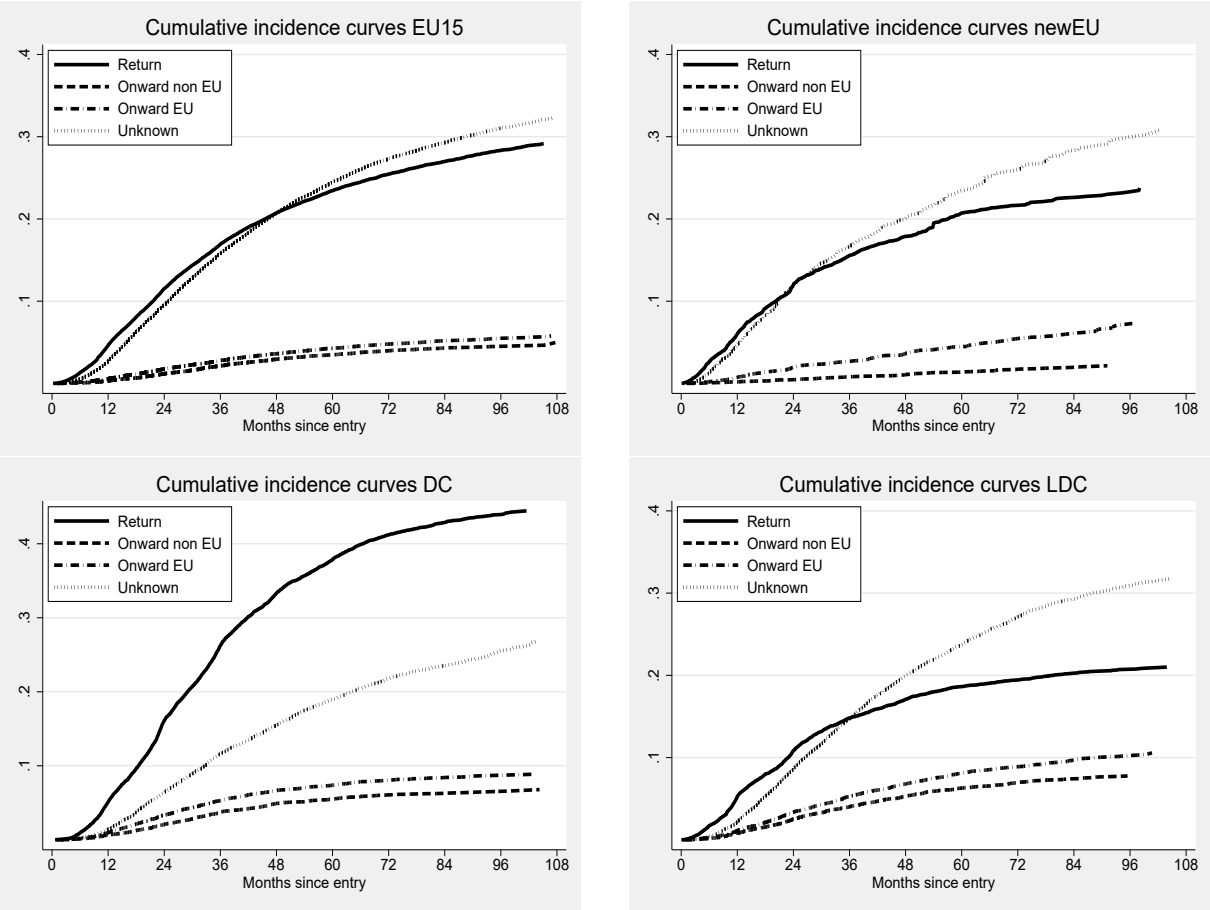
Table 3: Employment status at last observation by region (31.12.2007 or earlier)

	EU15	New EU	DCs	LDCs	All
		Censored			
Employed	82.7%	84.2%	82.9%	85.1%	83.6%
Services[b]	35%	39%	34%	47%	38%
Trade[b]	16%	10%	20%	12%	14%
Industry[b]	13%	11%	11%	8%	11%
Months employed[b]	33.3	18.7	25.3	24.3	27.9
Months unemployed[c]	4.5	1.9	4.2	3.2	3.7
Total	48.2%	70.9%	40.9%	56.0%	52.0%
		Return migration			
Employed	63.2%	69.9%	78.2%	69.3%	67.8%
Services[b]	32%	44%	30%	46%	34%
Trade[b]	18%	11%	24%	12%	18%
Industry[b]	18%	12%	15%	12%	16%
Months employed[b]	16.2	11.7	23.3	16.9	17.3
Months unemployed[c]	3.3	2.3	1.5	1.5	2.6
Total	21.7%	12.3%	31.5%	15.6%	20.5%
		Onward migration (EU)			
Employed	63.8%	66.7%	68.0%	61.5%	60.8%
Services[b]	33%	36%	29%	38%	33%
Trade[b]	18%	15%	31%	13%	18%
Industry[b]	17%	14%	15%	15%	16%
Months employed[b]	17.6	16.8	17.5	15.3	17.0
Months unemployed[c]	3.2	2.9	2.2	3.7	3.1
Total	4.0%	2.6%	6.3%	6.2%	4.5%
		Onward migration (non-EU)			
Employed	63.8%	66.7%	68.0%	61.5%	69.0%
Services[b]	40%	39%	34%	43%	38%
Trade[b]	15%	10%	15%	13%	14%
Industry[b]	21%	23%	19%	20%	20%
Months employed[b]	22.2	19.5	22.8	20.6	21.8
Months unemployed[c]	2.5	1.9	1.6	2.2	2.2
Total	3.3%	0.8%	4.6%	4.8%	3.4%
		Unknown emigration[a]			
Employed	23.4%	42.7%	17.3%	22.1%	24.2%
Services[b]	46%	59%	34%	59%	49%
Trade[b]	12%	8%	18%	10%	11%
Industry[b]	8%	6%	9%	5%	7%
Months employed[b]	4.5	5.5	4.0	4.7	4.5
Months unemployed[c]	14.5	7.7	17.0	12.9	13.9
Total	4.2%	2.6%	2.6%	3.4%	3.6%
Number of migrants	48,258	12,809	11,700	17,573	90,340

Notes: [a] Including unknown emigration and administrative removal. [b] For those who are employed at last observation. [c]For those who are unemployed at last observation.

Since the duration of migration, the length of stay in the host country, might affect the intensity of out-migration, we take the timing of out-migration into account and calculate the cumulative incidence functions, and the probability of out-migration by type (return, EU onward, non-EU onward or unknown) by months since entry in the country. The (non-parametric) Aalen-Johansen cumulative incidence functions (Aalen and Johansen, 1978) depicted in Figure 1 show that for all four immigrant groups, return migration of labour immigrants is much faster than onward migration. For EU15 and new EU immigrants the probabilities of leaving to unknown destinations are similar to the probabilities of return. For DC immigrants the probability of return is higher than for LDC immigrants. The probabilities of out-migration to unknown destination by duration of stay seem to be similar across the various groups. Overall, Figure 1 reinforces the importance of duration dependence an issue we will re-visit when examining the effects of total earnings and unemployment on the out-migration hazard rates.

Figure 1: Cumulative incidence curves by emigration type and region



4 Estimating return and onward migration hazards

Before we elaborate on accounting for endogeneity of the labour market transitions and wage formation, we first discuss how we allow for unknown destinations and administrative removal in our out-migration hazard model. Let's assume that a migrant either returns or moves to a third country (onward migration), where we distinguish between an EU country and a non-EU country, with hazards $\theta_r(t|\cdot)$, $\theta_{o1}(t|\cdot)$ and $\theta_{o2}(t|\cdot)$

$$\theta_r(t|x(t), v_r) = \lambda_{r0}(t)\exp\Big(x(t)\beta_r + v_r\Big) \quad (1)$$

$$\theta_{o1}(t|x(t), v_{o1}) = \lambda_{o10}(t)\exp\Big(x(t)\beta_{o1} + v_{o1}\Big) \quad (2)$$

$$\theta_{o2}(t|x(t), v_{o2}) = \lambda_{o20}(t)\exp\Big(x(t)\beta_{o2} + v_{o2}\Big) \quad (3)$$

with baseline duration dependence $\lambda_{r0}(t)$, $\lambda_{o10}(t)$ and $\lambda_{o20}(t)$ and unobserved heterogeneity terms v_r, v_{o1} and v_{o2}. Let $\delta_r = 1$ be the indicator that a migrant returned (zero otherwise), $\delta_{o1} = 1$ the indicator that a migrant moved to an EU country (no return, zero otherwise) and $\delta_{o2} = 1$ the indicator that a migrant moved to a non-EU country (no return, zero otherwise). A problem is that for some migrants (migrants who left with unknown destination) we only know that the migrant has left the country, i.e. returned or moved to a third country. Let δ indicate that a migrant has left. This includes the migrants for which we know they either returned $\delta_r = 1$ or moved on $\delta_{o1} = 1$ or $\delta_{o2} = 1$. The hazard of a migrant who leaves is equal to $\theta_r(t|\cdot)+\theta_{o1}(t|\cdot)+\theta_{o2}(t|\cdot)$. Then, conditional on the unobserved heterogeneity $v = (v_r, v_{o1}, v_{o2})$ the hazards are independent and the likelihood contribution of individual i is

$$L_i(v) = \theta_r(t_i|x_i(t), v_r)^{\delta_{ri}}\theta_{o1}(t_i|x_i(t), v_{o1})^{\delta_{o1i}}\theta_{o2}(t_i|x_i(t), v_{o2})^{\delta_{o2i}}$$
$$S_r(t_i|\cdot)S_{o1}(t_i|\cdot)S_{o2}(t_i|\cdot)\Big[\theta_r(t_i|\cdot) + \theta_{o1}(t_i|\cdot) + \theta_{o2}(t_i|\cdot)\Big]^{\delta_i(1-\delta_{ri})(1-\delta_{o1i})(1-\delta_{o2i})}$$

with $S_r(t|\cdot)$ is the survival function given the return hazard and $S_{o1}(t|\cdot)$ and $S_{o2}(t|\cdot)$ are the survival functions given the onward hazards (either to an EU country or a non-EU country), with $S_k(t|\cdot) = \exp\big(-\int_0^t \theta_k(s|x(s))\,ds\big)$ for $k \in \{r, o1, o2\}$.

Sometimes we only know that a migrant was administratively removed, i.e. the migrant has left *before* the date the administrative removal is recorded, and *after* the last date of any observed change in the observed characteristics (e.g. labour market status, housing and marital status). It is also worth noting that when a migrant is administratively removed, we do not know their destination.[7] If a migrant is administratively removed at duration t_a and the last observed change for this migrant occurred at duration $t_1 < t_a$, the contribution to the likelihood (of the out-migration) of this migrant is the probability of survival till t_1 times the probability that the migrant left the country between t_1 and t_a. The latter is equal to one minus the survival from t_1 to t_a given survival until t_1.

Let a_i indicate whether the emigration of migrant i was due to an administrative removal ($a_i = 1$). For an administratively removed migrant we introduce two different event dates: t_i^a is the administrative removal date and $t_i^1 < t_i^a$ is the date of the last

[7]The administrative removals are treated differently from those who emigrated with unknown destination as in the former case the exact data of emigration is also unknown.

recorded change in any of the characteristics of migrant i before t_i^a, i.e. interval censoring. Then, the likelihood conditional on the unobserved heterogeneity is

$$L_i(v) = \Bigg[\theta_r(t_i|\cdot)^{\delta_{ri}}\theta_{o1}(t_i|\cdot)^{\delta_{o1i}}\theta_{o2}(t_i|\cdot)^{\delta_{o2i}}S_r(t_i|\cdot)S_{o1}(t_i|\cdot)S_{o2}(t_i|\cdot) \Big[\theta_r(t_i|\cdot)+\theta_{o1}(t_i|\cdot)+\theta_{o2}(t_i|\cdot)\Big]^{\delta_i(1-\delta_{ri})(1-\delta_{o1i})(1-\delta_{o2i})}\Bigg]^{(1-a_i)} \times \Big[S_r(t_i^1|\cdot)S_{o1}(t_i^1|\cdot)S_{o2}(t_i^1|\cdot) - S_r(t_i^a|\cdot)S_{o1}(t_i^a|\cdot)S_{o2}(t_i^a|\cdot)\Big]^{a_i} \quad (4)$$

4.1 Accounting for endogenous unemployment and Timing-of-events

We seek to estimate the impact of labour market transitions and total earnings on return and onward migration. A major methodological concern with the empirical analysis of the impact of labour market experience in the host country on out-migration decisions is that both these processes depend on migrant characteristics. This implies that any observed relationship between individual labour market and out-migration may be caused by unobserved factors that influence both the labour market dynamics and the out-migration decision. Unemployment has been shown to affect the return decision (Kırdar, 2009, Bijwaard et al., 2014). It is therefore imperative to account for interdependence between labour market changes and out-migration. We use a Timing-of-events model, which explicitly controls for the strong correlation between unemployment and the decision to return (Bijwaard et al., 2014), to account for this interdependence.[8]

Another important empirical challenge is the interdependence among the various out-migration destinations (return to origin or move to a third country). A few papers have addressed this issue, the multilateral resistance to migration (Bertoli and Moraga, 2013), when looking at the initial migration decision from the origin using alternative strategies, such as origin-destination fixed effects or common correlated effects estimator.[9] We address this in our model by assuming that the out-migration hazards are interdependent and allow for the correlation among the return-, the EU-onward- and non-EU onward migration hazards (and the labour market transition rates).

To define our model in formal terms, let T_m denote the time (since entry into the Netherlands) the immigrant emigrates from the host country (either return or onward), T_e the time an employment spell ends in the host country, and T_u the time an unemployment spell ends. The duration of the employment and unemployment spells are denoted by $\delta_e(t)$ and $\delta_u(t)$.

We have five possible transitions: unemployment to employment, employment to unemployment, return migration and two types of onward migration. The conditional hazards from employment to unemployment and from unemployment to employment both follow

[8]This implies that our model is a restricted multilateral resistance migration model. If we extended our model to an origin-destination specific out-migration (competing) hazard model with migration rates between each dyad representing origin and destination, we would have a fully multilateral resistance to migration model (as the all the hazard rates are correlated through the unobserved terms). Such a model is, however, not feasible to estimate.

[9]See Beine et al. (2016) for a summary of the empirical strategies used to address the multilateral resistance to migration.

a mixed proportional hazard model:

$$\theta_u\big(\delta_u(t)\big|x_u(t),v_u\big) = \lambda_u\big(\delta_u(t)\big)\exp\Big(x_u(t)\beta_x^u + v_u\Big) \tag{5}$$

$$\theta_e\big(\delta_e(t)\big|x_e(t),v_e\big) = \lambda_e\big(\delta_e(t)\big)\exp\Big(x_e(t)\beta_x^e + v_e\Big), \tag{6}$$

with baseline hazards λ_k, unobserved time-invariant characteristics v_k, and observed time-varying characteristics x_k where $k \in \{u, e\}$ denotes the labour market state. In order to keep track of unemployment events, we also define the associated time-varying indicator: the indicator $I_u(t)$ takes value one if the migrant is unemployed at time t.

We allow the time till return migration, onward (EU or non-EU) migration and, labour market transitions to be correlated through unobservable heterogeneity terms and through a possible direct effect of labour market transitions on the emigration hazards. To account explicitly for the effect of earnings (initial and cumulative) on the out-migration hazards, we adjust the conditional out-migration hazards in (1)– (3) to

$$\begin{aligned}\theta_r(t|x(t),t_e,v_r) = \lambda_{r0}(t)\exp\Big(&\beta_{rw_0}\ln\big(\bar{W}_0\big) + \beta_{rw}\ln\big(\bar{W}(t)\big) + \\ &+ x(t)\beta_r + I_u(t)\big(\gamma_r + \gamma_{rw}\ln\bar{W}(t)\big) + v_r\Big)\end{aligned} \tag{7}$$

$$\begin{aligned}\theta_{o1}(t|x(t),t_e,v_{o1}) = \lambda_{o10}(t)\exp\Big(&\beta_{o1w_0}\ln\big(\bar{W}_0\big) + \beta_{o1w}\ln\big(\bar{W}(t)\big) + \\ &x(t)\beta_{o1} + I_u(t)\big(\gamma_{o1} + \gamma_{o1w}\ln\bar{W}(t)\big) + v_{o1}\Big)\end{aligned} \tag{8}$$

$$\begin{aligned}\theta_{o2}(t|x(t),t_e,v_{o2}) = \lambda_{o20}(t)\exp\Big(&\beta_{o2w_0}\ln\big(\bar{W}_0\big) + \beta_{o2w}\ln\big(\bar{W}(t)\big) + \\ &x(t)\beta_{o2} + I_u(t)\big(\gamma_{o2} + \gamma_{o2w}\ln\bar{W}(t)\big) + v_{o2}\Big)\end{aligned} \tag{9}$$

with $\bar{W}_0$ is the initial wage (of individual i) divided by the reference initial wage (€2000) and $\bar{W}(t)$ is the total (cumulative) earnings (of individual i) at duration t divided by the reference total earnings (€50,000). We also allow the impact of unemployment to vary with the total earnings.

The unobserved heterogeneity terms in the return and onward hazard might be correlated with distribution $H(v)$. We assume, which is standard in the Timing-of-events literature (Abbring and van den Berg, 2003), a discrete mixture for the unobserved heterogeneity M vectors of unobserved heterogeneity. The probability that the seven-dimensional vector of unobserved heterogeneities V is equal to $V_m = \{v_r = V_{rm}, v_{o1} = V_{o1m}, v_{o2} = V_{o2m}, v_u = V_{um}, v_e = V_{em}\}$ has probability p_m, $m = 1, \ldots, M$. Then, the observed likelihood is

$$L_i(v) = \sum_{m=1}^{M} p_m L_i(v_m) \tag{10}$$

Note that the probabilities p_m are estimated jointly with the other parameters of the likelihood. We use a logit transformation to ensure that each probability is bounded between zero and one and that $\sum_{m=1}^{M} p_m = 1$. Hence, $p_m = e^{q_m}/\big(1 + \sum_{k=2}^{M} e^{q_k}\big)$ for $m = 2, \ldots, M$ and $p_1 = 1 - \sum_{m=2}^{M} p_m = 1/\big(1 + \sum_{k=2}^{M} e^{q_k}\big)$.

4.2 Accounting for endogenous total earnings

It is very likely that the labour market behaviour, the out-migration and total earnings (wage development) are interdependent, see Bijwaard and Wahba (2014, 2019). Migrants

who are employed all the time are more likely to secure higher earnings than those who are unemployed or non-participating for a certain period.

The earnings of a migrant are only observed while the migrant is employed and we assume that the earnings change in the log-earnings (the proportional earnings growth) is linear and depends on the time in the host country (and migrant characteristics)

$$d \ln W(t) = \theta_0 + \theta_x x(t) + \epsilon(t), \tag{11}$$

where, for a given migrant, the error term comprises two components, an independently normally distributed idiosyncratic component, $\eta(t)$, and a random individual-specific component, v_w : $\epsilon(t) = \eta(t) + v_w$.

We allow for possible interdependence between the earnings equation and the transition rates by assuming a joint, correlated, distribution for the individual-specific component in the earnings equation and all the unobserved heterogeneity terms in the transition rates. For the sake of parsimony, we assume that each of the eight unobserved heterogeneity terms remains the same for recurrent durations of the same type, and we adopt a joint discrete distribution with $V_m = \{v_r = V_{rm}, v_{o1} = V_{o1m}, v_{o2} = V_{o2m}, v_u = V_{um}, v_e = V_{em}, v_w = V_{wm}\}$, see the previous section for details.

We assume that the baseline hazards are piece-wise constant on seven intervals. Any duration dependence can be approximated arbitrarily closely by increasing the number of intervals. For identification we assume that the baseline hazard is one in the first interval. For the out-migration hazards we use the intervals less than 6 months (reference), 6-12 months, 12-18 months, 28-24 months, 2-5 years and, more than 5 years. For the hazard from employment to unemployment we use the intervals: less than 3 months, 3-6 months, 6-12 months, 1- 2 years, 2-5 years and, more than 5 years. For the hazard from unemployment to employment we use the intervals: less than 3 months, 3-6 months, 6-12 months, 12-18 months, 18-24 months, 2-3 years and, more than 3 years. It is important to note that these piecewise baseline hazards allow us to identify separately the effects of duration of stay from those of total earnings.

The included control variables in the models refer to demographic characteristics (gender, age at entry, marital status and number of children), as well as to the labour market sector. We control for business cycle conditions in the Netherlands by including the national unemployment rates both at the moment of first entry into the country and the time-varying monthly rate. The national unemployment rate at entry captures the 'cohort effect' of migrants, while the current varying national unemployment rate captures the impact of the business cycle on the intensity to leave. We also control for the potential pull factors by the country of origin using the country of origin's GDP per capita and GDP growth rate. We include the (time-varying) log total earnings, in linear and quadratic form in both the migration hazards and the employment-unemployment hazard, and account for the initial wage (capturing migrant ability and therefore selectivity).[10] Thus, we are able to control for individual unobserved heterogeneity, and the push factors leading to out-migration.

It is important to note that the Timing-of-events allows us to estimate the causal effect of unemployment on out-migration, and identify the model relying on the assumption of no anticipation following Abbring and van den Berg (2003). In other words, we

[10]Note that in the absence of data on education, we use initial wage as well as industry sector to control for ability.

assume that migrants do not know in advance that they will become unemployed, and do not act upon this by out-migrating before they actually become unemployed. The no anticipation assumption requires that migrants do not change their migration behaviour before the labour market change. See Bijwaard et al. (2014) for further discussions on the use of Timing-of-events and the validity of the no anticipation assumption in our case. Auray and Lepage-Saucier (2021) use a similar approach to account for the endogeneity of intermediate jobs and partial unemployment on wage gains. Monte Carlo results from Gaure et al. (2007) have shown that the Timing-of-events approach is very robust in computing causal effects. This procedure is designed to control for selection bias arising from stable individual characteristics. A necessary exclusionary restriction is the absence of time varying unobserved heterogeneity at the individual level. A similar mechanism may be at play if, for instance, macroeconomic conditions influence the return and both onward hazard rates. To account for this effect, we control for entry time and the monthly national unemployment rate. An advantage of this method is that we do not need instruments or exclusion restrictions on the included variables for the endogenous equations (see Abbring and van den Berg (2003)), as it is unrealistic to find the variables to exclude, namely those that only influence one particular hazard and/or the wage equation.

5 Empirical Findings

5.1 The impacts of unemployment and exogenous total earnings

In order to show the effects of a migrant's total earnings in the host country and unemployment on their out-migration decision, we first report the estimates of the simplest model where we control for the endogenous unemployment but only include total earnings as a(n) (exogenous) control, in Table 4. The estimates show that the impact of unemployment is larger on the hazard rate of onward migration than on return migration. Total earnings have a positive impact on almost all out-migration hazards, but the magnitude of the impact varies by immigrant group and by type of out-migration. When we control for the endogeneity of total earnings, as shown in Table 5, the impact of total earnings on the out-migration hazard decreases, but the same pattern persists. Furthermore, in both models, there is a positive relationship between total earnings and the hazard rate of return and onward migration. The impact of total earnings is the highest for onward migration to non-EU countries, reflecting the higher cost of moving to non-EU destinations relative to the other options. These results suggest that unemployment leads to out-migration (both return and onward), and that high earners are more likely to out-migrate.

When we allow for interaction between unemployment and total earnings, as reported in Table 6, we find that the impact of total earnings and unemployment (and the interaction between them) on the hazard rates of return migration and onward migration differ substantially by immigrant group. Indeed, comparing these results with the results in the previous two tables show that it is not only important to account for the endogeneity of unemployment and total earnings, but also for the interaction between the two. Since the estimated coefficients of unemployment and the quadratic function of log total earnings on the hazard rates are difficult to interpret, we plot and discuss those proportional impacts of total earnings on the hazard rates in the next sub-section.

Table 4: The estimated coefficients of total earnings and the incidence of unemployment on out-migration hazards, Timing-of-events model with exogenous earnings

	EU15	new EU	DCs	LDCs
	Return migration			
Log total earnings	0.056^{**}	-0.043	0.374^{**}	0.360^{**}
	(0.017)	(0.056)	(0.029)	(0.045)
Log total earnings, squared	0.003	-0.002	0.034^{**}	0.020^{**}
	(0.002)	(0.006)	(0.004)	(0.006)
Unemployment	1.041^{**}	0.483^{**}	1.111^{**}	0.893^{**}
	(0.026)	(0.066)	(0.055)	(0.065)
	Onward migration (EU)			
Log total earnings	0.260^{**}	0.392^{**}	0.404^{**}	0.203^{**}
	(0.038)	(0.122)	(0.064)	(0.050)
Log total earnings, squared	0.014^{+}	0.042^{**}	0.009	0.012
	(0.006)	(0.011)	(0.017)	(0.007)
Unemployment	1.366^{**}	0.860^{**}	1.821^{**}	1.335^{**}
	(0.054)	(0.137)	(0.091)	(0.072)
	Onward migration (non EU)			
Log total earnings	0.538^{**}	1.275^{**}	0.631^{**}	0.714^{**}
	(0.045)	(0.241)	(0.084)	(0.073)
Log total earnings, squared	0.014	-0.115	0.029	-0.007
	(0.010)	(0.076)	(0.020)	(0.020)
Unemployment	1.341^{**}	1.219^{**}	1.445^{**}	1.420^{**}
	(0.060)	(0.262)	(0.111)	(0.090)
Number of migrants	48,258	12,809	11,700	17,573

Notes: Estimation results of a Timing-of-events model, using (5)–(10), assuming total earnings are exogenous to the migration and employment process. Thus, the earnings growth does not depend on v_w. Each panel shows an out-migration hazard: the first panel shows the return migration hazard, the second panel shows the hazard of onward migration to EU countries, and the third panel shows the hazard of onward migration to non EU. Reference total earnings €50,000. $^{+}p < 0.05$ and $^{**}p < 0.01$

Table 5: The estimated coefficients of total earnings and the incidence of unemployment on out-migration hazards, Timing-of-events model with endogenous earnings

	EU15	new EU	DCs	LDCs
	Return migration			
Log total earnings	0.087^{**}	-0.028	0.244^{**}	0.245^{**}
	(0.013)	(0.044)	(0.021)	(0.035)
Log total earnings, squared	0.006^{**}	-0.004	0.019^{**}	0.007
	(0.002)	(0.005)	(0.004)	(0.006)
Unemployment	1.062^{**}	0.674^{**}	0.801^{**}	0.844^{**}
	(0.021)	(0.055)	(0.041)	(0.054)
	Onward migration (EU)			
Log total earnings	0.259^{**}	0.332^{**}	0.321^{**}	0.144^{**}
	(0.035)	(0.103)	(0.058)	(0.039)
Log total earnings, squared	0.015^{+}	0.035^{**}	-0.006	0.011^{+}
	(0.006)	(0.010)	(0.017)	(0.005)
Unemployment	1.402^{**}	1.077^{**}	1.592^{**}	1.321^{**}
	(0.052)	(0.132)	(0.085)	(0.064)
	Onward migration (non EU)			
Log total earnings	0.560^{**}	1.175^{**}	0.497^{**}	0.659^{**}
	(0.044)	(0.224)	(0.084)	(0.068)
Log total earnings, squared	-0.001	-0.131	-0.004	-0.044^{+}
	(0.011)	(0.072)	(0.022)	(0.020)
Unemployment	1.393^{**}	1.327^{**}	1.210^{**}	1.451^{**}
	(0.058)	(0.248)	(0.107)	(0.085)
Number of migrants	48,258	12,809	11,700	17,573

Notes: Estimation results of a Timing-of-events model, using (5)–(10), assuming total earnings are endogenous to the migration and employment process through correlated v_w using (11). Each panel shows an out-migration hazard: the first panel shows the return migration hazard, the second panel shows the hazard of onward migration to EU countries, and the third panel shows the hazard of onward migration to non EU. Reference total earnings €50,000. $^{+}p < 0.05$ and $^{**}p < 0.01$

Table 6: The estimated coefficients of total earnings and the incidence of unemployment on out-migration hazards, Timing-of-events model with endogenous earnings and interaction between total earnings and employment status

	EU 15	new EU	DCs	LDCs
	Return migration			
Log total earnings	-0.016	-0.153^{**}	0.232^{**}	0.190^{**}
	(0.016)	(0.050)	(0.026)	(0.040)
Log total earnings, squared	-0.001	-0.013^{**}	0.018^{**}	-0.000
	(0.002)	(0.005)	(0.004)	(0.007)
Unemployment	1.061^{**}	0.900^{**}	0.775^{**}	0.808^{**}
	(0.021)	(0.065)	(0.050)	(0.055)
Unemp * log total earnings	0.165^{**}	0.246^{**}	0.021	0.127^{**}
	(0.015)	(0.053)	(0.027)	(0.040)
Unemp * log total earning, sq	0.017^{**}	0.018	0.004	0.029^{**}
	(0.003)	(0.010)	(0.007)	(0.010)
	Onward migration (EU)			
Log total earnings	0.132^{**}	0.213	0.189^{+}	0.072
	(0.043)	(0.119)	(0.075)	(0.050)
Log total earnings, squared	0.009	0.026^{+}	-0.004	-0.000
	(0.006)	(0.011)	(0.020)	(0.008)
Unemployment	1.279^{**}	1.085^{**}	1.397^{**}	1.278^{**}
	(0.057)	(0.133)	(0.110)	(0.066)
Unemp * log total earnings	0.211^{**}	0.178	0.180^{+}	0.123^{**}
	(0.037)	(0.094)	(0.077)	(0.047)
Unemp * log total earnings, sq	0.020^{+}	0.011	0.011	0.021^{+}
	(0.009)	(0.015)	(0.028)	(0.009)
	Onward migration (non EU)			
Log total earnings	0.639^{**}	1.017^{**}	0.489^{**}	0.655^{**}
	(0.061)	(0.257)	(0.118)	(0.085)
Log total earnings, squared	-0.017	-0.160	-0.014	-0.029
	(0.016)	(0.095)	(0.033)	(0.024)
Unemployment	1.427^{**}	1.061^{**}	1.139^{**}	1.526^{**}
	(0.073)	(0.313)	(0.145)	(0.107)
Unemp * log total earnings	-0.121^{+}	0.214	-0.006	0.009
	(0.057)	(0.240)	(0.124)	(0.094)
Unemp * log total earnings, sq	0.024	0.080	0.029	-0.050
	(0.021)	(0.129)	(0.043)	(0.041)
Number of migrants	48,258	12,809	11,700	17,573

Notes: Estimation results of a Timing-of-events model, using (5)–(10), assuming total earnings are endogenous to the migration and employment process through correlated v_w using (11). Additionally, the impact of the total earnings might change when a migrant becomes unemployed. Each panel shows an out-migration hazard: the first panel shows the return migration hazard, the second panel shows the hazard of onward migration to EU countries, and the third panel shows the hazard of onward migration to non EU. Reference total earnings €50,000. $^{+}p < 0.05$ and $^{**}p < 0.01$

5.2 The marginal effects of total earnings on out-migration hazard rates by employment status

First, we discuss the baseline (duration dependence) hazards of out-migration, the hazard when all the covariates are equal to zero, to highlight the role of migration duration (length of stay in the host country), see Figure C.1 in Appendix C.[11] Overall, the average monthly return hazard rates are 0.52% (EU15), 1.41% (new EU), 0.50% (DCs) and 0.96% (LDCs), while the average monthly onward hazard rates are 0.08% (EU15), 0.15% (new EU), 0.35% (DCs) and 0.27% (LDCs). This suggests that the baseline hazard rate of return is higher than the baseline hazard rate of onward migration for all immigrant groups.

Second, in order to quantify the impact of total earnings on out-migration, we display the proportional effect of total earnings on the hazard ratios. Figures 2 and 2 use €50,000 as the reference total earnings and a €2000 as the reference monthly initial wage for the migrants. Figure 2 depicts the proportional impact of total earnings on the total (return and onward) out-migration hazard by employment status; i.e. the hazard ratio of leaving the country for migrants with different total earnings while a migrant is employed or unemployed. The proportional impact of total earnings on the hazard ratio of out-migration for employed immigrants do not exceed two, and is almost flat around one, suggesting no effect, for EU15 and new EU immigrants. For employed immigrants from DCs, the out-migration hazard ratio rises the most with increasing total earnings. But, total earnings have a larger impact on the out-migration hazard ratio of unemployed migrants (Figure 2 (b), highlighting the significance of unemployment in driving out-migration for all immigrant groups. Interestingly, the hazard of out-migration increases with total earnings for all unemployed immigrants. However, distinguishing between return and onward migration reveals interesting patterns.

The proportional impact of total earnings on the return and onward migration hazards are shown in Figure 2. Figure 2.A (a) shows that for employed immigrants the hazard of return migration is flat with respect to total earnings for EU15 immigrants, but declines with higher total earnings for new EU immigrants. However, the hazard of return rises for employed immigrants from LDCs and DCs with increasing total earnings. Overall, though, the impact of total earnings on the hazards of return for employed immigrants is fairly low. Figure 2.B (a) shows that the impact of total earnings on the hazards for onward migration to a third EU destination is fairly low, but slowly rises with increasing total earnings for all immigrant groups. Interestingly, the impact of total earnings on the hazard of onward migration to a non-EU destination, Figure 2.C (a), increases with increasing total earnings for all immigrant groups, especially for new EU migrants.

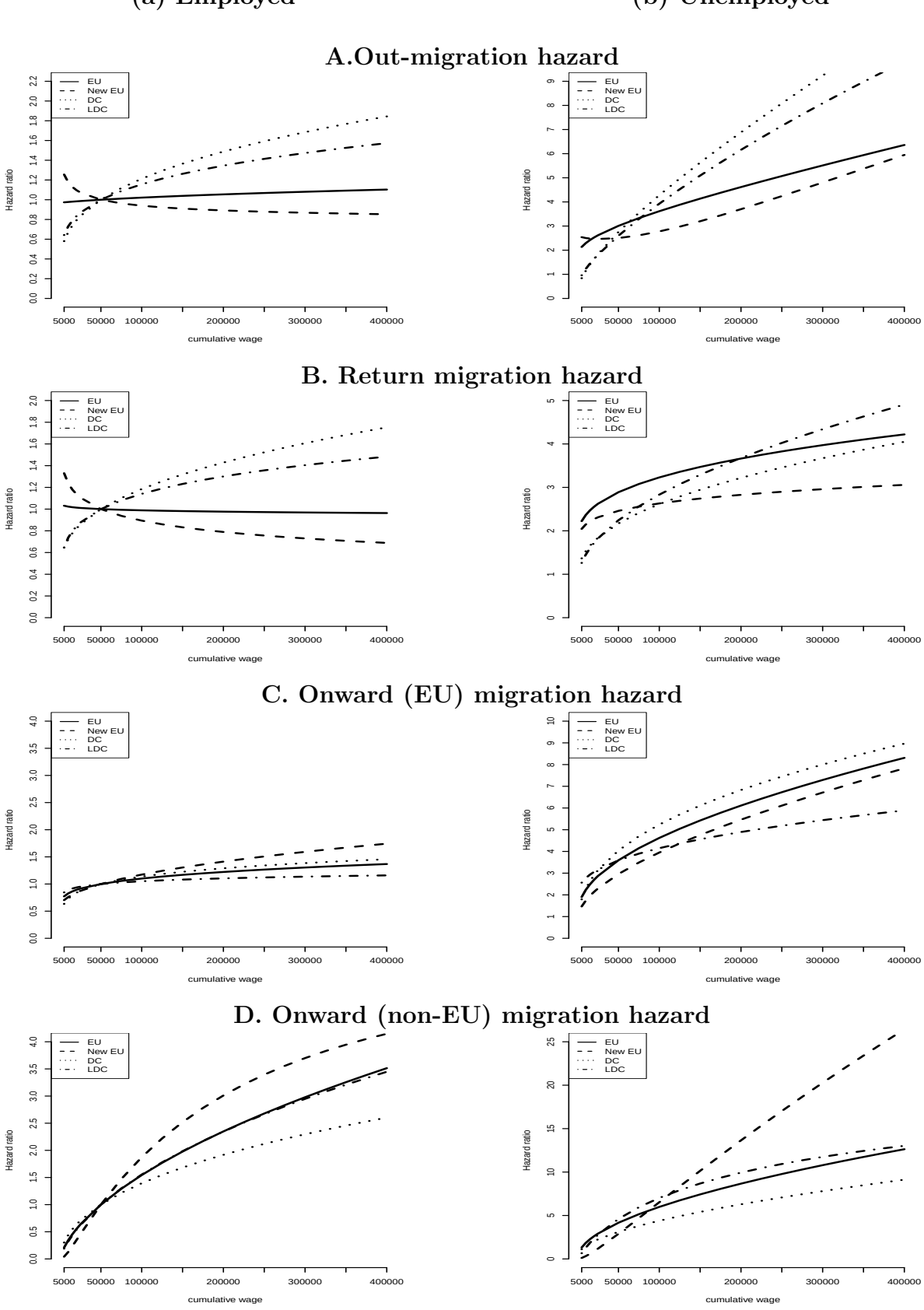
In contrast to these findings for employed migrants, we find for unemployed immigrants that the impact of total earnings increases the return migration hazard for all immigrants, except for new EU migrants whose hazard ratio is almost flat, Figure 2.A (b). Indeed, the increasing total earnings increases the hazard of onward migration to both other EU destinations and to other non-EU countries for all immigrant groups, Figures 2.B (b) and 2.C (b). Yet, the impact of increasing total earnings on the onward hazard to non-EU destinations is the highest.

So, to sum up, the impact of increasing total earnings is larger for unemployed immigrants compared to employed immigrants. Controlling for the interaction between unemployment and total earnings suggests that the proportional impact of total earnings

[11] Based on the estimated α's which can be found in Table C.1, C.2 and C.3 in Appendix D.

is larger for onward migration than for return migration. Thus, overall, the estimates of the Time-of Events model with endogenous wage formation, and allowing for interaction between total earnings and the impact of unemployment of the out-migration hazards, show that total earnings play an important role in the return versus onward migration decision reflecting the potential cost associated with a further move relative to returning to country of origin.

Figure 2: Proportional impact of total earnings on migration: hazard ratios by employment status and region of origin



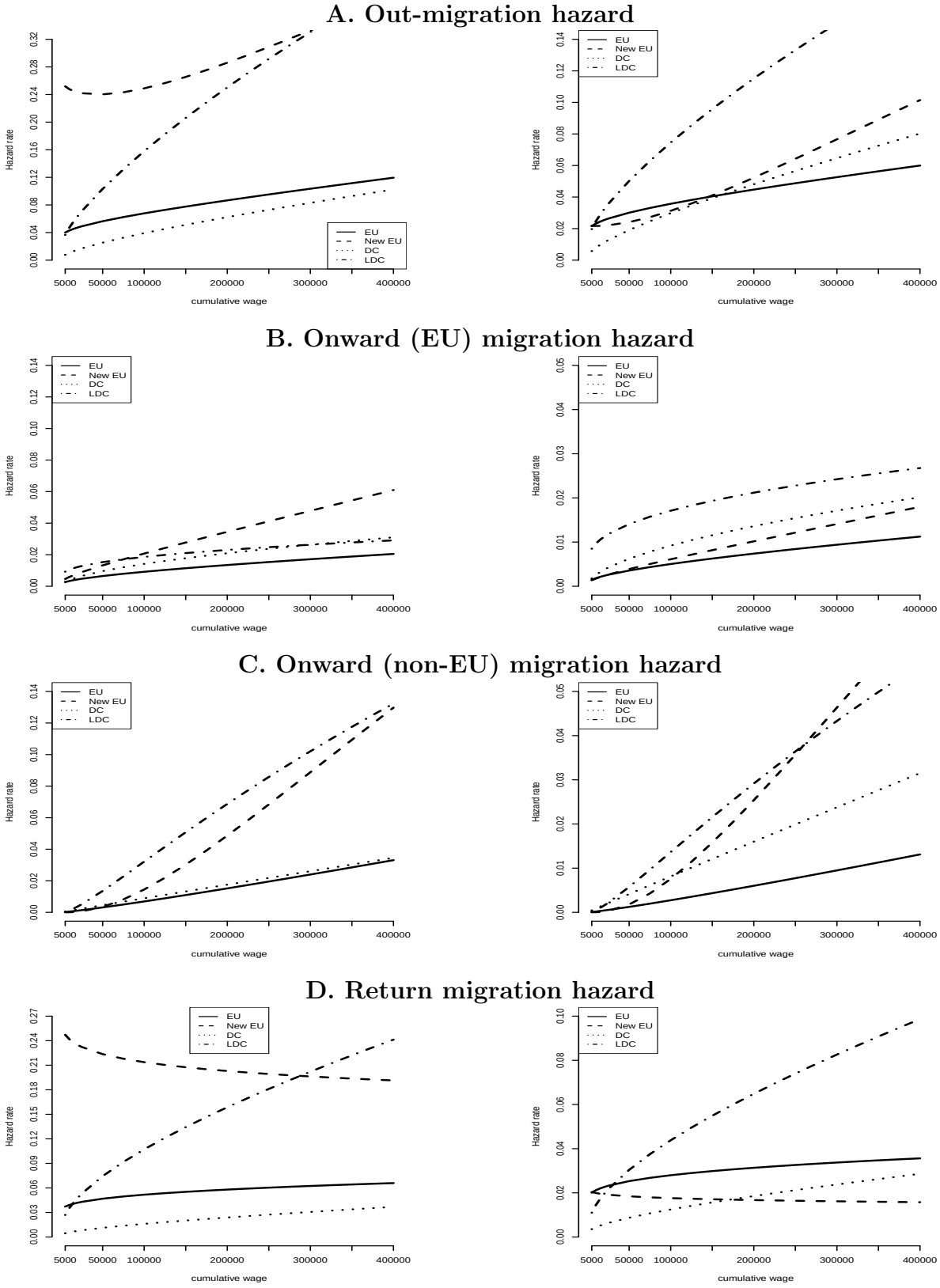
5.3 The effects of total earnings on unemployed migrants' hazard rate of out-migration

Focusing on the total effect rather than on the marginal effect as above, we examine next how the hazard rates are affected by total earnings. We focus our attention on unemployed immigrants who are the group of interest. Figure 3 depicts the out-, onward- and return migration hazards for unemployed migrants by region of origin and how these hazard rates change by total earnings. The figures take into account both the baseline hazard, Figure C.1, as well as the proportional impact of total earnings, Figure 2, discussed above. We present the out-migration hazards after one year in the Netherlands, to reflect early exits typically seen as a result of failure, and after five years in the Netherlands, to show the behaviour of more established migrants. Looking at the out-migration hazard in Figure 3.A, it is evident that the first-year out-migration hazard rates are higher than the five-year out-migration hazards, in particular for LDC and new EU immigrants. For DC and EU15 immigrants, the hazard of out-migration increases as total earnings rise, but not as much as for LDC immigrants whose out-migration hazard increases the most with total earnings increasing. Interestingly, for new EU immigrants, the first-year out-migration hazard initially - with low total earnings- decreases and then rises again as total earnings increase. However, this pattern does not persist over time: indeed, after five years the out-migration hazard for new EU immigrants rises with total earnings but not dramatically. It is also important to note that out-migration is a combination of potentially three different types of emigration: return and, two types of onward migration.

When examining the onward migration hazards, Figures 3.B and 3.C, it is clear that the hazard rates of onward migration to EU and non-EU destinations increase with total earnings for all immigrant groups, and are much higher after one year than after five years. After one year in the Netherlands, the hazard rate of onward migration to EU destinations is the highest for new EU immigrants, followed by LDC immigrants, while for the hazard rates of onward migration to non-EU countries LDC immigrants have the highest hazard rates. The hazard rates of onward migration to non-EU countries tend to be higher than the hazard rate of onward migration to EU countries in particular for LDC and new EU immigrants. The onward migration rate, both to EU and non-EU countries, is the lowest for EU15 migrants and hardly increase with total earnings.

Interestingly, Figure 3.D, shows that higher total earnings increase the one-year hazard rates of return for all immigrants groups especially for LDC immigrants, but reduce the return hazard for new EU immigrants. The return hazard rates for both DC and EU15 immigrants are positive but almost flat with respect to total earnings. Although the five-year hazard rates of return migration are lower, the same patterns with respect to total earnings are observed. Also, the total out-migration hazards, irrespective of whether they concern return to the home country or moving to a third country, are much higher if triggered by unemployment after the first year relative to after five years.

Figure 3: The out-migration hazards for the unemployed after one year or five years in the country by total earnings and region of origin)



(a) 1 year after entry **(b) 5 years after entry**

This is also consistent with the simulation results in Table 7, which shows that amongst unemployed migrants, the average total earnings are the highest for onward migrants to a non-EU destination. Indeed, unemployed immigrants who moved onward to a non-EU country tend to have higher total earnings and longer duration in the Netherlands compared to those who have moved to another EU country. Onward migrants have higher total earnings compared to return migrants. This supports the hypothesis that unemployment triggers return for low earners and increases onward migration for higher earners. Also, the effects of total earnings tend to be more prominent for immigrants from more credit-constrained backgrounds; i.e. immigrants from LDCs and new EU countries. Moreover, comparing the onward and return migration hazard, it is clear that the likelihood of return migration is higher than onward migration.

The results in Table 7 are based on the final Timing-of-events model with endogenous earnings and interaction between unemployment and total earnings we simulate the migration-employment dynamics of the labour migrants for a synthetic cohort. This synthetic cohort of labour migrants, all entering at the same time, reflects the entry distribution and consists of 90,340 migrants (48,258 from EU15; 12,809 from new EU; 11,700 from DCs and 17,573 from LDCs) for which the distribution of the start population of migrants equals the observed entry distribution. For each simulation round, we draw a vector of parameter estimates assuming that the estimated coefficients are normally distributed around the point estimates with a variance-covariance matrix equal to the estimated one. Then, on a monthly basis, we simulate the transitions for each member of the synthetic cohort using the implied transition intensities, migration or employment. If the simulated migrant becomes unemployed, we account for the unemployment effect. In the simulations the exogenous explanatory factors remain at their initial values. The (endogenous) value of the earnings of the migrant increases over the length of the time spent in employment using the implied earnings increase (11) obtained from the estimated model. We use the evolution of the labour-migration path, the history of all occurrences of labour market and migration states, of each individual member in the (dynamic) simulation. We simulate the labour market and migration path for ten years, and in the end, we save the whole simulated migrant history. We repeat the simulations 100 times.

It is important to note that we use the full sample and full information in estimating our ToE models; i.e. we include all out-migrants (including those with unknown destinations, assuming they are a mixture of return and onward migrants) and stayers. Given the observable characteristics of out-migrants with unknown destinations and their low total earnings, we expect those out-migrants to return to their country of origin rather than to move onward to a third country. Thus, our estimates of return are expected to be a lower bound.

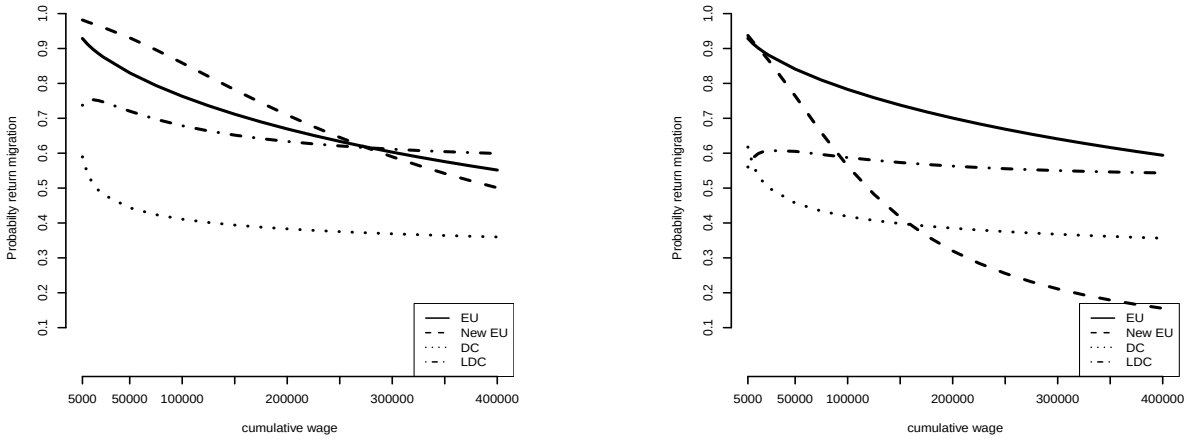
Table 7: Simulated migration statistics by migration status and region

	EU15	new EU	DCs	LDCs
	Average number of months till out-migration			
Return	41.6	26.9	41.6	33.7
Onward EU	45.6	47.8	41.8	49.2
Onward non-EU	46.3	61.2	45.2	43.3
	Average number of months in NL for unemployed[a]			
Return	45.5	31.2	46.6	41.8
Onward EU	48.3	49.3	45.7	53.3
Onward non-EU	44.8	63.9	48.4	46.6
Total[b]	62.0	76.6	59.7	64.9
	Average total earnings at last observation			
Censored	€153,120	€174,005	€104,698	€90,138
Return	€65,226	€27,205	€164,237	€77,768
Onward EU	€109,246	€300,351	€149,439	€65,734
Onward non-EU	€268,577	€179,777	€211,830	€190,266
	Average total earnings at last observation for unemployed[a]			
Censored	€33,178	€23,929	€34,314	€29,656
Return	€32,548	€15,019	€93,345	€44,745
Onward EU	€55,353	€30,614	€117,942	€41,556
Onward non-EU	€76,504	€96,160	€141,163	€96,612
Total[b]	€37,040	€22,950	€92,614	€44,628

Notes: Simulation based on the Timing-of-events model with endogenous earnings and interaction between unemployment and total earnings. This simulation is based on a synthetic cohort of labour migrants, all entering at the same time. The synthetic cohort consists of 90,340 migrants (48,258 from EU15; 12,809 from new EU; 11,700 from DCs and 17,573 from LDCs) for which the distribution of the start population of migrants equals the observed entry distribution. For each simulation round, we draw a vector of parameter estimates assuming that the estimated coefficients are normally distributed around the point estimates with a variance-covariance matrix equal to the estimated one. Then, on a monthly basis, we simulate the transitions for each member of the synthetic cohort using the implied transition intensities, migration or employment. [a]Unemployed at the moment of out-migration/censoring. [b] Censored, return or onward

In order to get insight into the choice between return and onward migration, Figure 4 presents the impact of total earnings on the probability of return conditional on out-migration after one or five years; i.e. this is the choice probability of returning versus the two types of onward migration taking into account unemployment and the baseline hazard rates of the three migration hazards. For unemployed immigrants who leave after one year, low earners are more likely to return rather than to move onward. Thus, the probability of return conditional on out-migration falls as total earnings increase. For unemployed immigrants who leave after five years the probability of return migration falls dramatically (i.e. onward migration rises) as total earnings increase for new EU immigrants. Thus, these findings suggest that the probability of return falls and that probability of onward migration rises with increasing total earnings even after controlling for migration duration in the Netherlands.

Figure 4: Impact of total earnings on probability of return migration for unemployed migrants who leave, after 1 or 5 years



(a) 1 year after entry **(b) 5 years after entry**

Overall, the results suggest that both total earnings and employment status matter for out-migration. In addition, the region of origin matters, as does the duration spent in the Netherlands. The hazard rates of return are higher when total earnings are low, but the hazard rate of onward migration increases as total earnings rise, supporting our hypotheses that onward migration is more costly than return migration.

5.4 Discussion and Robustness Checks

5.4.1 Other potential mechanisms

Although we argue that total earnings can be considered as a proxy for credit constraints, and therefore our findings can be framed as higher total earnings reducing migration costs, it is also possible that total earnings may capture alternative mechanisms. For example, our findings might also be explained by richer migrants' preference for living in wealthier countries. However, we do not find consistent evidence of this mechanism as not all high earning migrants stay or decide to move onward to a (wealthier than origin) EU third country. Secondly, it could be argued that habit formation might make migrants, and particularly richer migrants, more likely to stay in the host country. Again, since we

control for duration of stay independently from total earnings, and we are looking at the impact of unemployment, this is an unlikely explanation for our results. Of course, it is possible that total earnings are capturing or are correlated with other unobservables, that are not properly controlled for in our model, and/or that are origin and income specific characteristics, such as preference or taste. So, our interpretation that total earnings are mainly capturing credit constraints is compelling but is not the only possible explanation.

5.4.2 Robustness Checks

In order to check the robustness of our results we conduct three separate additional sets of estimations. First, we include the stock of migrants from the origin in the Netherlands (in logs) as an additional control.[12]. These data would capture social networks in the host and might be an important determinant in staying versus out-migrating. Indeed, we find that having a larger social network reduces the hazard rate of return and onward migration, however our previous results on the role played by the interaction between total earnings and unemployment still hold, see Table B.1 in Appendix B.

Second, in order to control for country-of-origin non-economic conditions which might be key in affecting the return decision, we include a number of governance measures. We use the World Bank Governance Index, and include seven measures as follows: Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law and Control of Corruption, see Kaufmann et al. (2010) for more information. These measures capture political freedom, democracy and corruption, all of which have been found to affect emigration from origin and, therefore, would also impact return migration to origin countries (Docquier et al., 2016). Interestingly, low political stability, low government effectiveness, better regulatory quality, better rule of law and more control of corruption increase the hazard rate of return versus onward migration for LDC migrants in particular. However, the effects of total earnings on the hazard rates of return and onward migration of unemployed migrants hold even for LDC migrants - see Table B.2 in Appendix B.

Finally, we also investigate whether our results are robust with respect to more refined unemployment information, when migrants have experienced repeated unemployment as well as the length of unemployment duration. We find that migrants who have repeated unemployment episodes are less likely to out-migrate and, in particular, to return to the country of origin. However, even after controlling for repeated unemployment and unemployment duration, our results do not qualitatively change (see Table B.3 in Appendix B), emphasising the role played by total earnings for unemployed migrants' hazard rate of out-migration.

6 Conclusion

Little is known about out-migration and what determines the choice between onward and return migration. We examine unemployment as a trigger for out-migration controlling for total earnings in the host country and deal with the potential endogeneity of both total earnings and unemployment in the out-migration decision. We investigate whether

[12]This is the annual migration stock in the Netherlands by country of birth based on publicly available data from Statics Netherlands in Statline, `https://opendata.cbs.nl/statline/#/CBS/nl/`

total earnings have a different impact on unemployed migrants' intensity (hazard rate) of returning and onward migration. We argue that total earnings in the host country can potentially affect the choice between return and onward migration as onward migration is likely to be more costly compared to return migration.

Using unique administrative data from the Netherlands and duration analysis, we find that unemployment triggers higher hazard rates of return migration as opposed to those of onward migration. Our findings provide evidence that the majority of out-migration is return migration rather than a move to a third country. The results also show that unemployment increases the hazard of return migration when total earnings are low. When total earnings are high unemployment increases the hazard rate of onward migration. Onward migration entails more cost than return migration hence our findings highlight the importance of total earnings in affecting the return versus onward decision. In addition, the hazard rates of out-migration are affected by the duration of migration. Furthermore, immigrants behaviour differs by region of origin perhaps reflecting credit constraints as well as migration restrictions. Although our findings suggest that total earnings are likely to be mainly reflecting easing or binding credit constraints associated with the out-migration cost, there might be other additional explanations for our findings. Nonetheless, it is important to underscore the role played by total earnings in the stay/return/onward migration decision, and to consider total accumulated earnings by migrant when studying the out-migration decision.

Our paper provides valuable insights that aid in understanding the complex determinants of return versus onward migration. The questions of who leaves and who stays, and whether out-migration is mostly return or onward migration are important issues for policymakers in the host and origin countries. Better understanding of the determinants of out-migration is key for devising the right migration policies.

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Appendix A Institutional background: Dutch immigration rules 1999-2007

Any immigrant from the EU15 can move freely in the Dutch labour market, as can, since 2004, immigrants from the new EU except for Bulgarians and Romanians.[13] All non-EU migrants need a work permit (the "Machtiging Voorlopig Verblijf (MVV)" or "Regular Provisional Residence Permit"). An MVV is a visa for a stay longer than 90 days. The MVV grants entry into the Netherlands and enables her/him to apply for a residence permit for an intended stay of more than three months. Immigrants from EEA, Australia, Canada, Japan, New Zealand, USA, South-Korea and Switzerland, are exempted from obtaining this MVV before entry. The visa for a longer stay may be applied for at a Dutch diplomatic or consular representation abroad. After entry, the MVV is valid for a maximum of three months.

To obtain a work permit, three conditions must be met: (i) the presence of prioritised supply (i.e. a labour market check), and the recruitment efforts of the employer to fill the position with a native; (ii) remuneration in accordance with the market, and at least at the level of the statutory minimum wage; (iii) having secured adequate accommodation. Although self-employed migrants are exempted from the work permit requirement, residence permits are only granted if the authorities deem that the immigrant would serve vital Dutch interest. The work permit is linked to the specific job, and thus not valid for the migrant across jobs.

Immigrants from the EU15 rapidly gain the same employment and benefits rights as natives, essentially after three months of full-time employment. By contrast, all other immigrants have to gain permanent residency before gaining these rights, the qualifying period for which is essentially five years of continuous full-time employment. Having lost a job, non-EU immigrants without permanent residence have about three months to find another job before they lose the right to stay in the Netherlands.

[13] The relevant Dutch laws are posted at `http://ec.europa.eu/justice/doc_centre/citizenship/movement/doc/netherlands_table_of_correspondence_en.pdf`

Appendix B Additional Tables

Table B.1: The impact of total earnings and the incidence of unemployment on out-migration hazards, Including migrant stock

	EU 15	new EU	DCs	LDCs
	Return migration			
Log total earnings	-0.018	-0.156^{**}	0.241^{**}	0.188^{**}
	(0.016)	(0.050)	(0.026)	(0.040)
Log total earnings, squared	-0.001	-0.013^{**}	0.019^{**}	-0.000
	(0.002)	(0.005)	(0.004)	(0.007)
Unemployment	1.058^{**}	0.892^{**}	0.800^{**}	0.807^{**}
	(0.021)	(0.066)	(0.051)	(0.055)
Unemp * log total earnings	0.165^{**}	0.242^{**}	0.018	0.130^{**}
	(0.015)	(0.053)	(0.027)	(0.040)
Unemp * log total earning, sq	0.017^{**}	0.018	0.004	0.029^{**}
	(0.003)	(0.010)	(0.007)	(0.010)
Log migration stock	-0.049^{**}	-0.035	-0.075^{**}	-0.009
	(0.007)	(0.027)	(0.021)	(0.017)
	Onward migration (EU)			
Log total earnings	0.131^{**}	0.202	0.209^{**}	0.108^{+}
	(0.042)	(0.119)	(0.077)	(0.053)
Log total earnings, squared	0.009	0.025^{+}	-0.003	0.003
	(0.006)	(0.011)	(0.020)	(0.008)
Unemployment	1.254^{**}	1.074^{**}	1.430^{**}	1.305^{**}
	(0.057)	(0.133)	(0.112)	(0.070)
Unemp * log total earnings	0.219^{**}	0.176	0.201^{+}	0.102^{+}
	(0.037)	(0.095)	(0.078)	(0.050)
Unemp * log total earnings, sq	0.020^{+}	0.011	0.008	0.019^{+}
	(0.008)	(0.015)	(0.029)	(0.009)
Log migration stock	-0.176^{**}	-0.051	-0.295^{**}	-0.025
	(0.017)	(0.062)	(0.048)	(0.019)
	Onward migration (non EU)			
Log total earnings	0.640^{**}	1.004^{**}	0.517^{**}	0.626^{**}
	(0.061)	(0.256)	(0.120)	(0.088)
Log total earnings, squared	-0.017	-0.160	-0.007	-0.021
	(0.016)	(0.095)	(0.033)	(0.026)
Unemployment	1.433^{**}	1.055^{**}	1.174^{**}	1.516^{**}
	(0.073)	(0.314)	(0.149)	(0.111)
Unemp * log total earnings	-0.123^{+}	0.211	0.006	-0.010
	(0.057)	(0.240)	(0.127)	(0.095)
Unemp * log total earnings, sq	0.024	0.079	0.023	-0.045
	(0.021)	(0.129)	(0.044)	(0.042)
Log migration stock	0.043^{+}	-0.060	-0.194^{**}	-0.089^{**}
	(0.021)	(0.109)	(0.062)	(0.027)

Notes: Estimation results of a Timing-of-events model, using (5)–(10), assuming earnings are endogenous to the migration and employment process through correlated v_w using (11). Each panel shows an out-migration hazard: the first panel shows the return migration hazard, the second panel shows the hazard of onward migration to EU countries, and the third panel shows the hazard of onward migration to non EU. Reference total earnings €50,000. $^{+}p < 0.05$ and $^{**}p < 0.01$

Table B.2: The impact of total earnings and the incidence of unemployment on out-migration hazards, Including Governance measures

	EU 15	new EU	DCs	LDCs
	Return migration			
Log total earnings	−0.023	−0.125^{+}	0.248**	0.165**
	(0.016)	(0.056)	(0.027)	(0.041)
Log total earnings, squared	−0.002	−0.013^{+}	0.021**	0.000
	(0.002)	(0.006)	(0.004)	(0.006)
Unemployment	1.075**	0.937**	0.844**	0.800**
	(0.021)	(0.070)	(0.051)	(0.055)
Unemp * log total earnings	0.165**	0.295**	0.015	0.143**
	(0.015)	(0.055)	(0.027)	(0.041)
Unemp * log total earning, sq	0.016**	0.030**	0.005	0.031**
	(0.003)	(0.010)	(0.007)	(0.010)
Voice and Accountability	0.098	0.114	−0.318	0.120**
	(0.109)	(0.372)	(0.258)	(0.039)
Political Stability	0.098**	0.230	0.304**	−0.095**
	(0.027)	(0.147)	(0.043)	(0.037)
Government Effectiveness	−0.053	−0.040	−0.347^{+}	−0.283**
	(0.047)	(0.493)	(0.169)	(0.105)
Regulatory Quality	−0.867**	−0.671	0.280**	0.463**
	(0.060)	(0.445)	(0.108)	(0.096)
Rule of Law	−0.073	0.704	−1.585**	0.571**
	(0.084)	(0.401)	(0.203)	(0.090)
Control of Corruption	0.221**	0.005	0.348^{+}	−0.649**
	(0.060)	(0.314)	(0.135)	(0.102)
	Onward migration (EU)			
Log total earnings	0.140**	0.034	0.212**	0.099
	(0.043)	(0.125)	(0.075)	(0.056)
Log total earnings, squared	0.007	0.014	0.000	0.001
	(0.007)	(0.011)	(0.018)	(0.009)
Unemployment	1.305**	1.095**	1.463**	1.300**
	(0.057)	(0.137)	(0.112)	(0.073)
Unemp * log total earnings	0.196**	0.243^{+}	0.201**	0.135**
	(0.037)	(0.102)	(0.076)	(0.051)
Unemp * log total earnings, sq	0.020^{+}	0.016	0.009	0.023^{+}
	(0.009)	(0.014)	(0.027)	(0.010)
Voice and Accountability	0.096	0.817	0.127	0.138^{+}
	(0.294)	(0.814)	(0.560)	(0.056)
Political Stability	0.281**	−0.474	0.572**	−0.023
	(0.073)	(0.324)	(0.108)	(0.051)
Government Effectiveness	0.053	−0.724	−0.689	−0.116
	(0.123)	(0.929)	(0.355)	(0.134)
Regulatory Quality	−1.242**	0.037	−0.207	0.072
	(0.159)	(0.950)	(0.250)	(0.101)
Rule of Law	−0.202	0.928	−0.595	−0.321^{+}
	(0.220)	(0.829)	(0.462)	(0.134)
Control of Corruption	0.161	−0.527	0.277	0.119
	(0.160)	(0.706)	(0.296)	(0.133)

Table B.2: (continued)

	EU 15	new EU	DCs	LDCs
	Onward migration (non EU)			
Log total earnings	0.605^{**}	1.112^{**}	0.487^{**}	0.612^{**}
	(0.062)	(0.337)	(0.119)	(0.088)
Log total earnings, squared	-0.006	-0.238^{+}	-0.002	-0.017
	(0.016)	(0.115)	(0.032)	(0.026)
Unemployment	1.408^{**}	0.843^{+}	1.119^{**}	1.449^{**}
	(0.073)	(0.387)	(0.149)	(0.113)
Unemp * log total earnings	-0.092	0.359	0.028	-0.049
	(0.057)	(0.319)	(0.124)	(0.093)
Unemp * log total earnings, sq	0.017	0.134	0.023	-0.023
	(0.020)	(0.151)	(0.042)	(0.041)
Voice and Accountability	-0.710^{+}	-3.418^{+}	2.368^{**}	-0.170^{**}
	(0.341)	(1.712)	(0.676)	(0.063)
Political Stability	-0.152	-0.535	0.385^{**}	-0.009
	(0.082)	(0.640)	(0.136)	(0.065)
Government Effectiveness	0.294	-0.240	-1.090^{**}	-0.256
	(0.154)	(1.579)	(0.412)	(0.167)
Regulatory Quality	0.017	-1.686	0.283	0.321^{+}
	(0.194)	(1.667)	(0.350)	(0.140)
Rule of Law	-0.842^{**}	1.149	0.130	0.187
	(0.270)	(1.456)	(0.562)	(0.158)
Control of Corruption	0.795^{**}	1.931	-0.506	-0.081
	(0.187)	(1.673)	(0.343)	(0.160)

Notes: Estimation results of a Timing-of-events model, using (5)–(10), assuming earnings are endogenous to the migration and employment process through correlated v_w using (11). Each panel shows an out-migration hazard: the first panel shows the return migration hazard, the second panel shows the hazard of onward migration to EU countries, and the third panel shows the hazard of onward migration to non EU. Reference total earnings €50,000. $^{+}p < 0.05$ and $^{**}p < 0.01$

Table B.3: The impact of total earnings and the incidence of unemployment on out-migration hazards, Including unemployment length and repeated unemployment

	EU 15	new EU	DCs	LDCs
	Return migration			
Log total earnings	-0.037^{+}	-0.186^{**}	0.147^{**}	0.162^{**}
	(0.018)	(0.055)	(0.027)	(0.043)
Log total earnings, squared	-0.003	-0.015^{**}	0.012^{**}	-0.002
	(0.002)	(0.005)	(0.004)	(0.007)
Unemployment	1.088^{**}	0.963^{**}	1.132^{**}	0.907^{**}
	(0.030)	(0.086)	(0.064)	(0.076)
Unemp * log total earnings	0.171^{**}	0.288^{**}	0.010	0.139^{**}
	(0.015)	(0.054)	(0.027)	(0.040)
Unemp * log total earning, sq	0.016^{**}	0.017	0.002	0.028^{**}
	(0.003)	(0.011)	(0.007)	(0.011)
Repeated unemployment	-0.146^{**}	-0.707^{**}	-0.333^{**}	-0.982^{**}
	(0.034)	(0.132)	(0.115)	(0.189)
Length of unemployment spell				
3–6 months	0.043	0.246^{+}	-0.083	0.037
	(0.042)	(0.103)	(0.085)	(0.112)
6–12 months	0.026	0.107	-0.527^{**}	-0.186
	(0.040)	(0.110)	(0.091)	(0.118)
1–2 year	-0.015	0.145	-0.633^{**}	0.001
	(0.043)	(0.129)	(0.096)	(0.120)
$>$ 2 years	-0.081	-0.163	-0.903^{**}	-0.208
	(0.049)	(0.158)	(0.118)	(0.151)
	Onward migration (EU)			
Log total earnings	0.064	0.138	0.036	0.081
	(0.045)	(0.129)	(0.075)	(0.053)
Log total earnings, squared	0.004	0.021	-0.013	0.000
	(0.007)	(0.012)	(0.018)	(0.008)
Unemployment	1.359^{**}	1.034^{**}	1.697^{**}	1.154^{**}
	(0.076)	(0.191)	(0.124)	(0.095)
Unemp * log total earnings	0.218^{**}	0.196^{+}	0.190^{**}	0.110^{+}
	(0.037)	(0.095)	(0.073)	(0.047)
Unemp * log total earnings, sq	0.019^{+}	0.009	0.013	0.019^{+}
	(0.009)	(0.015)	(0.027)	(0.009)
Repeated unemployment	-0.415^{**}	-0.441	-0.098	-0.170
	(0.097)	(0.267)	(0.191)	(0.100)
Length of unemployment spell				
3–6 months	0.190^{+}	0.493^{+}	-0.085	0.252^{+}
	(0.096)	(0.242)	(0.149)	(0.125)
6–12 months	0.003	0.105	-0.679^{**}	0.338^{**}
	(0.099)	(0.265)	(0.177)	(0.117)
1–2 year	-0.196	0.053	-0.714^{**}	0.269^{+}
	(0.118)	(0.315)	(0.199)	(0.130)
$>$ 2 years	-0.419^{**}	-0.214	-1.013^{**}	0.177
	(0.148)	(0.388)	(0.301)	(0.146)

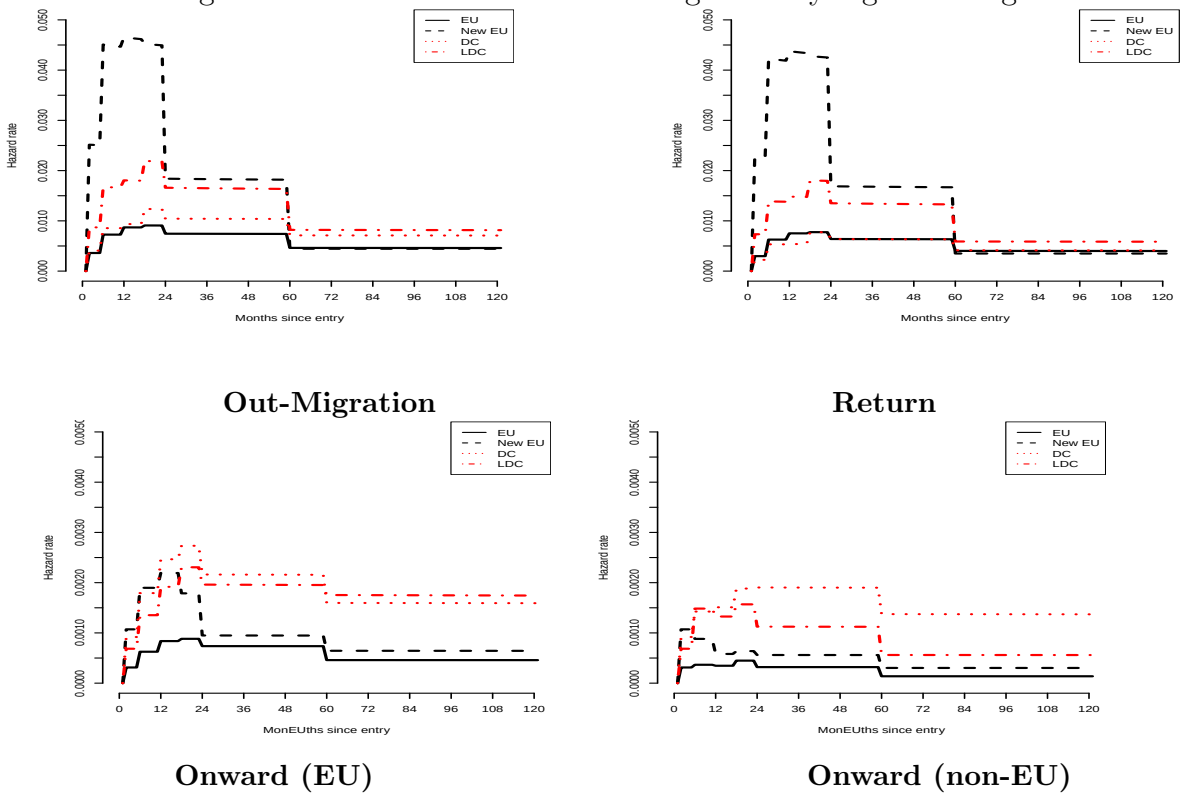
Table B.3: (continued)

	EU 15	new EU	DCs	LDCs
	Onward migration (non EU)			
Log total earnings	0.581^{**}	0.812^{**}	0.362^{**}	0.619^{**}
	(0.063)	(0.268)	(0.112)	(0.086)
Log total earnings, squared	−0.014	−0.167	−0.007	−0.029
	(0.016)	(0.094)	(0.030)	(0.024)
Unemployment	1.508^{**}	1.569^{**}	1.436^{**}	1.678^{**}
	(0.093)	(0.347)	(0.167)	(0.128)
Unemp * log total earnings	−0.109	0.320	0.007	0.019
	(0.056)	(0.239)	(0.113)	(0.094)
Unemp * log total earnings, sq	0.015	0.041	0.023	−0.056
	(0.021)	(0.130)	(0.040)	(0.041)
Repeated unemployment	-0.350^{**}	−1.902	−0.585	-0.552^{**}
	(0.121)	(1.032)	(0.328)	(0.206)
Length of unemployment spell				
3–6 months	0.148	−0.192	−0.030	0.020
	(0.117)	(0.491)	(0.209)	(0.170)
6–12 months	−0.010	−0.582	−0.325	−0.254
	(0.120)	(0.506)	(0.220)	(0.186)
1–2 year	−0.155	−1.245	-0.780^{**}	−0.161
	(0.144)	(0.753)	(0.299)	(0.201)
$>$ 2 years	-0.427^{+}	−1.635	-0.889^{+}	−0.547
	(0.144)	(0.753)	(0.299)	(0.201)

Notes: Estimation results of a Timing-of-events model, using (5)–(10), assuming earnings are endogenous to the migration and employment process through correlated v_w using (11). Each panel shows an out-migration hazard: the first panel shows the return migration hazard, the second panel shows the hazard of onward migration to EU countries, and the third panel shows the hazard of onward migration to non EU. Reference total earnings €50,000. $^{+}p < 0.05$ and $^{**}p < 0.01$

Appendix C Additional Figures

Figure C.1: Baseline hazard of out-migration by region of origin



Appendix D Additional Tables: Full estimates[14]

Table C.1: Estimated coefficients of return migration hazard

	EU15	new EU	DCs	LDCs
Female	-0.209^{**}	-0.536^{**}	-0.226^{**}	-0.259^{**}
	(0.019)	(0.054)	(0.042)	(0.051)
Age 18–25	0.166^{**}	-0.243^{**}	0.260^{**}	0.045
	(0.027)	(0.066)	(0.067)	(0.065)
Age 25–30	0.035	-0.179^{**}	0.078	0.026
	(0.024)	(0.063)	(0.049)	(0.053)
Age 35–40	-0.035	-0.045	0.084	0.075
	(0.032)	(0.083)	(0.051)	(0.073)
Age 40–45	-0.036	-0.177	0.158^{**}	-0.133
	(0.038)	(0.093)	(0.056)	(0.096)
Age 45–50	-0.156^{**}	-0.229^{+}	0.034	-0.298^{+}
	(0.047)	(0.114)	(0.065)	(0.129)
Age 50–55	-0.102	-0.288	-0.067	-0.073
	(0.056)	(0.165)	(0.074)	(0.172)
Age 55–60	0.075	-0.322	0.140	-0.166
	(0.075)	(0.254)	(0.096)	(0.288)
Age 60–65	-0.030	0.279	-0.101	0.683
	(0.182)	(0.579)	(0.244)	(0.487)
Married	-0.010	-0.398^{**}	0.224^{**}	-0.160^{**}
	(0.023)	(0.050)	(0.039)	(0.046)
Divorced	-0.187^{**}	-0.715^{**}	-0.259	-0.532^{+}
	(0.058)	(0.257)	(0.176)	(0.237)
Number of children	-0.334^{**}	-0.381^{**}	-0.173^{**}	-0.351^{**}
	(0.007)	(0.011)	(0.018)	(0.012)
inter ethnic	-0.236^{**}	-1.429^{+}	-0.319^{**}	-0.513^{**}
	(0.067)	(0.700)	(0.101)	(0.180)
Dutch parent	0.028	0.167	0.166	0.451
	(0.130)	(0.580)	(0.217)	(0.335)
other country	-0.520^{**}	-0.499^{**}	-0.717^{**}	-1.968^{**}
	(0.029)	(0.070)	(0.051)	(0.079)
ln GDP per capita	0.527^{**}	0.970^{**}	0.611^{**}	0.075^{**}
	(0.037)	(0.092)	(0.066)	(0.020)
GDP growth	0.000	0.127^{**}	0.054^{**}	0.026^{**}
	(0.006)	(0.016)	(0.015)	(0.006)

Notes: $^{+}p < 0.05$ and $^{**}p < 0.01$

[14]These are the full sets of coefficients for all the variables, equations and outcomes in the Timing-of-events model with endogenous wage and interaction between total earnings and employment status, in Table 6.

Table C.1: Continued)

	EU15	new EU	DCs	LDCs
Self-Employed	-1.316^{**}	-1.126^{**}	-2.038^{**}	-0.977^{+}
	(0.109)	(0.116)	(0.355)	(0.419)
On benefit	-1.062^{**}	-0.890^{**}	-1.132^{**}	-0.734^{**}
	(0.052)	(0.217)	(0.227)	(0.162)
Sector				
Agriculture	-0.718^{**}	-0.540^{**}	0.698^{**}	-0.589
	(0.112)	(0.115)	(0.241)	(0.410)
Industry	-0.471^{**}	-0.870^{**}	-0.282^{**}	-0.315^{**}
	(0.030)	(0.084)	(0.054)	(0.073)
Construction	-0.701^{**}	-0.930^{**}	-0.285	-0.477
	(0.077)	(0.204)	(0.282)	(0.362)
Trade	-0.570^{**}	-0.618^{**}	-0.355^{**}	-0.606^{**}
	(0.029)	(0.085)	(0.045)	(0.073)
Catering	-0.860^{**}	-0.875^{**}	-0.070	-0.452^{**}
	(0.052)	(0.234)	(0.092)	(0.126)
Transportation	-0.764^{**}	-0.869^{**}	-0.422^{**}	-0.752^{**}
	(0.047)	(0.137)	(0.065)	(0.125)
Finance	-0.589^{**}	-0.403^{+}	-0.606^{**}	-0.546^{**}
	(0.061)	(0.183)	(0.083)	(0.120)
Education	-0.560^{**}	-0.651^{**}	-0.423^{**}	-0.684^{**}
	(0.044)	(0.105)	(0.081)	(0.071)
Care	-0.693^{**}	-1.072^{**}	-0.659^{**}	-1.019^{**}
	(0.061)	(0.206)	(0.148)	(0.128)
Public	-0.720^{**}	-0.759^{**}	-0.588^{**}	-0.932^{**}
	(0.065)	(0.185)	(0.096)	(0.149)
National UN rate	-0.020	-0.005	-0.071^{**}	0.005
	(0.011)	(0.032)	(0.019)	(0.027)
National UN rate at entry	-0.164^{**}	-0.118	-0.312^{**}	-0.279^{**}
	(0.032)	(0.079)	(0.061)	(0.073)

Notes: $^{+}p < 0.05$ and $^{**}p < 0.01$

Table C.1: (continued)

	EU15	new EU	DCs	LDCs
year of entry				
2000	-0.082^{+}	-0.207	-0.237^{**}	-0.293^{**}
	(0.032)	(0.126)	(0.060)	(0.094)
2001	-0.196^{**}	-0.405^{**}	-0.297^{**}	-0.227^{+}
	(0.045)	(0.144)	(0.086)	(0.116)
2002	-0.175^{**}	-0.809^{**}	-0.156^{+}	-0.187
	(0.041)	(0.140)	(0.075)	(0.107)
2003	0.016	-1.077^{**}	0.254^{**}	0.404^{**}
	(0.038)	(0.147)	(0.064)	(0.094)
2004	0.179^{**}	-1.458^{**}	0.530^{**}	0.758^{**}
	(0.057)	(0.186)	(0.101)	(0.131)
2005	0.297^{**}	-1.487^{**}	0.421^{**}	0.868^{**}
	(0.063)	(0.191)	(0.114)	(0.141)
2006	0.120^{+}	-1.961^{**}	0.347^{**}	0.977^{**}
	(0.054)	(0.174)	(0.091)	(0.099)
2007	0.460^{**}	-1.453^{**}	-0.061	1.490^{**}
	(0.096)	(0.189)	(0.205)	(0.121)
in EU in 2004		0.587^{**}		
		(0.100)		
in EU in 2006		0.935^{**}		
		(0.123)		
duration dependence				
α_2 (6–12 months)	0.746^{**}	0.616^{**}	0.867^{**}	0.639^{**}
	(0.047)	(0.081)	(0.111)	(0.087)
α_3 (12–18 months)	0.928^{**}	0.662^{**}	0.879^{**}	0.710^{**}
	(0.049)	(0.099)	(0.115)	(0.105)
α_4 (18–24 months)	0.961^{**}	0.649^{**}	1.243^{**}	0.912^{**}
	(0.052)	(0.111)	(0.117)	(0.114)
α_5 (2–5 years)	0.768^{**}	-0.274^{+}	1.049^{**}	0.628^{**}
	(0.052)	(0.127)	(0.119)	(0.122)
α_6 ($>$ 5 years)	0.313^{**}	-1.835^{**}	0.625^{**}	-0.185
	(0.064)	(0.205)	(0.135)	(0.168)
constant	2.256^{**}	3.068^{**}	0.892^{**}	2.372^{**}
	(0.182)	(0.397)	(0.296)	(0.215)

Notes: $^{+}p < 0.05$ and $^{**}p < 0.01$

Table C.2: Estimated coefficients of onward (EU) migration hazard

	EU15	new EU	DCs	LDCs
Female	−0.097	0.025	−0.312**	−0.188**
	(0.050)	(0.119)	(0.096)	(0.064)
Age 18–25	−0.213**	0.143	0.310+	−0.017
	(0.078)	(0.166)	(0.154)	(0.089)
Age 25–30	−0.030	−0.091	−0.060	−0.168+
	(0.061)	(0.159)	(0.105)	(0.077)
Age 35–40	−0.072	−0.049	−0.051	−0.137
	(0.075)	(0.225)	(0.110)	(0.089)
Age 40–45	−0.082	−0.451	−0.134	−0.149
	(0.091)	(0.283)	(0.132)	(0.102)
Age 45–50	−0.357**	−0.107	−0.278	−0.113
	(0.119)	(0.278)	(0.151)	(0.121)
Age 50–55	−0.382**	−1.490	−0.809**	−0.402+
	(0.135)	(0.978)	(0.209)	(0.188)
Age 55–60	−0.558**	−0.548	−0.491	−0.268
	(0.204)	(0.718)	(0.254)	(0.269)
Age 60–65	0.231	–	−0.306	0.561
	(0.342)		(0.569)	(0.397)
Married	−0.046	−0.169	0.303**	−0.304**
	(0.055)	(0.121)	(0.085)	(0.068)
Divorced	−0.394+	0.169	−0.100	−0.207
	(0.159)	(0.352)	(0.371)	(0.185)
Number of children	−0.216**	−0.263**	−0.240**	−0.278**
	(0.027)	(0.046)	(0.037)	(0.025)
inter ethnic	0.377**	−0.493	−0.142	0.149
	(0.118)	(0.934)	(0.179)	(0.168)
other country	0.963**	1.152**	0.770**	1.297**
	(0.047)	(0.117)	(0.075)	(0.072)
ln GDP per capita	0.673**	−0.112	0.019	−0.037
	(0.106)	(0.173)	(0.131)	(0.024)
GDP growth	0.019	−0.037	0.002	0.009
	(0.017)	(0.037)	(0.033)	(0.006)

Notes: $^{+}p < 0.05$ and $^{**}p < 0.01$

Table C.2: Continued)

	EU 15	new EU	DCs	LDCs
Self-Employed	-1.531^{**}	-0.897^{+}	-11.264	-1.152^{**}
	(0.413)	(0.380)	(596.844)	(0.368)
On benefit	-0.870^{**}	-0.411	-0.710^{+}	-1.294^{**}
	(0.120)	(0.301)	(0.321)	(0.162)
Sector				
Agriculture	-1.224^{+}	-0.372	-1.045	-0.879^{+}
	(0.543)	(0.301)	(1.010)	(0.448)
Industry	-0.500^{**}	-0.734^{**}	-0.470^{**}	-0.666^{**}
	(0.076)	(0.194)	(0.130)	(0.111)
Construction	-1.117^{**}	-1.215	-1.355	-0.463
	(0.258)	(0.709)	(0.995)	(0.306)
Trade	-0.607^{**}	-0.279	-0.387^{**}	-0.843^{**}
	(0.074)	(0.184)	(0.099)	(0.116)
Catering	-0.650^{**}	-0.809	-1.952^{**}	-0.877^{**}
	(0.150)	(0.653)	(0.456)	(0.192)
Transportation	-0.762^{**}	-0.935^{**}	-1.119^{**}	-0.701^{**}
	(0.117)	(0.299)	(0.198)	(0.157)
Finance	-0.644^{**}	-1.112^{+}	-0.867^{**}	-0.621^{**}
	(0.137)	(0.451)	(0.198)	(0.175)
Education	-0.291^{**}	-0.519^{+}	-0.811^{**}	-0.827^{**}
	(0.101)	(0.225)	(0.207)	(0.137)
Care	-1.225^{**}	-0.670^{+}	-0.539	-1.231^{**}
	(0.201)	(0.321)	(0.305)	(0.255)
Public	-0.783^{**}	-2.331^{**}	-0.883^{**}	-0.890^{**}
	(0.172)	(0.729)	(0.239)	(0.226)
National UN rate	-0.049	-0.085	-0.095^{+}	-0.003
	(0.027)	(0.071)	(0.045)	(0.034)
National UN rate at entry	-0.195^{+}	0.038	-0.114	-0.291^{**}
	(0.083)	(0.199)	(0.136)	(0.107)

Notes: $^{+}p < 0.05$ and $^{**}p < 0.01$

Table C.2: (continued)

	EU15	new EU	DCs	LDCs
year of entry				
2000	−0.128	−0.187	−0.137	−0.058
	(0.083)	(0.243)	(0.137)	(0.106)
2001	-0.245^{+}	−0.031	0.052	−0.190
	(0.119)	(0.304)	(0.196)	(0.149)
2002	-0.256^{+}	−0.072	0.069	0.060
	(0.110)	(0.282)	(0.175)	(0.130)
2003	0.120	−0.376	0.153	0.413^{**}
	(0.098)	(0.293)	(0.156)	(0.118)
2004	0.096	-1.276^{**}	0.481^{+}	0.923^{**}
	(0.153)	(0.437)	(0.229)	(0.183)
2005	0.151	-1.158^{+}	0.628^{+}	0.783^{**}
	(0.178)	(0.460)	(0.256)	(0.223)
2006	0.093	-0.957^{+}	0.644^{**}	0.464^{**}
	(0.154)	(0.390)	(0.197)	(0.165)
2007	0.213	-1.492^{+}	0.396	−0.128
	(0.323)	(0.580)	(0.463)	(0.393)
in EU in 2004		1.209^{**}		
		(0.225)		
in EU in 2006		1.262^{**}		
		(0.274)		
duration dependence				
α_2 (6–12 months)	0.695^{**}	0.572^{+}	0.669^{**}	0.681^{**}
	(0.142)	(0.261)	(0.229)	(0.157)
α_3 (12–18 months)	0.987^{**}	0.718^{+}	0.988^{**}	1.030^{**}
	(0.144)	(0.279)	(0.234)	(0.160)
α_4 (18–24 months)	1.040^{**}	0.514	1.092^{**}	1.216^{**}
	(0.148)	(0.313)	(0.243)	(0.164)
α_5 (2–5 years)	0.860^{**}	−0.119	0.858^{**}	1.054^{**}
	(0.151)	(0.333)	(0.247)	(0.164)
α_6 ($>$ 5 years)	0.387^{+}	−0.504	0.557	0.947^{**}
	(0.180)	(0.418)	(0.289)	(0.192)

Notes: $^{+}p < 0.05$ and $^{**}p < 0.01$

Table C.3: Estimated coefficients of onward (non-EU) migration hazard

	EU15	new EU	DCs	LDCs
Female	-0.238^{**}	-0.224	-0.056	-0.186^{+}
	(0.061)	(0.242)	(0.114)	(0.091)
Age 18–25	-0.090	0.107	-0.292	-0.138
	(0.095)	(0.364)	(0.244)	(0.145)
Age 25–30	-0.013	0.215	-0.031	-0.059
	(0.070)	(0.298)	(0.131)	(0.101)
Age 35–40	-0.190^{+}	0.480	-0.020	-0.021
	(0.079)	(0.396)	(0.134)	(0.108)
Age 40–45	-0.342^{**}	-0.864	-0.004	-0.476^{**}
	(0.096)	(0.635)	(0.152)	(0.143)
Age 45–50	-0.608^{**}	-0.073	-0.009	-0.255
	(0.122)	(0.562)	(0.171)	(0.153)
Age 50–55	-0.627^{**}	0.921	0.133	-0.443^{+}
	(0.141)	(0.573)	(0.185)	(0.218)
Age 55–60	-0.785^{**}	0.560	-0.113	-0.789^{+}
	(0.206)	(1.010)	(0.284)	(0.380)
Age 60–65	0.207	2.749^{**}	0.303	0.053
	(0.400)	(0.955)	(0.580)	(0.509)
Married	0.253^{**}	0.022	0.102	0.199^{+}
	(0.058)	(0.227)	(0.105)	(0.083)
Divorced	-0.303	0.141	-1.263	-1.029^{+}
	(0.192)	(0.729)	(0.706)	(0.493)
Number of children	-0.142^{**}	-0.506^{**}	-0.024	-0.072
	(0.030)	(0.064)	(0.053)	(0.042)
inter ethnic	0.146	1.114	-0.247	0.161
	(0.141)	(0.733)	(0.211)	(0.209)
other country	0.719^{**}	1.703^{**}	0.906^{**}	0.910^{**}
	(0.054)	(0.233)	(0.087)	(0.078)
ln GDP per capita	1.006^{**}	-0.068	-0.449^{**}	0.086^{**}
	(0.120)	(0.268)	(0.148)	(0.031)
GDP growth	0.035	-0.023	0.209^{**}	0.020^{+}
	(0.019)	(0.069)	(0.038)	(0.008)

Notes: $^{+}p < 0.05$ and $^{**}p < 0.01$

Table C.3: Continued)

	EU 15	new EU	DCs	LDCs
Self-Employed	-2.516^{**}	-0.764	-1.386	-15.205
	(0.703)	(1.017)	(1.192)	(700.944)
On benefit	-1.471^{**}	-0.285	-1.445^{+}	-1.664^{**}
	(0.197)	(0.723)	(0.697)	(0.352)
Sector				
Agriculture	-2.118^{+}	–	–	–
	(0.997)			
Industry	-0.300^{**}	-0.237	-0.061	-0.169
	(0.075)	(0.301)	(0.132)	(0.109)
Construction	-1.310^{**}	–	–	–
	(0.333)			
Trade	-0.753^{**}	-0.595	-0.936^{**}	-0.705^{**}
	(0.085)	(0.408)	(0.145)	(0.130)
Catering	-0.920^{**}	0.995	-1.281^{+}	-1.260^{**}
	(0.227)	(0.795)	(0.513)	(0.440)
Transportation	-0.910^{**}	–	-0.892^{**}	-1.171^{**}
	(0.135)		(0.212)	(0.238)
Finance	-0.723^{**}	-0.855	-0.159	-0.768^{**}
	(0.136)	(0.615)	(0.169)	(0.179)
Education	-0.204	0.411	0.135	-0.293^{+}
	(0.117)	(0.315)	(0.175)	(0.148)
Care	-1.551^{**}	–	-0.795	-1.837^{**}
	(0.270)		(0.449)	(0.411)
Public	-1.139^{**}	-1.736	-0.486	-1.124^{**}
	(0.235)	(1.084)	(0.279)	(0.322)
National UN rate	-0.030	-0.355^{**}	-0.039	-0.024
	(0.031)	(0.133)	(0.054)	(0.045)
National UN rate at entry	0.045	0.574	0.215	-0.084
	(0.092)	(0.337)	(0.166)	(0.136)

Notes: $^{+}p < 0.05$ and $^{**}p < 0.01$

Table C.3: (continued)

	EU15	new EU	DCs	LDCs
year of entry				
2000	−0.117	−1.175**	0.223	0.006
	(0.094)	(0.412)	(0.175)	(0.143)
2001	−0.134	−0.574	0.657**	−0.011
	(0.135)	(0.521)	(0.247)	(0.197)
2002	−0.207	−0.353	0.746**	−0.063
	(0.123)	(0.467)	(0.216)	(0.176)
2003	−0.330**	−1.415**	0.283	0.257
	(0.113)	(0.525)	(0.184)	(0.151)
2004	−0.155	−3.475**	0.373	0.321
	(0.161)	(1.168)	(0.267)	(0.230)
2005	−0.340	−1.102	0.271	0.555+
	(0.196)	(0.734)	(0.329)	(0.262)
2006	−0.318	−1.043	0.971**	0.507**
	(0.186)	(0.687)	(0.246)	(0.190)
2007	0.400	−0.433	1.244+	0.998**
	(0.354)	(0.946)	(0.534)	(0.314)
in EU in 2004		0.316		
		(0.419)		
in EU in 2006		0.496		
		(0.473)		
duration dependence				
α_2 (6–12 months)	0.159	−0.195	0.439	0.773**
	(0.169)	(0.485)	(0.270)	(0.209)
α_3 (12–18 months)	0.105	−0.611	0.497	0.662**
	(0.175)	(0.542)	(0.282)	(0.220)
α_4 (18–24 months)	0.363+	−0.517	0.719+	0.830**
	(0.174)	(0.554)	(0.289)	(0.220)
α_5 (2–5 years)	0.024	−0.647	0.730+	0.498+
	(0.180)	(0.540)	(0.291)	(0.221)
α_6 ($>$ 5 years)	−0.821**	−1.261	0.406	−0.196
	(0.213)	(0.675)	(0.342)	(0.258)

Notes: $^{+}p < 0.05$ and $^{**}p < 0.01$

Table C.4: Estimated coefficients of Employment to Unemployment hazard

	EU15	new EU	DCs	LDCs
Female	-0.135^{**}	-0.038	-0.027	-0.052^{+}
	(0.012)	(0.029)	(0.034)	(0.026)
Age 18–25	0.101^{**}	-0.054	0.186^{**}	-0.010
	(0.017)	(0.042)	(0.054)	(0.037)
Age 25–30	-0.055^{**}	-0.129^{**}	0.067	-0.090^{**}
	(0.016)	(0.042)	(0.042)	(0.032)
Age 35–40	0.031	0.116^{+}	-0.078	0.054
	(0.020)	(0.053)	(0.051)	(0.038)
Age 40–45	0.089^{**}	0.039	-0.091	0.109^{+}
	(0.024)	(0.060)	(0.059)	(0.043)
Age 45–50	0.093^{**}	0.067	-0.050	0.049
	(0.029)	(0.069)	(0.072)	(0.055)
Age 50–55	0.119^{**}	0.260^{**}	0.071	0.046
	(0.038)	(0.090)	(0.080)	(0.076)
Age 55–60	0.241^{**}	0.347^{+}	0.261^{+}	0.357^{**}
	(0.055)	(0.152)	(0.110)	(0.112)
Age 60–65	0.414^{**}	0.144	0.803^{**}	0.701^{**}
	(0.115)	(0.503)	(0.212)	(0.232)
Married	-0.158^{**}	-0.151^{**}	-0.453^{**}	-0.373^{**}
	(0.015)	(0.030)	(0.039)	(0.028)
Divorced	-0.155^{**}	-0.306^{**}	-0.292^{+}	-0.147^{+}
	(0.032)	(0.109)	(0.140)	(0.074)
Number of children	-0.044^{**}	-0.079^{**}	-0.048^{+}	-0.074^{**}
	(0.007)	(0.012)	(0.019)	(0.012)
inter ethnic	-0.100^{+}	-0.221	-0.008	-0.127
	(0.041)	(0.231)	(0.077)	(0.075)
Dutch parent	-0.001	-0.086	0.084	0.183
	(0.078)	(0.355)	(0.169)	(0.220)
other country	-0.037^{+}	0.072^{+}	0.029	0.185^{**}
	(0.016)	(0.036)	(0.036)	(0.025)
ln GDP per capita	-0.091^{**}	-0.102^{+}	0.444^{**}	0.017
	(0.020)	(0.052)	(0.055)	(0.010)
GDP growth	0.053^{**}	0.011	0.215^{**}	0.002
	(0.004)	(0.010)	(0.012)	(0.002)

Notes: $^{+}p < 0.05$ and $^{**}p < 0.01$

Table C.4: Continued)

	EU 15	new EU	DCs	LDCs
log initial wage	0.063^{**}	0.092^{**}	-0.045	0.016
	(0.010)	(0.028)	(0.027)	(0.019)
log initial wage, squared	-0.003^{+}	-0.005	0.010^{**}	0.002
	(0.001)	(0.004)	(0.003)	(0.002)
log total earnings	0.361^{**}	0.625^{**}	0.254^{**}	0.366^{**}
	(0.015)	(0.041)	(0.041)	(0.033)
log total earnings , squared	-0.038^{**}	-0.064^{**}	-0.022^{**}	-0.033^{**}
	(0.001)	(0.003)	(0.003)	(0.002)
Self-Employed	-0.715^{**}	-1.614^{**}	-0.678^{**}	-0.613^{**}
	(0.041)	(0.078)	(0.115)	(0.100)
Repeated employment	0.519^{**}	0.480^{**}	0.487^{**}	0.681^{**}
	(0.014)	(0.039)	(0.052)	(0.031)
Sector				
Agriculture	0.108^{+}	0.134^{**}	0.960^{**}	0.211^{+}
	(0.042)	(0.050)	(0.178)	(0.100)
Industry	-0.465^{**}	-0.489^{**}	-0.293^{**}	-0.435^{**}
	(0.020)	(0.048)	(0.054)	(0.044)
Construction	-0.214^{**}	-0.002	0.140	0.057
	(0.037)	(0.095)	(0.191)	(0.112)
Trade	-0.354^{**}	-0.409^{**}	-0.288^{**}	-0.216^{**}
	(0.018)	(0.047)	(0.044)	(0.038)
Catering	0.080^{**}	-0.009	-0.237^{**}	0.010
	(0.020)	(0.086)	(0.077)	(0.047)
Transportation	-0.337^{**}	-0.452^{**}	-0.308^{**}	-0.261^{**}
	(0.025)	(0.074)	(0.060)	(0.054)
Finance	-0.230^{**}	-0.364^{**}	-0.097	-0.325^{**}
	(0.038)	(0.120)	(0.066)	(0.072)
Education	-0.735^{**}	-0.714^{**}	-0.581^{**}	-0.602^{**}
	(0.030)	(0.067)	(0.069)	(0.046)
Care	-0.679^{**}	-0.840^{**}	-0.442^{**}	-0.579^{**}
	(0.038)	(0.103)	(0.102)	(0.066)
Public	-0.273^{**}	-0.043	0.313^{**}	-0.163^{+}
	(0.033)	(0.090)	(0.057)	(0.064)
National UN rate	0.018^{+}	0.053^{**}	-0.185^{**}	-0.004
	(0.008)	(0.020)	(0.020)	(0.015)
National UN rate at entry	-0.033	0.067	-0.055	0.093^{+}
	(0.020)	(0.047)	(0.054)	(0.041)

Notes: $^{+}p < 0.05$ and $^{**}p < 0.01$

Table C.4: (continued)

	EU 15	new EU	DCs	LDCs
year of entry				
2000	0.042^{+}	0.020	0.091	0.042
	(0.020)	(0.075)	(0.055)	(0.043)
2001	0.024	0.021	0.070	−0.008
	(0.029)	(0.086)	(0.078)	(0.060)
2002	−0.002	−0.038	0.076	0.051
	(0.026)	(0.083)	(0.071)	(0.053)
2003	0.034	-0.398^{**}	0.057	−0.043
	(0.024)	(0.085)	(0.064)	(0.049)
2004	-0.072^{+}	-0.588^{**}	−0.156	-0.298^{**}
	(0.036)	(0.108)	(0.096)	(0.075)
2005	-0.164^{**}	-0.648^{**}	−0.010	-0.390^{**}
	(0.041)	(0.112)	(0.103)	(0.086)
2006	-0.395^{**}	-0.645^{**}	-0.367^{**}	-0.607^{**}
	(0.034)	(0.102)	(0.077)	(0.061)
2007	-0.285^{**}	-0.493^{**}	−0.093	-0.542^{**}
	(0.054)	(0.112)	(0.110)	(0.088)
in EU in 2004		0.650^{**}		
		(0.059)		
in EU in 2006		0.782^{**}		
		(0.074)		
duration dependence				
α_2 (3–6 months)	-0.043^{+}	0.084	0.109	−0.058
	(0.019)	(0.043)	(0.067)	(0.043)
α_3 (6–12 months)	-0.077^{**}	0.170^{**}	0.137^{+}	−0.016
	(0.019)	(0.048)	(0.066)	(0.042)
α_4 (1–2 years)	-0.218^{**}	0.145^{+}	0.070	-0.093^{+}
	(0.023)	(0.059)	(0.073)	(0.047)
α_5 (2–5 years)	-0.247^{**}	0.185^{+}	0.192^{+}	−0.035
	(0.028)	(0.077)	(0.086)	(0.056)
α_6 ($>$ 5 years)	-0.422^{**}	0.169	−0.070	0.024
	(0.046)	(0.131)	(0.124)	(0.085)

Notes: $^{+}p < 0.05$ and $^{**}p < 0.01$

Table C.5: Estimated coefficients of Unemployment to Employment hazard

	EU 15	new EU	DCs	LDCs
Female	−0.026	−0.001	0.080	−0.045
	(0.016)	(0.038)	(0.063)	(0.036)
Age 18–25	0.010	0.421**	−0.055	0.152**
	(0.022)	(0.060)	(0.095)	(0.051)
Age 25–30	−0.021	0.221**	−0.001	0.067
	(0.022)	(0.062)	(0.078)	(0.047)
Age 35–40	−0.025	0.147	−0.098	0.014
	(0.028)	(0.078)	(0.105)	(0.054)
Age 40–45	−0.031	0.270**	0.010	0.058
	(0.033)	(0.087)	(0.121)	(0.059)
Age 45–50	−0.045	0.147	−0.548**	−0.172+
	(0.040)	(0.101)	(0.179)	(0.082)
Age 50–55	−0.281**	0.108	−0.716**	−0.300+
	(0.055)	(0.128)	(0.209)	(0.119)
Age 55–60	−0.537**	−0.368	−1.085**	−0.303
	(0.087)	(0.253)	(0.376)	(0.166)
Age 60–65	−0.871**	−1.075	−1.292	−0.448
	(0.211)	(1.001)	(0.704)	(0.406)
Married	0.009	0.174**	0.010	−0.003
	(0.021)	(0.039)	(0.077)	(0.040)
Divorced	0.155**	0.215	0.421	0.032
	(0.040)	(0.130)	(0.231)	(0.093)
Number of children	0.058**	0.050+	0.024	0.047+
	(0.010)	(0.024)	(0.042)	(0.018)
inter ethnic	−0.124+	0.182	0.100	0.264**
	(0.056)	(0.280)	(0.130)	(0.096)
Dutch parent	0.254**	0.500	0.294	0.104
	(0.097)	(0.412)	(0.262)	(0.279)
other country	−0.029	−0.076	0.153+	0.255**
	(0.022)	(0.050)	(0.068)	(0.035)
ln GDP per capita	−0.169**	−0.044	0.336**	−0.066**
	(0.024)	(0.072)	(0.104)	(0.014)
GDP growth	−0.019**	0.005	0.049	0.015**
	(0.005)	(0.012)	(0.025)	(0.003)
National UN rate	−0.068**	−0.015	−0.048	−0.091**
	(0.009)	(0.025)	(0.037)	(0.019)
National UN rate at entry	−0.000	−0.010	−0.117	−0.027
	(0.027)	(0.066)	(0.109)	(0.060)

Notes: $^{+}p < 0.05$ and $^{**}p < 0.01$

Table C.5: Continued)

	EU 15	new EU	DCs	LDCs
On benefit	0.519^{**}	0.218^{**}	1.006^{**}	0.415^{**}
	(0.019)	(0.060)	(0.087)	(0.041)
Repeated unemployment	0.357^{**}	0.092^{+}	0.504^{**}	0.400^{**}
	(0.016)	(0.043)	(0.074)	(0.035)
year of entry				
2000	0.003	-0.263^{**}	0.006	0.032
	(0.027)	(0.096)	(0.101)	(0.059)
2001	0.005	-0.293^{**}	-0.151	0.020
	(0.039)	(0.113)	(0.150)	(0.084)
2002	0.081^{+}	-0.243^{+}	-0.115	0.166^{+}
	(0.035)	(0.105)	(0.137)	(0.073)
2003	0.152^{**}	-0.226^{+}	0.052	0.074
	(0.032)	(0.100)	(0.127)	(0.068)
2004	0.203^{**}	-0.310^{+}	0.080	0.080
	(0.049)	(0.127)	(0.205)	(0.110)
2005	0.195^{**}	-0.300^{+}	0.355	0.275^{+}
	(0.057)	(0.129)	(0.209)	(0.126)
2006	0.365^{**}	-0.348^{**}	-0.023	-0.111
	(0.050)	(0.105)	(0.197)	(0.108)
2007	0.157	-0.859^{**}	-0.873	-0.445
	(0.104)	(0.146)	(0.556)	(0.233)
in EU in 2004		0.600^{**}		
		(0.075)		
in EU in 2006		0.383^{**}		
		(0.096)		
duration dependence				
α_2 (3–6 months)	-0.525^{**}	-0.462^{**}	-0.415^{**}	-0.411^{**}
	(0.020)	(0.046)	(0.080)	(0.042)
α_3 (6–12 months)	-0.871^{**}	-0.812^{**}	-0.470^{**}	-0.790^{**}
	(0.021)	(0.051)	(0.074)	(0.044)
α_4 (12–18 months)	-1.402^{**}	-1.295^{**}	-1.055^{**}	-1.163^{**}
	(0.033)	(0.085)	(0.119)	(0.067)
α_5 (18–24 months)	-1.686^{**}	-1.611^{**}	-1.459^{**}	-1.507^{**}
	(0.046)	(0.121)	(0.167)	(0.095)
α_6 (2–3 years)	-1.976^{**}	-2.008^{**}	-1.876^{**}	-1.646^{**}
	(0.050)	(0.143)	(0.197)	(0.095)
α_7 ($>$ 3 years)	-2.402^{**}	-2.152^{**}	-2.201^{**}	-2.120^{**}
	(0.063)	(0.166)	(0.209)	(0.121)

Notes: $^{+}p < 0.05$ and $^{**}p < 0.01$

Table C.6: Estimated coefficients of change in wage

	EU 15	new EU	DCs	LDCs
Female	0.007^{**}	0.001	0.003	0.001
	(0.001)	(0.002)	(0.002)	(0.001)
Age 18–25	0.002^{**}	-0.002	0.005	0.000
	(0.001)	(0.003)	(0.003)	(0.002)
Age 25–30	-0.003^{**}	-0.002	-0.002	-0.003
	(0.001)	(0.003)	(0.002)	(0.002)
Age 35–40	0.002^{+}	-0.004	0.002	0.004^{+}
	(0.001)	(0.003)	(0.002)	(0.002)
Age 40–45	0.000	-0.005	0.003	0.006^{**}
	(0.001)	(0.004)	(0.003)	(0.002)
Age 45–50	-0.002	-0.005	0.001	0.004
	(0.001)	(0.005)	(0.003)	(0.003)
Age 50–55	-0.003	0.001	-0.000	-0.006
	(0.002)	(0.007)	(0.003)	(0.004)
Age 55–60	-0.001	-0.012	0.014^{**}	-0.002
	(0.003)	(0.013)	(0.005)	(0.007)
Age 60–65	0.004	0.034	0.019	0.002
	(0.007)	(0.036)	(0.013)	(0.015)
Married	-0.011^{**}	-0.008^{**}	-0.011^{**}	-0.014^{**}
	(0.001)	(0.002)	(0.002)	(0.001)
Divorced	-0.000	-0.002	-0.009	-0.012^{**}
	(0.001)	(0.006)	(0.006)	(0.004)
Number of children	-0.005^{**}	-0.007^{**}	-0.007^{**}	-0.007^{**}
	(0.000)	(0.001)	(0.001)	(0.001)
inter ethnic	0.006^{**}	0.001	-0.007	-0.003
	(0.002)	(0.013)	(0.004)	(0.004)
Dutch parent	-0.006	-0.029	-0.020	0.013
	(0.003)	(0.021)	(0.011)	(0.011)
other country	0.004^{**}	0.019^{**}	-0.006^{**}	-0.003^{+}
	(0.001)	(0.002)	(0.002)	(0.001)
ln GDP per capita	-0.083^{**}	-0.075^{**}	-0.030^{**}	-0.009^{**}
	(0.001)	(0.003)	(0.003)	(0.001)
GDP growth	0.006^{**}	-0.010^{**}	0.007^{**}	-0.002^{**}
	(0.000)	(0.001)	(0.001)	(0.000)

Notes: $^{+}p < 0.05$ and $^{**}p < 0.01$

Table C.6: Continued)

	EU15	new EU	DCs	LDCs
Self-Employed	-0.016^{**}	0.009^{**}	-0.024^{**}	-0.023^{**}
	(0.001)	(0.003)	(0.005)	(0.004)
Repeated employment	-0.035^{**}	-0.027^{**}	-0.040^{**}	-0.045^{**}
	(0.001)	(0.002)	(0.003)	(0.002)
Sector				
Agriculture	-0.016^{**}	0.005	−0.019	0.032^{**}
	(0.003)	(0.004)	(0.017)	(0.008)
Industry	-0.018^{**}	-0.019^{**}	−0.000	-0.010^{**}
	(0.001)	(0.003)	(0.002)	(0.002)
Construction	-0.006^{**}	−0.001	0.004	−0.005
	(0.002)	(0.006)	(0.012)	(0.007)
Trade	-0.014^{**}	-0.007^{+}	-0.009^{**}	−0.002
	(0.001)	(0.003)	(0.002)	(0.002)
Catering	-0.010^{**}	0.026^{**}	−0.003	0.009^{**}
	(0.001)	(0.008)	(0.004)	(0.003)
Transportation	-0.013^{**}	-0.016^{**}	-0.013^{**}	-0.014^{**}
	(0.001)	(0.004)	(0.003)	(0.003)
Finance	-0.012^{**}	-0.011^{+}	−0.006	-0.014^{**}
	(0.001)	(0.006)	(0.003)	(0.003)
Education	-0.014^{**}	-0.026^{**}	-0.008^{**}	-0.016^{**}
	(0.001)	(0.003)	(0.003)	(0.002)
Care	-0.010^{**}	-0.011^{+}	0.001	-0.016^{**}
	(0.001)	(0.004)	(0.005)	(0.003)
Public	-0.011^{**}	−0.008	−0.003	-0.014^{**}
	(0.001)	(0.006)	(0.004)	(0.003)
Nat UN rate	-0.007^{**}	0.014^{**}	-0.010^{**}	-0.013^{**}
	(0.000)	(0.001)	(0.001)	(0.001)
Nat UN rate at entry	-0.010^{**}	-0.037^{**}	-0.016^{**}	-0.014^{**}
	(0.001)	(0.003)	(0.003)	(0.002)
in EU in 2004		0.009^{**}		
		(0.003)		
in EU in 2006		-0.009^{+}		
		(0.004)		

Notes: $^{+}p < 0.05$ and $^{**}p < 0.01$

Table C.6: (continued)

	EU 15	new EU	DCs	LDCs
year of entry				
2000	-0.001	-0.016^{**}	-0.011^{**}	-0.005^{+}
	(0.001)	(0.004)	(0.003)	(0.002)
2001	0.001	-0.026^{**}	-0.015^{**}	-0.009^{**}
	(0.001)	(0.005)	(0.004)	(0.003)
2002	0.018^{**}	-0.007	0.000	0.009^{**}
	(0.001)	(0.005)	(0.004)	(0.003)
2003	0.042^{**}	0.045^{**}	0.021^{**}	0.038^{**}
	(0.001)	(0.004)	(0.003)	(0.003)
2004	0.058^{**}	0.116^{**}	0.037^{**}	0.050^{**}
	(0.002)	(0.006)	(0.004)	(0.004)
2005	0.071^{**}	0.166^{**}	0.049^{**}	0.068^{**}
	(0.002)	(0.006)	(0.005)	(0.004)
2006	0.065^{**}	0.130^{**}	0.040^{**}	0.044^{**}
	(0.002)	(0.005)	(0.004)	(0.003)
2007	0.180^{**}	0.236^{**}	0.143^{**}	0.141^{**}
	(0.003)	(0.006)	(0.006)	(0.004)
$\ln(\sigma)$	-1.126^{**}	-0.834^{**}	-0.907^{**}	-0.933^{**}
	(0.001)	(0.001)	(0.001)	(0.001)
v_{RO1}	-7.306^{**}	-6.128^{**}	-7.031^{**}	-6.488^{**}
	(0.167)	(0.371)	(0.246)	(0.184)
v_{RO2}	-8.108^{**}	-6.900^{**}	-6.296^{**}	-7.342^{**}
	(0.160)	(0.348)	(0.260)	(0.165)
v_{E1}	-2.194^{**}	-3.379^{**}	-4.775^{**}	-3.021^{**}
	(0.069)	(0.187)	(0.213)	(0.153)
v_{E2}	-3.058^{**}	-3.828^{**}	-3.715^{**}	-3.968^{**}
	(0.068)	(0.187)	(0.211)	(0.153)
v_{U1}	-2.977^{**}	-3.366^{**}	-3.676^{**}	-3.569^{**}
	(0.070)	(0.168)	(0.171)	(0.126)
v_{U2}	-2.211^{**}	-2.489^{**}	-4.671^{**}	-2.869^{**}
	(0.037)	(0.109)	(0.287)	(0.065)
v_{dW1}	0.866^{**}	0.725^{**}	0.132^{**}	0.705^{**}
	(0.006)	(0.009)	(0.005)	(0.007)
v_{dW2}	0.180^{**}	0.050^{**}	0.769^{**}	0.080^{**}
	(0.001)	(0.005)	(0.011)	(0.002)
q^{a}	-3.494^{**}	-2.858^{**}	3.284^{**}	-3.106^{**}
	(0.029)	(0.043)	(0.054)	(0.042)

[a] Notes: With $\Pr(V = \{v_{RO1}, v_{E1}, v_{U1}, v_{dW1}\}) = \frac{e^q}{1+e^q}$ and $\Pr(V = \{v_{RO2}, v_{E2}, v_{U2}, v_{dW2}\}) = \frac{1}{1+e^q}$ $^{+}p < 0.05$ and $^{**}p < 0.01$

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ISSN 2042-4116