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DISCUSSION PAPER SERIES

IZA DP No. 17569

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ABSTRACT

The Long-Term Fiscal Impact of Immigrants in the Netherlands, Differentiated by Motive, Source Region and Generation*

We use very detailed microdata on fiscal contributions and benefits of the entire population to calculate the discounted lifetime net contribution of the immigrant population present in The Netherlands in 2016. We differentiate by immigration motive and up to 87 source regions. Labour migrants' net contribution is positive, study, family and asylum immigrants' contributions are negative. Second generation scholastic performance scores at age 12 by social background are similar to scores for native Dutch children, highest education attained for given test scores is also similar, but incomes for given education levels are lower, and so are net contributions. The gap between net contributions of individuals with immigrant background and without immigrant background does not root in attained levels of schooling but in the benefits from schooling. Regional cultural distance to Protestant Europe is associated with large fiscal net contributions.

JEL Classification: H5, J6, J15

Keywords: fiscal incidence, immigrants, cultural distance

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Inhoud

1 Introduction

Immigration is a key policy issue throughout the European Union, and The Netherlands is no exception. Considering the high relevance for government expenditures and revenues and the high profile of migration issues in the public debate, one might perhaps have expected that Dutch policy choices are based on solid empirical evidence on present and future implications for the government budget. To the contrary, however, there is a strong reluctance to investigate the fiscal implications of large-scale immigration that is even frequently explicitly stated. A former Cabinet minister remarked that the Cabinet is not interested in assessing humans in the metric of money. A director of CPB, the prime government advisory agency on economic policy, noted that cost accounting should not be applied to refugees. A Cabinet minister of Justice told parliament that government evaluates policies, not human beings and that their source country is irrelevant for most policy domains.[1] We strongly disagree with this attitude and actually the mood has changed recently after immigration was an issue in national elections and the new government coalition is keen on reducing immigration. In the Report underlying this paper, we seek to make a contribution to better informed policy making, by estimating the effect on government revenues and expenditures associated with present immigration flows as differentiated by motive and source region. We build on and substantially extend the only publication on The Netherlands that is based on the usual Dutch cycle of policy preparation and that dates back to 2003 (Roodenburg, Euwals and ter Rele 2003). A full account of our results is given in the Report (Van de Beek, Roodenburg, Hartog and Kreffer, 2023[2]). In this paper, we contribute key findings to the international literature.

Internationally, and certainly among economists, our desire to base immigration policies also on measured financial consequences is widely shared and there is an extensive international literature on the fiscal impact of immigration. Rather recent surveys are given in Vargas-Silva (2015), OECD (2013) and Hennessey and Hagen-Zanker (2020), older surveys are OECD (2007) and, for the US, Smith & Edmonston (1997). However, for several reasons, the literature does not lead to unequivocal conclusions on net gain or loss for the public budget. First, there are differences among static and dynamic approaches, i.e., single year snapshot or lifetime discounted net effects. Second, many assignments of revenues and expenditures to individuals are far from straightforward, with pure public goods as the most obvious case. Third, there is substantial heterogeneity, with Western immigrants integrating much easier than non-Western immigrants and second-generation immigrants differing markedly from the first generation. Fourth, socio-economic institutions (taxes, social security, pensions) differ widely, and this may lead to large differences among countries. Thus, as OECD (2007) notes, for rather similar countries the outcomes need not be identical: *In Northern European countries* […] *immigrants (in particular those from developing countries) are estimated to generate significant fiscal costs (see Roodenburg et al. 2003, for the Netherlands*[3]*; Pederson, 2002, and Schou, 2005, for Denmark and Storesletten, 2003, for Sweden; for Germany, however, Bonin et al. (2000) estimate the fiscal impact of immigration to be positive).*[4] Hennessey and Hagen-Zanker (2020) conclude that "host

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[1] Eberhard van der Laan, *NOS-journaal* 4 september, 2009; Laura van Geest, *De Volkskrant*, 22 oktober 2015; Klaas Dijkhoff, *Aanhangsel Handelingen II* 2015/16, 3502, download 11-12-2020 from https://zoek.officielebekendmakingen.nl/ah-tk-20152016-3502.html.

[2] This is the English translation of the second revised edition. The first (Dutch-language) edition was published in 2021.

[3] Roodenburg, H., R. Euwals and H. ter Rele (2003)

[4] Jean, S. et al. (2007)

country context has a strong influence on the fiscal impact of immigration, including how easily migrants can enter the labour market, how generous welfare systems are and whether immigrants have the right to work and access welfare services", thus providing additional motivation for a detailed country-specific study. Our result, however, does not fit in with their conclusion that the overall net fiscal impact of immigration is minimal. This might well be due to the specific Dutch features of easy access, difficult integration in the labour market and generous welfare provision.

As noted, in the Netherlands, research on the effects of immigration and in particular on fiscal effects has clearly been discouraged, certainly in policy making circles (Van de Beek 2010). A report in 1988 by a policy advisory agency, the Social and Cultural Planning Bureau, commissioned by the Ministry of Wellbeing and Health, concluding that the net cost of the presence of ethnic minorities during 1987-2000 would amount to 53 billion guilders[5], was never published. In 1995, a report commissioned by a consortium of newspapers[6], concluded that during 1960-1983, non-Western immigrants would have made a net fiscal contribution of several tens of billions of guilders, but that after 1980 the net contribution had been negative; ignoring disability benefits and overrepresentation in social assistance, however, led to positive bias[7]. Lakeman (1999) estimated that Turkish and Moroccan immigrants since 1974 had cost the government a total of 70 billion guilders. In 2003, Central Planning Bureau, the main government advisory agency on economic policy, published an analysis of lifetime net expenditures showing that immigrants with characteristic of the average Dutch resident would make a positive lifetime net contribution if arriving between ages 15 and 45, while the average non-Western immigrant would make a negative net contribution[8]. Nyfer (2010), applying a similar method, concluded that large scale immigration of unskilled non-Western immigrants has strong negative effect on the public budget[9]. Thus, Dutch studies point mostly to a negative net effect of non-Western immigration on government finances.

Our study differs mostly from the earlier studies, nationally and internationally, in its extensive detail: we cover all relevant items in the public budget, use observations from age-specific micro data on the entire Dutch population, include predictions on fertility and return migration, distinguish immigrants by migration motives and source regions and differentiate by a childhood scholastic aptitude test score. We find large differences in fiscal impact by migration motive, source region, scholastic aptitude and age at immigration. Only 20% of all immigrants make a positive lifetime net contribution to the public budget. Groups with large contributions come from Scandinavia, the Anglo-Saxon world and a few other countries like France and Japan.

We start by picturing immigration to the Netherlands, its history and the present populations. We then present our methodology (section 3), discuss the data (section 4, 5 and 6), present results (sections 7 and 8), report on sensitivity analyses (section 9), differentiate results by scholastic test scores (section 10), consider the role of cultural differences among source regions (section 11) and end with conclusions (section 12). Scholastic aptitude scores we use, and measurement of cultural difference are elaborated in appendices. In a Technical appendix directly accessible at our website (http://www.demo-demo.nl) we present a collection of tables related to this paper and detailed

[5] When the guilder was replaced by the euro, in 2003, it was valued at 0.45 euro.
[6] Delphiconsult (1995)
[7] Beek, J. van de (2010), blz. 309-311
[8] Roodenburg, H., R. Euwals and H. ter Rele (2003)
[9] Geest, L. van der en A. Dietvorst (2010)

explanation of data collection and analysis; full results are given in the Report also available at the website.

2 History and stock of immigrants

During the post war era, The Netherlands switched from an emigration surplus to an immigration surplus. Before 1960, there was only positive net immigration in 3 years (1945, 1946 and 1950). After 1960, there was positive net immigration in every year except 1967. There was post-colonial immigration during the first post-war decade from Dutch East Indies (now Indonesia), a peak from Surinam (Dutch Guyana) during the 1970's and early 1980's, and later some smaller peaks from the Dutch Antilles. Large-scale unskilled labour migration from the Mediterranean started during the 1960's, was constrained during the 1970's but followed by a long tail of family migration, in particular from Turkey and Morrocco. Asylum migration takes off in the early 1980's, with peaks and troughs depending on the extent of turmoil in Europe, Africa and the Middle East. Among labour migrants, the emphasis shifted slowly from low skilled to high skilled, with explicit policy stimulus developing since the late 1990's. The European Union and related predecessors have worked towards creating an open European labour market right from the start in the early 1950's (the European Community on Coal and Steel, OECD, EEC); since 1968 there has been free labour mobility among the 6 EEC members, since 2013 there has been free mobility among the 28 member states (reduced to 27 by 2020).

In 2016, the core year of our data, 22.1 % of Dutch inhabitants have a migration background, crudely speaking half of them Western, half of them non-Western and half of them first generation (born abroad), half of them second generation (born in The Netherlands, at least one parent born abroad); see Table 1 for details.

Table 1 Dutch population by background, 2016

	Total	1st generation	2nd generation
All backgrounds	**16.979.120**		
Dutch background	**13.226.829**		
Migration background	**3.752.291**	**1.920.877**	**1.831.414**
Western	**1.655.699**	**772.428**	**883.271**
European Union	1.034.201	512.788	521.413
Germany, Belgium	*476.505*	*146.909*	*329.596*
Greece, Italy, Spain, Portugal	*135.637*	*82.511*	*53.126*
Central and Eastern EU countries	*249.554*	*191.719*	*57.835*
Other European Union	*172.505*	*91.649*	*80.856*
Other Europe	170.707	110.975	59.732
Indonesia	366.849	105.235	261.614
Other Western	83.942	190.339	370.108
Non-Western	**2.096.592**	**1.148.449**	**948.143**
Morocco	385.761	168.336	217.425
Turkey	397.471	190.621	206.850
Surinam	349.022	177.720	171.302
Dutch Antilles	146.202	78.109	68.093
Top 5 Asylum*	222.369	168.590	53.779
Other non-Western	595.767	365.073	230.694

*Afghanistan, Iran, Iraq, Syria, Somalia; Source: CBS-StatLine.

3 Our approach

The data we use, mainly come from two sources. The first source is Statistics Netherlands (CBS), for short referred to as CBS. We use both CBS-microdata – register data on the entire Dutch population at person level which is only accessible with special permission and under strict privacy conditions – and CBS-StatLine, which is a publicly accessible online database. The second source is the CPB Netherlands Bureau for Economic Policy Analysis, for short referred to as CPB. The CPB is the main research institute for economic policy analysis and policy advice in the Netherlands. In that capacity, it advises the government and regularly produces economic forecasts and reports.

We start out from observed immigrants' contributions paid to or benefits received from the government in 2016[10]:

$$X_{gac}$$

With:

- c category of contributions or benefits
- a immigrant age, $0 \leq a \leq 99$
- g group defined by generation, source region, migration motive, education

We distinguish 23 categories of contributions/benefits, following the CPB study on consequences of ageing (Smid, ter Rele, Boeters, Draper, Nibbelink and Wouterse 2014). Although Smid et al. (2014) was the starting point for the classification into the 23 categories, in practice, a more up-to-date dataset was used, namely a projection[11] to 2060 for the *CPB Update Medium-Term Forecast 2018-2021*[12], which had been made available by the CPB. This dataset – referred to as the CPB2018 dataset for short – consists of 6×23×100 nominal amounts. Specifically, these are age profiles (0-99 years) for each of the 6 years 2016, 2021, 2030, 2040, 2050 and 2060 and each of the 23 items in Table 2. The nominal amounts in CPB2018 were based on the assumption of 3% discount rate and 1.5% productivity growth, but this has been recalculated to 2.5% and 1%, respectively, which the CPB used at the time of calculation, this in order to match the authoritative CPB as much as possible.[13] Furthermore, adjustments were made to account for changes to pension legislation; for details, see the aforementioned Technical Appendix. For the 23 categories of contributions/benefits, we take observations from CBS-microdata and CBS-StatLine; for the future development of these 23 categories, we use the adjusted CPB2018 dataset.

The net contribution profile $\overrightarrow{P_g}$ for group g is a profile by age, a vector with elements P_{ga} given by:

---

[10] 2016 was the most recent year for which the data were available. In 2016, the number of persons receiving unemployment benefit was at a peak after rising since 2008; after 2016, the number has continuously declined. The rate of GDP growth was equal to the average over 1990-2019, the unemployment rate was slightly higher (6.0 versus 5.3) and the sustainability ratio of the government budget was zero.

[11] Projectie voor het 'houdbare basispad model', versie 4, 15-8-2017, ISIS-versie 23.8.0 (Projection for the "sustainable base path model," version 4, 15-8-2017, ISIS version 23.8.0).

[12] CPB (2017) *Actualisatie Middellangetermijnverkenning 2018-2021.* Retrieved 19-4-2023 from: https://www.cpb.nl/publicatie/actualisatie-middellangetermijnverkenning-2018-2021

[13] See Adema, Y., & I. van Tilburg (2019), pp. 70-72, 42.

$$P_{ga} = \sum_{c} X_{gac} \ for\ 0 \leq a \leq 99$$

P_{ga} is the net contribution for group g and age a.

Future contributions/benefits for year $y \geq 2016$ are obtained from multiplying by W_{yac} taken from the CPB2018 dataset, $W_{2016ac} = 1$. In this study, CPB has predicted levels of contributions and benefits up to 2060, based on expectations on inflation and productivity growth[14]. For years after 2060, the values are extrapolated assuming 1% productivity growth.

As contributions/benefits in category c for group g at age a in year y are given by $W_{yac} \cdot X_{gac}$, the net contribution of group g at age a in year y is given by:

$$NCA_{gay} = \sum_{c} W_{yac} \cdot X_{gac}$$

The net contribution NCE_{ge} by age of entry e and group g is given by:

$$NCE_{ge} = \sum_{a=e}^{99} \left\{ \left(\frac{1+p}{1+i} \right)^{a-e} \cdot NCA_{ga(2016+a-e)} \cdot SURV_{ea} \cdot STAY_{gea} \right\}$$

With:

- p rate of productivity growth (perunage)
- i real rate of interest (perunage)
- $SURV_{ea}$ probability of survival up to age *a* when arriving at entry age *e*
- $STAY_{gea}$ probability of staying in the Netherlands up to age *a* when arriving at entry age *e,* for a member of group *g*

Note that we treat every immigrant who resides in the Netherlands in 2016 as if he (she) arrived in 2016 at his recorded age at entry and assign values of net contributions observed for a residing immigrant by age in 2016. The value for year $2016 + t$ is set at the value observed for an immigrant of age $e + t$ in 2016, adjusted for future productivity growth, some policy parameter changes (like shifting retirement age) and discounting back to 2016. Lifetime values are calculated from age of entry until age of exit by death or remigration.

The lifetime net contribution LNC_g for an individual in group g is given by:

$$LNC_g = \sum_{e=0}^{99} \{NCE_{ge} \cdot I_{ge}\}$$

I_{ge} is the fraction of immigrants in group *g* immigrating at entry age *e.* The fractions are taken from immigrants arriving between 1-1-1995 en 31-12-2017.

The immigration profile $\overrightarrow{I_g}$ is a profile by age for group g, a vector with elements I_{ge} , $0 \leq e \leq 99$.

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[14] See the Technical Appendix of the CBS study: https://www.cpb.nl/sites/default/files/publicaties/bijlagen/dp170-technische-bijlage.pdf

The fraction $SURV_{ea}$ is given by:

$$SURV_{ea} = \prod_{m=e}^{a} (1 - S_{m(2016+m-e)})$$

S_{ay} is the probability of dying at age a in year y. The probabilities are taken from CBS predictions up to 2060 and kept constant thereafter.

The fraction $STAY_{gea}$ is given as:

$$STAY_{gea} = \prod_{m=e}^{a} (1 - R_{ge(m-e)})$$

R_{ged} is the probability of remigration for an immigrant in group g arriving at age e after a stay of duration d for $d + e \leq 99$. The probabilities for $0 \leq d \leq 23$ have been calculated from CBS-microdata on emigration of immigrants arriving in The Netherlands in the period 1995-2017. The approximately exponential profiles were extrapolated from 23 years to 50 years, by estimating the (negative) exponent based on observations for 11 different 10-year periods (1-10 years of residence, 2-11 years of residence, … , 11-20 years of residence), and averaging these 11 estimates. Additionally, three profiles have been estimated for the long-term probabilities of remigration for alle immigrants, and Western and non-Western immigrants separately, by averaging the percentage of emigrants per length of stay over the years 2011-2017. For length of stay up to 23 years, the observed remigration probabilities were used. For length of stay from 24 to 30 years, the extrapolations were used. For lengths of stay of 30 to 50 years, the weighted average was taken of the extrapolations and the applicable long-term remigration profile. The function (length of stay – 30) / 20 has been weighted for a gradual transition. For length of stay of 50 years or more, only the long-term remigration profiles were used, whether or not broken down by the Western or non-Western region of origin, whatever was most appropriate.

For first generation immigrants, the net contribution is augmented by initial cost of immigration: integration courses, processing of immigration application, cost of housing and monetary allowances for refugees, based on observations attributed to the respective groups. Present values of entitlement to state pension (AOW) for immigrants who have left The Netherlands are also added, based on anticipated length of stay derived from remigration probabilities and weighted by the entry age distribution (pension entitlements build up by year of presence). Every resident recorded in the Municipal Basis Administration of population, GBA, participates in the state pension system.

For individuals without immigration background and individuals with second generation immigration background who will not remigrate, the lifetime net contribution is determined as:

$$LNC_g = \sum_{a=0}^{99} \left\{ \left(\frac{1+p}{1+i} \right)^a \cdot NCA_{ga(2016+a)} \cdot SURV_{0a} \right\}$$

Thus, in this case the calculation for LNC_g equals the calculation for NCE_{ge} for entry age $e = 0$ and $STAY_{gea} = 1$ for all $0 \leq a \leq 99$.

For many second-generation groups, there is too little or no data for the second half of life. Therefore, for second-generation group g a synthetic net contribution age profile $\overrightarrow{P'}_g$ is estimated as follows. Following Roodenburg et a. (2003)[15], an integration parameter i is chosen in such way that the linear combination $\overrightarrow{P'}_g$ of the profile $\vec{P}_{NW1}$ of the non-Western first generation and the profile $\vec{P}_{NTV}$ of native Dutch:

$$\overrightarrow{P'}_g = (1 - i) \cdot \vec{P}_{NW1} + i \cdot \vec{P}_{NTV}$$

best fits the observed net contributions $\vec{P}_g$ of group g for the first half of life. Then $\overrightarrow{P'}_g$ is combined with $\vec{P}_g$ to form a synthetic net contribution age profile for g, used in the generational accounting. For more details, see Appendix 3.

Thus, to summarise, our basic data are observations on contributions and benefits observed at individual levels in 2016. They are carried forward using remigration probabilities observed in 1995-2017, mortality rates predicted by CBS and macro-economic developments predicted by CPB. Differentiation by age of entry is obtained by assuming that an immigrant enters the lifetime age profile of contributions and benefits observed in 2016 for a residing immigrant at his observed age at entry.

4 Budget items allocated

We have organised the government budget items in the classification used by the CPB Netherlands Bureau for Economic Policy Analysis (CPB), as shown in Table 2. The table shows the totals for each of these items for the year 2016, both for the entire population and broken down by immigration background. Such a static snapshot for a particular year can lead to highly distorted comparisons by background due to differences in age structure. This is also the case for the Netherlands. In particular, non-Western immigrants have a relatively young age structure, which is one of the reasons why certain items such as state pension[16] and healthcare are relatively low. Items related to the youth phase, such as education[17], are actually higher, indeed partly because of the age structure. The total amounts per item are from CPB (see Technical Appendix) and serve as reference for our allocations from CBS-microdata; if totals differ, we adjust to match the CPB aggregates. Gaps mostly reflect administrative overhead.

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[15] Roodenburg et al. gave tentative calculations of the effect of the immigration of families, by assuming that the profile of net contribution per entry age of the non-Western second generation, would be the average of the profiles of the non-Western first generation and natives. We developed that idea further by replacing this assumption of '50% integration' with an estimate of the degree of integration based on CBS-microdata, starting from the assumption that the net contribution profile for the second generation is always a linear combination of the profile for native Dutch people (full integration, or 100% integration) and the profile for the non-Western first generation (no integration, or 0% integration).

[16] This is partly a distortion because the first generation has not always built up sufficient state pension, and will then be supplemented by social assistance benefits. The actual costs are therefore higher than is expressed in the amount for AOW. Approximately 90% of all social assistance recipients older than the 'state pension age' have a migration background, mostly non-Western. CBS-StatLine, *Personen met bijstand; persoonskenmerken*, retrieved 27-12-2020 from: https://opendata.cbs.nl/statline/#/CBS/nl/dataset/82016NED/table?dl=47859

[17] As will become apparent, the costs of education for immigrants are often higher, also calculated over the life course.

The differences between Western and non-Western immigrants are striking. Western immigrants contributed 0.9 billion euros overall in 2016 and non-Western immigrants received 18.2 billion euros[18]. Western immigrants are much more similar to native Dutch people in terms of costs and benefits than non-Western immigrants. In terms of age structure, the differences between Western immigrants and the native Dutch people are also relatively limited, so that, for example, the use of the state pension is almost equal to that of the native Dutch population.

Table 2 Totals for 2016, of 23 cost and benefit items, for the entire population and broken down by immigration background, in absolute amounts (billions of euros) and relative (per capita) compared to native Dutch people (%), as well as the population size (× 1,000 people) by immigration background, being the population on 1 January 2016 plus 171 thousand 0-year-olds born or immigrated in 2016. Our own calculation based on CBS-StatLine and CBS-microdata. The macro amounts for the entire population are partly based on CPB data.

				With immigration background					
		Total	Dutch	Western		Non-Western		Total	
	Population size (× 1000)	**17,150**	**13,352**	**1,671**	**(10%)**	**2,127**	**(12%)**	**3,798**	**(100%)**
	REVENUE – EXPENDITURE	**-1.2**	**16.1**	**0.9**		**-18.2**		**-17.3**	
Nr.	**TOTAL EXPENDITURE**	**299.9**	**229.6**	**28.2**	**(98%)**	**42.1**	**(115%)**	**70.4**	**(108%)**
1	Public administration	67.3	48.2	6.6	(100%)	12.7	(165%)	19.0	(141%)
2	Defence	6.9	5.3	0.7	(100%)	0.9	(100%)	2.0	(100%)
3	Education	27.8	20.8	2.0	(73%)	4.9	(149%)	7.0	(117%)
4	Child benefit/student grants	5.2	3.8	0.4	(75%)	1.1	(179%)	1.0	(136%)
5	Disability/sickness benefit	13.4	10.2	1.3	(96%)	2.0	(125%)	3.0	(113%)
6	Unemployment	8.0	6.2	0.9	(116%)	0.9	(88%)	2.0	(100%)
7	Social assistance/ANW	7.4	3.2	0.8	(106%)	3.4	(648%)	4.0	(445%)
8	Social security residual	17.2	13.4	1.7	(103%)	2.1	(100%)	0.0	(102%)
9	State pension	36.9	32.1	3.5	(99%)	1.3	(26%)	4.9	(53%)
10	Transfers abroad	10.5	8.2	1.0	(100%)	1.3	(100%)	2.3	(100%)
11	Child, rent and healthcare allowances	9.4	6.2	1.0	(106%)	2.2	(227%)	3.2	(182%)
12	Healthcare	65.2	53.1	6.2	(97%)	6.0	(71%)	12.1	(80%)
13	Gross invest. buildings	8.5	6.6	0.8	(100%)	1.1	(100%)	1.9	(100%)
14	Gross invest. infrastructure	10.1	7.8	1.0	(100%)	1.2	(100%)	2.2	(100%)
15	Gross invest. schools	5.9	4.5	0.4	(77%)	1.0	(144%)	1.5	(116%)
	TOTAL REVENUE	**298.8**	**245.7**	**29.1**	**(100%)**	**24.0**	**(61%)**	**53.1**	**(76%)**
16	Wage and income taxes and social premiums	153.2	125.9	15.5	(104%)	11.8	(59%)	27.0	(76%)
17	Other direct taxes households	7.9	6.5	0.8	(104%)	0.6	(59%)	1.4	(76%)
18	Inheritance tax	1.7	1.5	0.1	(79%)	0.1	(26%)	0.2	(45%)
19	Corporate income and div. tax	21.8	19.2	1.7	(81%)	0.8	(26%)	2.5	(46%)
20	IRN (indirect tax like VAT etc.)	68.1	55.0	6.8	(102%)	6.3	(72%)	13.1	(84%)
21	IRN from companies	16.1	14.2	1.3	(81%)	0.6	(26%)	1.8	(46%)
22	Net land sales	2.3	1.8	0.2	(100%)	0.3	(100%)	0.5	(100%)
23	Non-tax resources residual	27.8	21.6	2.7	(100%)	3.4	(100%)	6.2	(100%)

[18] Note that these numbers would imply a static overall net burden of 17.3 billion, 5.7 % of total government expenditures, 2.7% of GDP. This static, single year net burden thus is in line with an often claimed modest net burden.

On the expenditure side, the costs for public administration for non-Western immigrants are also relatively high. First of all, this is because the considerable costs for the Immigration and Naturalisation Service (IND) and the Central Agency for the Reception of Asylum Seekers (COA) in 2016 have been allocated to public administration. These costs have been allocated to the first generation and are largely attributed to non-Western immigrants. The sub-item security (police, justice and crime) also falls under public administration. The costs of security are much higher for people with an immigration background because the number of suspects per 10,000 inhabitants is higher for all age groups than for native Dutch people[19]. In addition, the average passage through the criminal justice system turns out to be more expensive for immigrants, partly because of the more frequent imposition of expensive prison sentences[20]. Here too, the young age structure of especially non-Western immigrants distorts the picture because young people (with and without an immigration background) simply commit crimes more often than older people.

On the expenditure side, the relatively high costs for benefits are particularly striking for non-Western immigrants, with social assistance in particular standing out. The exception is unemployment benefits, which are relatively high for Western immigrants. Besides benefit fraud (see Report) a possible explanation is that Central and Eastern European migrant workers can commute back and forth between the Netherlands and the country of origin and can often claim unemployment benefits for at least 3 months after a relatively short period of work (at least 26 weeks). Non-Western immigrants make relatively little use of unemployment benefits. However, this is less favourable than it seems, in part due to low employment rates and relatively high dependence on other benefits. Finally, the allowances received by non-Western immigrants are also relatively high. In the case of income-related schemes, this is mainly due to a low average income.

On the revenue side, the item wage and income taxes and social premiums is relatively low for people with a non-Western immigration background because of a low average income, despite the overrepresentation in the working age group. This is partly related to a low level of education and low labour force participation. A low income also depresses the payments of taxes classified under the IRN item in Table 2, which mainly includes indirect taxes such as VAT. Furthermore, immigrants pay relatively few taxes associated with business ownership, such as corporate income tax and dividend tax. This concerns direct ownership (such as partners in a company), but mainly pension assets invested in shares. On average, immigrants are less wealthy than people with a Dutch background and have lower pension assets. The young age structure also plays a role for non-Western immigrants. Lower wealth, in combination with lower ages also results in low inheritance tax payments.[21]

The revenue side in particular shows a difference between the native Dutch population and non-Western immigrants. Expenditure for non-Western immigrants is 115% of that of native Dutch people. That amounts to approximately 5 billion euros higher expenditure on non-Western immigrants than could be expected on the basis of the numerical relationships between the population groups. The incomes of non-Western immigrants are only 61% of the native Dutch people and that amounts to 13

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[19] CBS-StatLine, *Verdachten; geslacht, leeftijd, migratieachtergrond en generatie*, retrieved 25-12-2020 from: https://opendata.cbs.nl/statline/#/CBS/nl/dataset/81959NED/table?dl=48730

[20] A CBS customized table was used for these differences, see §8.12 and the Technical Appendix.

[21] The inheritance tax is attributed to the person who dies and not to the receiving party. However, its age dependence is based on a CPB profile, which gives a fairly even distribution over ages. The use of a profile based on the CBS table population would perhaps be more logical, but this has been abandoned due to excessive sensitivity to age structure when, for example, mortality probabilities change. See also the Technical Appendix.

billion less in government revenues. Of the total net effect on public finances of 18 billion euros of non-Western immigrants, about 70% relates to the revenue side. As noted, Table 2 is a representation of the static approach – a snapshot – whereby, among other things, the young age structure produces distortion. However, our calculations show that also in the dynamic approach about 70% of the difference between first-generation immigrants and native Dutch people is determined by the revenue side. On average, non-Western immigrants have a low average income and therefore pay relatively few premiums and taxes (see also §8.13 of the Report), which has a greater impact on the net contribution than a high take-up of allowances, benefits or care. This applies to many non-Western immigrants, but also, for example, to immigrants from Central and Eastern Europe.

We allocate all revenues and expenditures of the national government in 2016. From CBS-microdata, we can observe what individuals, or individual households, contribute to government revenue for most categories. Direct taxes and social security contributions are directly observed at individual level, indirect taxes are inferred from household expenditure data. Assignment to individuals within households is done on basis of household members' gross income. We allocate contributions paid by enterprises according to proprietorship of the enterprises (invested pension wealth, shares and direct ownership). Revenues from the inheritance tax are individualised, by applying age profiles from CPB, by inferring inheritances by age of the deceased from wealth tax, primary personal income and mortgage interest paid as indication of home ownership.

Most categories of expenditures are also observed at the individual level, in the microdata on incomes. Problematic are expenditures on overhead and public goods, with these expenditures amounting to some 94 billion euro. This covers public administration, defence, vigilance and maintenance of dikes and dams, transfers to developing countries, investments in buildings and infrastructure and some residual categories like fundamental scientific research. A small share of these expenditures has been directly assigned to individuals by indicators of incidence. Police and justice expenditures have been assigned on basis of convictions and incarcerations. Costs of residential permits provided by the Immigration Service IND, housing and living expenditures for refugees by the refugee department COA and transfers and defaults on loans related to the Integration Programme ("Inburgering") have been assigned per capita to first generation immigrants, taking into account group differences in expenditures on those items.

The non-individualised categories are only differentiated by age, based on the CPB profiles. This applies to 23% of revenues and 34% of expenditures. Note that this has implications for redistribution between residents and immigrants: immigrants receive 11% more of the budget than they contribute on account of "public goods/expenditures".

The proper assignment of expenditures on public goods depends on the nature of the cost function. One question is homogeneity of the population: will immigrants and additional natives have identical marginal cost, i.e., require the same additional outlays to maintain the quality of public goods provision? The second key question is the slope of the cost function on population size: are marginal cost zero (one king can serve one million or one hundred million inhabitants), zero over intervals (infrastructure up to the next congestion level), positive (constant or variable) everywhere? Empirically, we know very little about the cost function.

The OECD (2013) survey refers to "congestible public goods" and notes that most studies which account for them tend to attribute the costs of such goods equally across the whole population (i.e. an assignment pro rata). They thus assume that the cost of provision is proportional to the number of recipients. They also challenge the pure public goods character of some standard cases, such as defence: “The marginal increase in these costs due to immigration should, within certain limits, therefore be zero and immigrants will thus lower the per capita cost for the native-born. Nevertheless, defence spending tends to grow proportionally with GDP, which challenges the pure public good classification; and indeed, a number of studies assign the cost of defence proportionally” (o.c. 132).

In their survey of the literature, Krieger and Meierrieks (2020) conclude from their own empirical work (on 130 countries, 1970-2014) that “the estimates from this approach (the authors’ preferred method of panel time-series) indicate that larger population size is positively related to government size, suggesting that the costs of size (due to congestion, crime, conflict etc.) dominate its potential benefits (e.g., from scale economies).”

Dutch data (CBS *Zeventig jaren statistiek in tijdreeksen*, B 39 en H 28) reveal that at a population size of 6,865 million in 1921 the government employed 2,5% of them, while in 1939, at size 9,884 million, it employed 2,8%. In 1950, at population 10,027 million, the share was 3,9% and in 1960, at 11,417 million, 4,3%. From 1921 to 1936, the level of government services may have been more or less constant, after the war the scope of government activity has strongly expanded. Between 2007 and 2018, Dutch population grew by 5%, while the number of civil servants at the national level dropped by 1.6%.[22] This was a period of explicit budget constraint, and many complaints about the decrease in government services followed.

Identifying the cost function for public services at constant quality is a difficult job. We follow the internationally dominant practice of assignment per capita and hence assume cost proportional to population size. In the sensitivity analysis of section 9 we also consider alternative assignment rules.

5 Generation, motive and region

5.1 Generation and motive

A *first-generation immigrant* is defined as a person born abroad, with at least one parent born abroad. *A second-generation* immigrant is defined as a person born in the Netherlands, with at least one parent born abroad.[23]

The migration motive is registered on the application for a residential permit with the Immigration and Naturalisation Service (IND) and hence, an administrative classification[24]. The CBS-microdata variable used is the “immigration motive of the IND that is published after imputation (and other adjustments)” by CBS.[25] There are 5 categories: work, study, asylum, family (re-unification and formation) and other. For the second generation, we assign father’s motive; in case father’s motive is family re-union, mother’s motive is recorded.

[22] https://kennisopenbaarbestuur.nl/

[23] This is consistent with CBS definitions, where the word “immigration background” has been replaced with the word “immigrant.”

[24] If the motive is unkown in the original record, CBS imputes on basis of the immigrant’s characteristics.

[25] CBS, *Vrlmigmotbus: Migratiemotieven*, retrieved 12-2-2021 from: https://www.cbs.nl/nl-nl/onze-diensten/maatwerk-en-microdata/microdata-zelf-onderzoek-doen/microdatabestanden/vrlmigmotbus-migratiemotieven

The immigration motive is not registered until 1995. This means that the analysis by motive is based on a smaller group of first-generation immigrants. But it also means that it provides insight into the fiscal effects of recent immigration, since the year 1995.[26] This is important for the interpretation because there is no direct influence of events before that year, such as the recruitment policy for guest workers or immigration due to the decolonization of Suriname.

5.2 Source regions

In our report, we use five regional composites for immigrant source regions. R2 is a simple dichotomy for Western and Non-Western, R12 is a distinction in 12 regions as used by CBS, R19 is a differentiation within R12, and R42 is a further disaggregation within R19. For some applications, like the study of the effects of education and culture on net contribution, we used R87, a further refinement of R42.

R42 has been constructed for this project, balancing desire for decomposition into homogenous regions against reliability as determined by number of observations.[27] We have made a special effort to guarantee that cell sizes for combinations of conditioning variables do not become too low for desired statistical reliability.[28] With age the key variable for assigning net benefits, we started by considering standard deviations of net benefits within age classes. Using 5-year age intervals and distinguishing net benefits only by age class, standard deviations within age classes are low and very similar up to age 20. They are highest between 40 and 70 and then decrease, with a pattern that is much more pronounced for Western than for non-Western immigrants. Given this pattern, and the fact that data for high ages carry little weight after discounting and allowing for remigration and mortality, data from the more aggregated region have been used (in a weighted average with the observations) for older and younger age classes if the regional differentiation led to unacceptably low number of observations. Regional classifications have been adjusted until age classes between 20 and 70 had acceptably large numbers of observations.[29]

The problem of small cell sizes is only acute for combinations of conditioning variables (see Table 3). If we only differentiate Western and non-Western source countries (R2), for first generation immigrants, the smallest cell size by age has between 101 and 300 observations. There are 2 such cells. In all, there are 190 cells, with 80 of them between 10,001 and 30,000 observations. If we do not combine with motive, education or CITO score, R42 for second generation immigrants[30] relatively count most low-fill cells, 6 out of 1426 cells have between 10 and 30 observations, and 74 cells have between 31 and 100 observations. The most vulnerable differentiations are combinations of age, source region and migration motive, especially the combination with R12, with 21% of cells with 10 to 100 observations. This is because very young labour and study migrants are rare, as are some combinations of motive

[26] More precisely formulated: insight into the fiscal effect of immigration that took place from 1995, calculated on the basis of the data of immigrants who came since 1995 and who were present in the Netherlands in 2016, based on the numbers observed in the average (cross-sectional) in 2016.

[27] R12 contains 5 Western regions (Netherlands, EU, other Europe, other non-Europe, Indonesia), and 7 non-Western regions (Asia excluding Indonesia and Japan, Turkey, Morocco, North Africa excluding Morocco, Surinam, Aruba and Dutch Antilles, other Latin America). R19 adds differentiation within Europe, Asia and Africa, R42 further differentiates within aggregate regions, R87 further refines R42.

[28] In addition to statistical reliability, another issue is that too low a cell fill will compromise the anonymization imposed on users of CBS-microdata.

[29] This does not apply to Japan and Israel. As they are too different from neighbouring countries, they have been kept separate even in R42.

[30] Up to 48 years, due to lack of data for older ages for many second-generation groups, see Appendix 3 for further details.

and country or region. If we combine age with R2 and education, the mode of cell sizes is 30,001 to 100,000, with the joint relative frequency of sizes 10-30 and 31-100 less than for 2%. Combinations of CITO score, R42 and generation are also well sampled, with only 1 cell with between 31 to 100 observations and a mode of 3,001 to 10,000 observations.

Table 3 Number of observations per age group. The modal class is in bold.

Breakdown by	Motive, Education, CITO	N/A						Motive			Education		CITO score[a]
	Generation[b]	N/A	0, 1, 2	1			2[c]	1			N/A	0,1,2	1,2
	Origin[d]	N/A	N/A	R2	R12	R42	R42[e]	N/A	R2	R12	N/A	R2	R42
Cell size class	10-30	0	0	0	0	10	6	1	5	60	0	10	0
	31-100	0	1	0	9	42	74	4	13	144	3	55	1
	101-300	0	5	2	24	139	326	7	18	213	14	130	4
	301-1,000	0	8	10	61	**320**	**646**	8	38	**276**	18	308	25
	1,001-3,000	0	15	25	73	297	289	18	45	183	36	623	26
	3,001-10,000	4	45	72	**120**	213	73	34	**75**	93	60	855	**19**
	10,001-30,000	5	76	**80**	64	77	12	**35**	31	8	126	938	4
	30,001-100,000	11	72	1	1	1	0	10	5	2	**215**	**1,021**	3
	> 100,000	**80**	**78**	0	0	0	0	0	0	0	15	9	0
Total		100	300	190	352	1,099	1,426	117	230	979	487	3,949	82
10-100 as % total		0%	0%	0%	3%	5%	6%	4%	8%	21%	1%	2%	1%

[a] This concerns the total number of persons of the second generation (without natives, so 2 × 41 = 82 groups) whose CITO score is known; this is the only variable that is not also aggregated by age. [b] Generation 0 stands for native Dutch. [c] Up to 48 years, see §4.2 of the Technical Appendix for more details. [d] Country type is the CBS designation for the Western, non-Western classification (R2). [e] Whereby for origin Indonesia, Turkey, Morocco, Suriname and Aruba and the (former) Dutch Antilles is further broken down by the number of parents born abroad.

6 Data

As noted, our basic observations are net contributions to the government budget (government revenues minus expenditures) for immigrants present in base year 2016. The amounts, by age, are carried forward to future years by applying the real growth rate of 1% advocated by CPB. Conditional on immigrant age at arrival the amounts are then used to calculate present values along the remaining future age profile, in the standard case discounted at the real discount rate of 2.5 % (CPB).

For categories 2, 10, 13, 14, 22 and 23 in Table 2, we assign equal amounts per capita, similar to the CPB2018 dataset. For category 1 we also assign equal amounts per capita, with the exception of 10 billion euros for police and justice, which is assigned to individuals based on CBS-StatLine data on the number of suspects per 10.000 inhabitants, per age group, broken down by immigration background, and taking into account group differences in the proportion of suspects who go through the different stages of the criminal justice chain. For the other categories, we mainly use CBS-microdata, a dataset accessible under strict security conditions to safeguard privacy and anonymity. CBS-microdata contains very detailed individual information on virtually each resident of the Netherlands, mostly from linked administrative sources.[31] Residents are differentiated by demographic characteristics (age, gender, country of birth including that of parents and grandparents, education). Categories 4, 5, 6, 7, 8, 9, 11, 16 and 17 are monetary flows between government and individuals (sometimes conditioned on household situation) that can be taken straight from CBS-microdata on individual income. For education (3 and 15) we use CBS-microdata on participation in education. For healthcare (12) we partly use CBS-microdata on consumption of medical care under the Healthcare Insurance Act (*Zorgverzekeringswet*), and for healthcare costs not covered by this law we assign equal amounts per capita, similar to the CPB2018 dataset. For indirect taxes on household consumption (20) we use CBS-microdata on personal income and household income, which we relate to CBS-StatLine data on the relationship between household income and indirect taxes. For corporate income and dividend tax and indirect taxes on firms (19 and 21) we use CBS-microdata on (pension) assets (shares indirectly owned by individuals), dividends received for shares directly owned by individuals, and dividend tax paid by directors-major shareholders. The total of these taxes provides an estimate for the distribution of accumulated wealth across (age) groups. Inheritance tax (18) is calculated as an average of three measures for wealth, being (i) the beforementioned estimate for wealth, (ii) CBS-microdata on personal gross income, and (iii) homeownership based on CBS-microdata on interest paid on mortgage debts, all three computed as the ratio between the average for the group in question and the entire population.

For some second-generation R42-groups, we have few observations, and for ages 48 and above, often no observations at all. Moreover, there are clear cohort effects, with for example smaller, older cohorts performing better than larger younger cohorts. As said before, we solved this by assuming that the net contribution age profile is a linear combination of the age profile of Dutch natives and the age profile of the non-Western first generation, fitting this linear combination on observed net contribution over the first half of life, and subsequently combining the linear combination with those observations into a synthetic net contribution age profile used in the generational accounting. This procedure results in an integration parameter for second-generation R42-groups, which are used to construct integration parameters for other groups, like the regional aggregates R19, R12 and R2. For further details see Appendix 3.

7 Results

7.1 Net contributions by age of entry

In Figure 1 we present core aggregate results, for first generation immigrants, total and split in Western and non-Western. For comparison, we have defined a Native Dutch reference immigrant. The Native Dutch reference immigrant is a hypothetical immigrant who has all the characteristics of the average native Dutch (schooling, labour market performance, healthcare cost, etc.) except mobility behaviour and participation in the state pension program: the latter are set to equal those for the average immigrant from neighbouring countries, which resemble Dutch natives in labour market performance. Mobility behaviour means patterns of (re)migration, pension participation acknowledges the consequences of this mobility behaviour (state pension entitlements are only built up when residing

[31] For details see the CBS Microdata Catalogue, https://www.cbs.nl/en-gb/our-services/customised-services-microdata/microdata-conducting-your-own-research/microdata-catalogue. Each individual has a random identifier to access files with data on education, social security, etc.

in the Netherlands, pension payments will be received anywhere). We then calculate the net contributions of hypothetical immigrants with those characteristics.

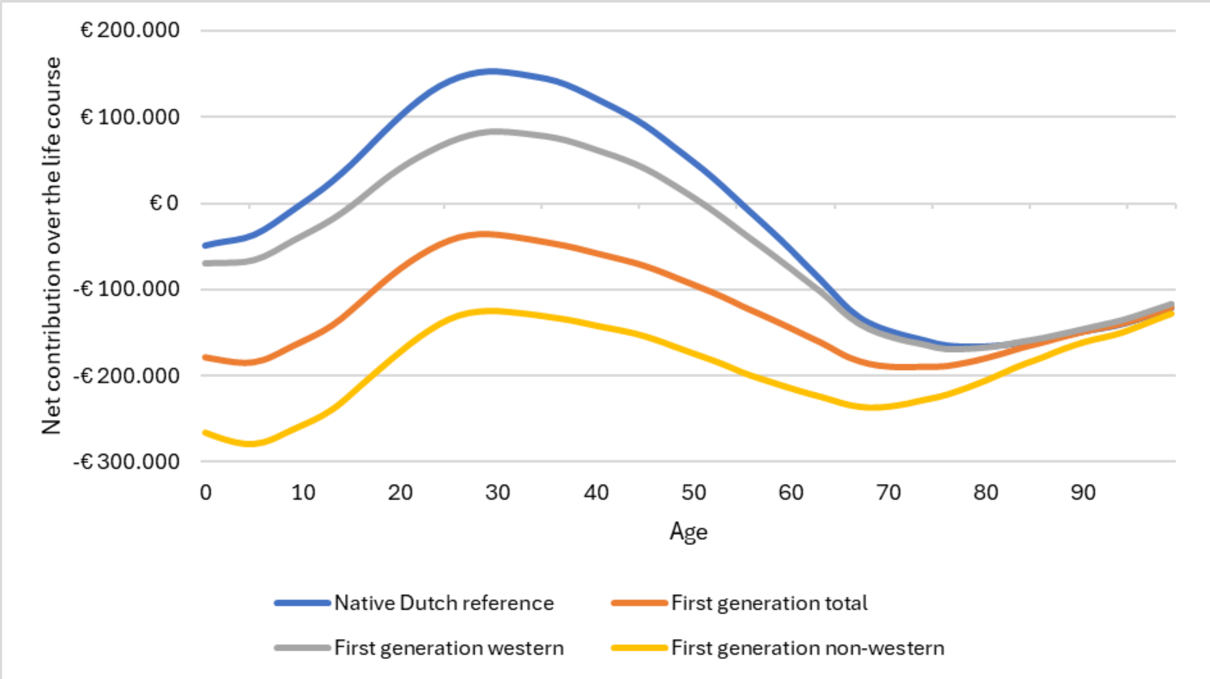

Figure 1. Net contribution by entry age for first-generation immigrants, total and broken down by Western and non-Western and for hypothetical immigrants with the characteristics of the average native Dutch person (referred to as 'native Dutch reference').

The graph for Native Dutch reference shows key features of the lifecycle. During youth, the anticipated discounted lifetime contribution is negative. At age 10, the remaining lifetime contribution rises above zero, at age 55 it drops again into negative values. The first stage is dominated by cost of educating, in the second stage tax contributions dominate, in the third stage cost of retirement and health care dominate. From the perspective of the public budget, the cost of the first and the third life stage are paid for in the stage of working life. Note that any new Dutch child with a migrants' profile of remigration is a burden on the public purse.

Western immigrants have smaller impact on the government budget than the Native Dutch reference, (the Native Dutch made immigrant). They bring gain to the state budget if they arrive between the ages 16 and 50, they are a burden when they arrive at other ages. Non-Western immigrants are a burden no matter at what age they arrive. Table 3 gives the numbers. The amounts are substantial. A newborn Dutch on average will have a clean lifetime slate, but joint with the immigrants, there is an average lifetime deficit of €65,000. First generation Western immigrants, averaged over observed entry ages, bring a benefit of €42,000, non-Western immigrants a deficit of €167,000. Note the tremendous effect of accounting for family immigration from non-Western regions, by assuming a hypothetical family rather than only looking at individuals.

Table 3. Above: net contribution for immigrants, with remigration, (right) net contribution per person, (left) net contribution by entry age for six selected entry ages and (middle) for a hypothetical family consisting of two parents with entry age 30 years, one child with entry age zero and one child with an entrance age of ten years. Below: net contribution, from birth, without remigration, for persons born in the Netherlands. NB: there may be minor deviations due to rounding.

	Net contribution (x €1,000)							
	by entry age (years)						hypothetical family	per person
Immigrants (with remigration)	**0**	**10**	**30**	**50**	**70**	**90**		
First generation total	-179	-160	-37	-95	-190	-149	-414	-76
First generation Western	-69	-37	83	7	-154	-145	60	42
First generation non-Western	-266	-257	-125	-174	-236	-161	-772	-167
Native Dutch reference	-49	0	153	48	-148	-149	256	98
Born in the Netherlands (without emigration)								**per person**
Average native Dutch person (person with a Dutch background)								-3
Average resident (total all migration backgrounds)								-65

7.2 Differentiation by region and motive

In Figure 2, we present data for 42 regions, for the immigrant populations present in 2016 and hence, averaged over actual arrival ages. The minimum group size in this format is 5,000 people and the average group size is 48,000 people. Blue and green colours represent (very) high positive net contributions and red and orange colours represent (very) high negative net contributions. The yellow colours represent more or less neutral net contributions (around €0). In this map, the Netherlands is coloured with the net contribution of the Native Dutch reference individual.

The classification reveals major differences within the continents[32]. For Latin America, immigrants from the Caribbean (–€195,000) make a much lower net contribution than immigrants from the economically more developed southern countries such as Brazil and Argentina, which are part of the so-called Mercosur customs union.

Within Africa, there is a striking contrast between immigrants from Southern Africa, who make a positive net contribution of €180,000, and immigrants from the rest of Africa. Immigration from the Southern Africa region is for the most part immigration from South Africa and consists for a considerable part of immigrants with recent or older Dutch roots. Immigrants from the East African region make a modest negative net contribution to the treasury. Immigrants from the other African regions show significant negative net contributions. Immigrants from the Horn of Africa and Sudan region in particular – with countries such as Somalia, Ethiopia and Eritrea where many asylum seekers come from – make a substantial negative net contribution, amounting to approximately –€315,000.

[32] The classification into continents follows the CBS classification into 'Western' and 'non-Western' (R2) and according to this classification, North America (in the continent America), Japan and Indonesia (in the continent Asia) are classified by the CBS as the 'Western' parts of otherwise 'non-Western' continents. Conversely, Turkey was classified by CBS as a ‘non-Western’ part of the otherwise ‘Western’ continent of Europe.

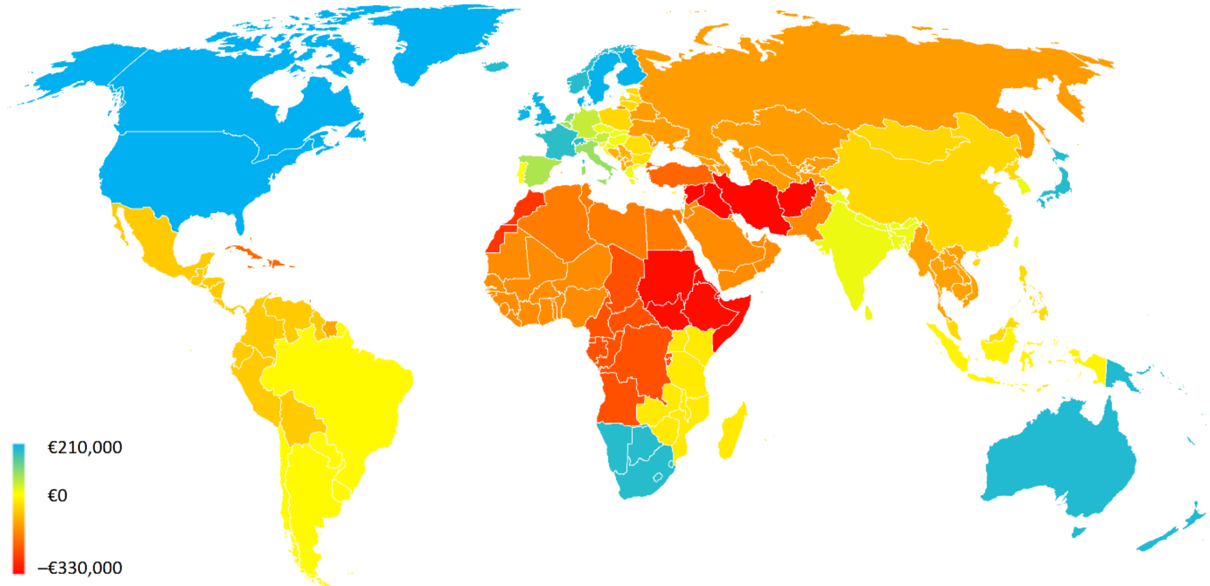

Figure 2. Net contribution of first-generation immigrants for 42 regions of origin, with remigration. The Netherlands is coloured with the results of the native Dutch reference (a hypothetical immigrant with the characteristics of the average native Dutch person). Source: Our own calculation based on CBS-StatLine and CBS-microdata.

Within Asia, comparable negative amounts (lower than –€320,000) apply to the net contribution of immigrants from the Afghanistan, Iran, Syria and Iraq region, also a typical asylum origin region. Furthermore, the difference between the net contribution of immigrants from Pakistan (–€150,000) and the rest of the Indian subcontinent (€15,000) is striking. These regions share a lot of culture and history, but apparently have a different dynamic with regard to immigration to the Netherlands. Finally, there is a strong contrast between immigrants from Israel who, with this classification[33], make the highest net contribution within Asia (€75,000) and the surrounding countries on the Arabian Peninsula and Jordan and Lebanon (–€150,000).

First-generation immigrants from Western countries generally make a positive contribution. This is especially the case for Japan, France, Switzerland, Scandinavia and the Anglo-Saxon countries, with North America (€210,000) as a high outlier, and to a lesser extent for a number of other European countries. Immigrants from Central and Eastern European countries such as Romania, Bulgaria, Poland and the Baltic states cost a net €40,000 to €50,000. Finally, also in Europe it is the immigrants from the typical asylum origin regions of former Yugoslavia and the former Soviet Union who make the largest negative net contribution relative to the other European countries of –€100,000 to –€130,000.

Figure 3 presents result by migration motive. As discussed above, we can distinguish five migration motives, 'work', 'study', 'asylum', 'family immigration' and 'other'. In addition, there is a group with unknown motive.[34] Irrespective of age of entry, only labour migrants make a positive contribution (provided they arrive before age 60). Except for motive unknown, the order is stable across ages of entry. Labour migrants make the largest net contribution. Their contribution is positive for entrance

[33] CBS classifies Japan and Indonesia as Western and the other Asian countries – including Israel – as non-Western. Among the non-Western countries in Asia, the net contribution of immigrants from Israel is highest. However, Japanese immigrants make a higher net contribution than Israeli immigrants.

[34] For proper comparison, only those with unknown motive who arrived since 1995 (the first year with statistics on immigration motive) are presented.

ages up to approximately 60 years. The negative net contribution is the smallest for study immigrants, while asylum seekers make the largest negative net contribution. For entrance ages up to approximately 70 years, the net costs for asylum seekers amount to roughly €400,000. This is mainly due to the very weak labour market performance and high benefit utilization. In addition, the costs of integration and especially the reception of asylum seekers push the net contribution line even further down.[35] Family migration, covering a large group of immigrants, also brings a large burden to the budget.

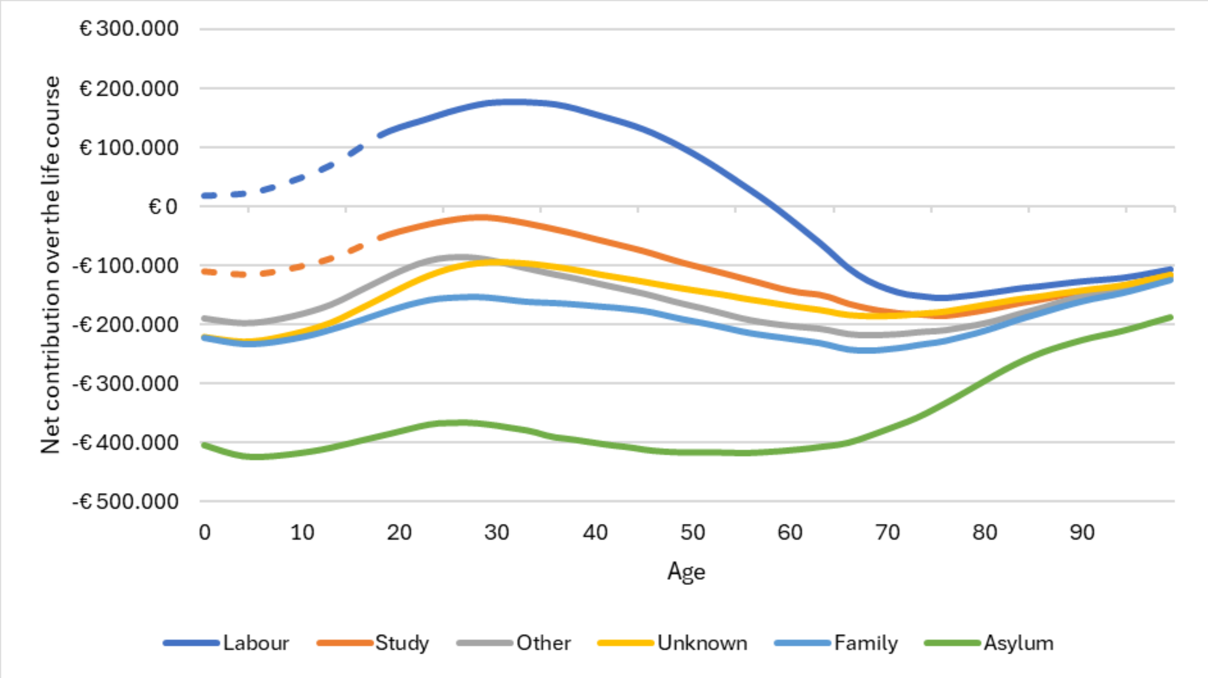

Figure 3. Net contribution of first-generation immigrants by immigration motive and entry age. For study and work immigrants, the numbers for young ages are low and the profile is wholly or partly synthetic, which is indicated by a dotted line.[36] Source: Our own calculation based on CBS-StatLine and CBS-microdata.

7.3 The second generation

As Figure 4 shows, for only a few of the 42 regions of origin does the second generation make a significant positive net contribution.[37] This concerns a dozen countries, mainly located in North-West

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[35] The costs of the asylum reception are calculated at €53,700. The costs of integration are (for asylum seekers) calculated at €5,200 for every asylum immigrant with an integration duty. The amounts for reception are high because expenditures for application processing are high. The total costs for COA (centres for applicant reception) alone, according to the national budgets 2008-2018, for the period 2013-2018 amounted to 5.1 billion euros for 132,000 residence permits (€39,000 per residence permit) and over the period 2008-2018 7.4 billion euros for 169,000 permits (€43,000 per permit).

[36] There are no data on labour immigrants under the age of 14. There are relatively few data for ages between 14 and 19 years, the curve for this age is dotted to indicate this. This is not a problem when determining the net contribution over the life course; if there are no observations for certain ages, the ages in question do not have to be taken into account and if there are few observations, the resulting uncertainty hardly counts in the net contribution over the life course. Something similar applies to study immigrants. There are no data for ages up to four years and few data for ages up to 15 years.

[37] In addition, there are two regions – France and North America – for which the average net contribution of persons with a second-generation immigration background is around zero.

Europe and East Asia. For Switzerland[38], Scandinavia and China[39], the positive net contribution of the second generation is between €15,000 and €20,000. The highest net contributions (€95,000) are by Japanese with a second-generation immigration background. For the 'Asian tigers'[40] (South Korea, Taiwan, Hong Kong and Singapore) the net contribution is 'budget neutral'. Immigrants from Israel and France generally integrate well into Dutch society, but still, their net costs amount to some €30,000 per individual.

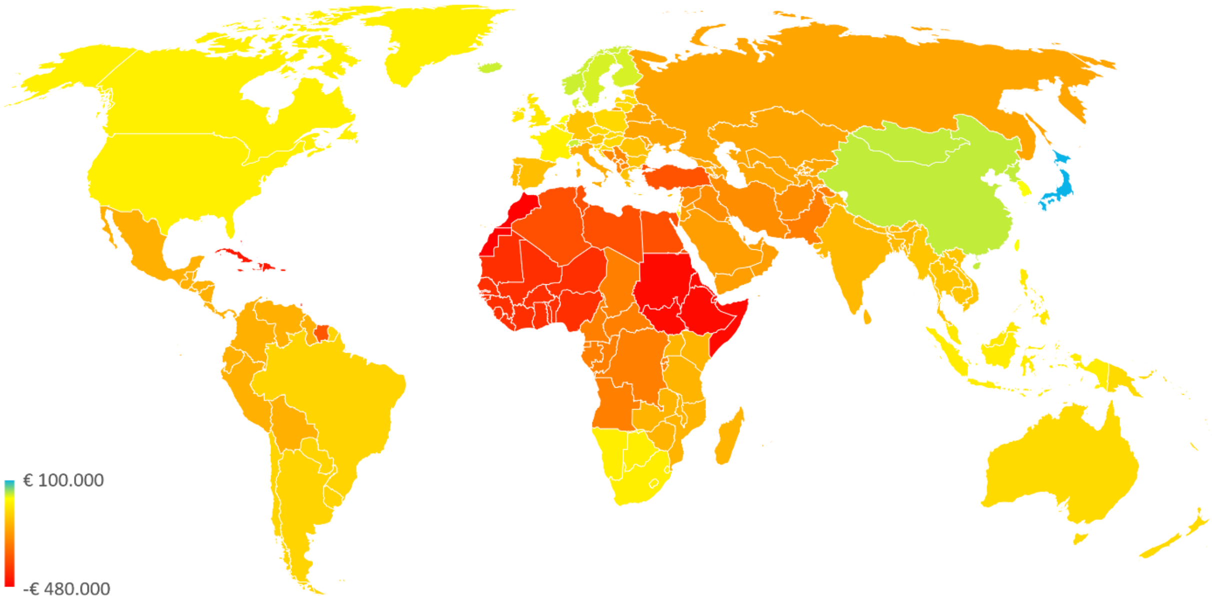

Figure 4. Net contribution of people with a second-generation immigration background for 42 regions of origin, with permanent settlement (no remigration). Source: Our own calculation based on CBS-StatLine and CBS-microdata.

For the vast majority of the regions of origin, however, people with a second-generation immigration background make a negative net contribution over the life course. For the former Yugoslavia, Aruba and the (former) Antilles, Suriname, Pakistan, Turkey and West and North Africa, the net costs are roughly €200,000 to €300,000 per person. Negative outliers are West Africa (–€390,000), the Caribbean (–€435,000), the region of Horn of Africa and Sudan (–€460,000) and Morocco (–€480,000).

There is a remarkable asymmetry in the relationship between the net contributions of the first and second generations. The children of first-generation immigrants with a positive or very high net contribution – with a few exceptions – themselves have no net contribution that deviates significantly from the net contribution of a native Dutch person born in 2016, which is about 'budget neutral'. Conversely, children of immigrants with a large negative net contribution often also make a significant negative net contribution themselves (for details, see the full report).

We also find that persons with one parent born in the Netherlands and one parent born abroad make on average a greater positive or less negative net contribution than persons with two parents born

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[38] This concerns Denmark, Sweden, Finland and the EFTA region (Norway, Iceland, Switzerland and Liechtenstein) and some dwarf states and British crown dependencies, but only the countries with many immigrants in the Netherlands are mentioned explicitly.

[39] This concerns the region of China, Mongolia and North Korea, but in practice mainly China.

[40] It should be noted that the Japanese are a relatively small group, which is necessarily classified separately from the East Asia region because of the existing CBS classifications (Japan is both Western and Asian).

abroad. This difference is considerable for some groups and greatest for Latin America (approximately €210,000) and Aruba and the (former) Antilles (approximately €270,000). On the other hand, the difference is very small for Asia (approximately €20,000) and Turkey (approximately €25,000). A likely explanation for this difference is that in the first two cases, the Dutch-born parent is usually a Dutch native, while in the last two cases, the Dutch-born parent usually has a second-generation migration background. The differences are also relatively small for the European Union and the region Other outside Europe (details in the full report).

8 Where are the gaps among natives and immigrants?

As shown in Table 2 (i.e. the static approach) for Western immigrants, total expenditures per capita amount to 98% of those for native Dutch, for non-Western immigrants this is 108%. For revenues, these ratios are 100% and 60%. The high fiscal burden for non-Western immigrants is not so much due to the benefits they receive but to the low contributions they make to the government budget: 8% more benefits but 40% less contributions. Exceptionally high expenditures on non-Western immigrants are social assistance (648% of native Dutch) and allowances with respect to housing, health care and the upbringing of children (227% of native Dutch), exceptionally low is the state pension (26%). Among revenues, the ratio is exceptionally low for inheritance tax, corporate income and dividend tax and for IRN (indirect tax and non-tax) from companies, each at 26%. These differences are for a considerable part explained by distortion due to the relatively young age structure of non-Western immigrants, which is a major drawback of the static approach.

Chapter 8 of the Report gives an analyses of group differences for R42 in the dynamic approach (i.e. total net contribution over the life course) for the first and second generation together, taking into account the number of children and remigration behaviour. In this analysis, the budget items in Table 2 are lumped together in larger categories and when applicable premiums (for care, benefits, etc.) are subtracted from costs. As a reference category we use the Native Dutch reference. For education, differences come from extra funding for primary schools with many children from low-educated parents, ranging from 1% to 63% extra funding (natives 3%) of a nominal amount if about €6,300. Furthermore, there are big differences in participation of relatively expensive forms of ‘special needs education’, ranging from 6% to 36% (natives 15%). Another cause of differences with the native Dutch population is participation in non-government-funded education, such as international private schools for ‘expat-children’. All in all, within R42 cost of schooling range from €28,000 to €146,000 (native Dutch reference €58,000). Furthermore, total costs for various youth-related social provisions like childcare, child allowance, child budget and child supplement vary according to immigration background from €5,000 to €34,000 (native Dutch reference €14,000). Income-dependent social rent allowances vary from €1,000 to €36,000 (native Dutch reference €5,000), reflecting the importance of social housing in the Netherlands (28% ownership of non-profit housing associations) and the fact that for many low-income immigrants social housing is permanent. For security (police, justice and crime) there are clear differences according to immigration background, with costs ranging from €3,000 to €101,000 (native Dutch reference €13,000). Net contribution (i.e. premiums subtracted) for benefits like unemployment, disability and social assistance, varies from –€218,000 to €7,000 (native Dutch reference –€12,000), for state pensions from –€39,000 to €1,000 (native Dutch reference –€6,000) and for health care from –€145,000 to –€19,000 (native Dutch reference –34,000). Finally, the residual category ‘taxes minus public goods’ ranges from €52,000 to €347,000 (native Dutch reference €236,000), which can largely be explained from differences in personal primary income (PPI), ranging from €8,000 to €47,000 for first-generation immigrants (natives €35,000).[41] PPI has a very strong correlation with the total of taxes and social and healthcare premiums paid[42], and group differences in paid taxes and premiums are larger (range €6,000 to €21,000 with €15,000 for natives) than group differences in received benefits, state pensions and health care[43] (range €2,000 to €11,000, with €5,000 for natives). Total net contributions over the life course, with remigration, for immigrants and their children, range within R42 from –€606,000 to €208,000 (€95,000 for the native Dutch reference, for details see Table 4).

9 Sensitivity analysis

Potentially the most debatable assumptions are on discounting the future and on assignment of public expenditures. Following CPB, we assume real productivity growth of 1% and a discount rate of 2.5%, effectively discounting at 1.5 %. Variation in discount rates will compress or widen differences in future contributions and thus may twist lifetime profiles for different entry ages differently. The effect of variation in the discount rate will interact with assumptions on the retirement age for the state pension. Our base assumption is a gradual increase of the retirement age to 70, as set by present government policy. To get some indication of sensitivity we have compared our base case with a case where the discount rate is only 0.5 % and a case where the state pension retirement age is maintained at 65.

We have also considered sensitivity to the allocation of public goods. The current report attributes public goods equally to residents, following the 2014 CPB Ageing Study *Minder zorg om morgen* and the CPB2018-dataset (see Chapter 8 of the Technical Appendix for details). This deviates from the methodology of the CPB (2003) report *Immigration and the Dutch Economy* on which our work builds. This CPB (2003) report allocates public goods to residents in proportion to their contribution to the gross domestic product. In Table 4, we have added a scenario in which public goods are partially allocated to inhabitants based on their contribution to GDP. Here, 'contribution to GDP' is operationalised as average personal primary income (PPI, see Table 4), the income people generate from their own work or business. Finally, we also give a variant in which public goods are higher due to immigration. The rationale behind both variants is as follows.

Certain government expenditure is indeed, as stated in *Immigration and the Dutch Economy*, more related to the GDP than to the population. Think of obligations such as EU contributions and international agreements on development cooperation and defence, which are expressed as a percentage of GDP. However, this concerns only 18.5% of total expenditure on what in the current report is classified as 'public goods'. The remaining expenditure on public goods probably follows to a fairly large extent the development of the population. One can think of personnel costs for civil servants working in all kinds of executive services such as the tax department. Costs for civil servants' salaries are expected to largely keep pace with population size, as are investments in the government buildings where these civil servants are housed.

[41] Yearly average for ages 20-67 for natives and first-generation R42 groups.
[42] Yearly average for ages 20-67 for natives and first-generation R42 groups.
[43] Yearly average for ages 20-67 for natives and first-generation R42 groups.

Table 4 Sensitivity analysis regarding state pension age, discount rate and weighting of public goods.

	PPI as % of native Dutch[3]	Baseline scenario	35% of Public goods weighted by PPI	Public goods 20% higher	State pension at 65 years	1% lower discount rate
	%					
Max	144%	208	191	178	183	259
Min	24%	-606	-528	-665	-620	-849
Max - Min	**120%**	**814**	**719**	**843**	**803**	**1.108**
Horn of Africa and Sudan	24%	-606	-528	-665	-620	-849
Morocco	40%	-542	-482	-599	-558	-795
Afghanistan, Iran, Syria and Iraq	35%	-418	-357	-471	-435	-571
Central Africa	43%	-382	-325	-439	-402	-519
West Africa	50%	-348	-306	-397	-365	-499
Turkey	45%	-340	-294	-388	-354	-504
Caribbean	40%	-321	-283	-357	-332	-456
North Africa (excl. Morocco)	47%	-319	-276	-365	-333	-461
Aruba and (former) Netherlands Antilles	59%	-254	-229	-288	-265	-350
Pakistan	44%	-238	-201	-276	-250	-343
Arabian Peninsula, Jordan and Lebanon	63%	-224	-193	-272	-241	-322
Suriname	68%	-185	-166	-220	-200	-277
Former Soviet Union (excl. Baltic states)	58%	-177	-148	-217	-192	-270
Former Yugoslavia, Albania[1]	63%	-161	-136	-199	-176	-246
Thailand, Indochina and Myanmar	47%	-159	-121	-200	-176	-234
Central America and South America Other	59%	-118	-91	-156	-133	-180
East Africa	75%	-98	-77	-145	-120	-139
Poland and the Baltic states	59%	-71	-46	-105	-83	-114
Bulgaria and Romania	60%	-70	-48	-102	-82	-113
Philippines, Malaysia, Brunei, East Timor	58%	-66	-34	-109	-87	-106
China, Mongolia and North Korea	60%	-47	-21	-84	-66	-76
Brazil, Argentina, Paraguay, Uruguay, Chile[2]	74%	-34	-17	-72	-54	-62
Indian subcontinent excl. Pakistan	78%	-27	-13	-63	-41	-69
Portugal	78%	-27	-16	-56	-42	-63
Indonesia	65%	-24	-5	-55	-41	-45
Greece and Cyprus	79%	-13	-2	-43	-29	-50
Hungary, Czech Rep., Slovakia, Slov., Croatia	69%	-6	12	-39	-19	-25
South Korea, Taiwan, Hong Kong, Singapore	78%	14	27	-20	-7	-7
Germany and Austria	89%	23	29	-7	7	5
Spain	92%	39	43	8	20	18
Italy and Malta	99%	50	50	20	31	26
Israel	100%	58	58	8	35	66
Belgium and Luxemburg	97%	63	65	30	49	68
Native Dutch reference	**100%**	**95**	**95**	**60**	**74**	**102**
Southern Africa	117%	158	144	112	125	202
France	123%	165	152	132	143	192
Oceania	130%	166	151	137	147	200
EFTA, dwarf states, crown dependencies	108%	182	176	142	155	234
UK and Ireland	130%	191	177	164	169	224
Japan	121%	194	185	169	173	244
North America	144%	203	182	175	183	256
Denmark, Sweden and Finland	133%	208	191	178	182	259

[1]Excl. Slovenia, Croatia. [2]Incl. French Guiana.

However, there are also costs that most likely increase more than proportionally with population growth. This is relevant because Dutch population growth is entirely related to immigration (see Report). For example, in a densely populated country like the Netherlands, infrastructure costs might well be more than proportionally related to population size due to congestion phenomena. The same applies to costs incurred for nitrogen[44] and climate policy, insofar as they fall under the heading of 'public goods'. After all, as the population grows, achieving (reduction) targets requires a greater effort. Costs for nature, environmental and energy policy may also increase disproportionately with population size, as space becomes scarcer, and population density increases. With population growth due to immigration, costs for policies with a redistribution component are also likely to increase disproportionately. Consider poverty reduction and all kinds of social support, insofar as they fall under 'public goods'. The reason is that poverty and low income are disproportionately common among immigrants in the Dutch case.

The literature also suggests that when allocating public goods costs to individuals, in addition to the possibility of economies of scale – a decrease in per capita costs with population growth – there is also the possibility of a disproportionate increase in these costs with population growth. Krieger and Meierrieks summarise the literature on the relationship between government size and population size as follows:

> "Our discussion of the existing literature on the population-government size relationship can be summarized as follows. First, the theoretical effect of larger population size on government size is a priori unclear: the beneficial effects predicted to reduce government size (scale economies, reduced exposure to international aggression and markets) must be weighed against effects that may stimulate government size (costs due to congestion, heterogeneity, crime, corruption and domestic conflict). Second, the empirical evidence reflects this theoretical ambiguity, with some studies reporting a negative population-government size relationship … and others reporting positive or non-significant associations …".[45]

In their own contribution – which they say is based on improved econometric methodology – they find that "effects of population size that increase government size (mainly through the costs of heterogeneity, congestion, crime and conflict) dominate those that decrease government size (mainly through economies of scale)." Thus, the net effect is that costs increase disproportionately with population growth.

It would be going too far to estimate here the degree of dependence on GDP or population size for each item and the extent to which those relationships are (dis)proportionate. Instead, two calculation examples are given, which are not based on exact calculation, but are mainly illustrative in nature. The first example illustrates the possible outcomes if public goods are partly related to population size and partly to GDP. The second calculation example illustrates what happens if the costs for public goods increase more than proportionally with population size due to (large-scale) immigration.

The first calculation example (column 4 of Table 4) is based on the assumption that defence, development cooperation and the like are 100% GDP-related and the other items are 20% GDP-related

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[44] Dutch government policy – on which billions of euros are spent – to reduce 'nitrogen deposition' from sources like traffic and farming https://www.government.nl/topics/nature-and-biodiversity/the-nitrogen-strategy-and-the-transformation-of-the-rural-areas

[45] Krieger, T. and D. Meierrieks (2019)

on average. In these proportions, 35% of public goods costs are related to GDP and the rest to population size (for details see the Technical Appendix). In this variant, the positive contribution for North America goes down from €203,000 to €182,000 compared to the baseline scenario. The negative contribution for the region Horn of Africa and Sudan goes up from –€606,000 to –€528,000. This variant dampens group differences.

The second calculation example (column 5 of Table 4) is based on the assumption that public goods costs increase 20% across the board, due to an unspecified combination of all the potential effects of growing population density and size mentioned above (like infrastructure and congestion costs, greater effort on environmental, climate, energy, nitrogen and CO_2 targets, costs of additional redistribution, integration and minority policies, and – as suggested by Krieger and Meierrieks (2019) – costs due to "heterogeneity, crime, corruption and domestic conflict"). In the resulting variant, the positive contribution for North America goes down from €203,000 to €175,000 compared to the baseline scenario. The negative contribution for Horn of Africa and Sudan goes down further from –€606,000 to –€665,000. This variant reduces net contributions but does not dampen group differences.

To summarise: the scenarios show differences. The state pension age maintained at 65 results in relatively small differences. With a 1% lower discount rate, the difference between the highest and lowest net contribution becomes considerably larger (approximately 1.1 million euros). Attributing public goods partly in proportion to their contribution to GDP dampens the group differences, higher public goods increase the group differences. However, the results in Table 4 show that the ranking of the 42 regions is unchanging and the zero point (€0 net contribution) shifts only slightly. In this sense, the differences are mainly gradual. Therefore, when applying policies, such as steering by net contribution, a different scenario does not suddenly produce completely different results.

10 Differences in net benefits: initial human capital or returns to human capital?

The results so far have revealed large differences among individuals with Dutch background and individuals with immigrant background, and within the latter group by source country. Our data allow us to distinguish between the effects of differences in human capital taken to the labour market and differences in rewards to human capital. We will argue that the gaps emerge in the labour market and not in the school system.

As a measure of initial human capital we can use the so-called CITO score, measured in a test of scholastic ability. The CITO test is the '*CITO Eindtoets Basisonderwijs*' (CITO's End-of-Primary-School-Test[46] or End Test of CITO Test for short)[47]. The CITO Test is a 50-point scale – running from 501 to 550 – for the assessment of pupils in primary education, taken in the last year of primary school (age 11-12 years) and used for advice on the type and level of secondary education the student should pursue. Five levels of secondary education are distinguished: CITO range 501-523 corresponds to VMBO-B (lower secondary vocational basic), 524-528 corresponds to VMBO-K (lower secondary vocational advanced), 529-536 corresponds to VMBO-G/T (lower secondary theoretical), 537-544 corresponds to HAVO (upper secondary theoretical) and 545-550 corresponds to VWO (upper secondary university

[46] Compare Lek, K. (2020) pg. 1
[47] See Appendix for a detailed description of the test.

track). The CITO test is not an IQ test, and the scale of 501-550 is used to suppress misinterpretation: the aim is to measure achieved learning progress.

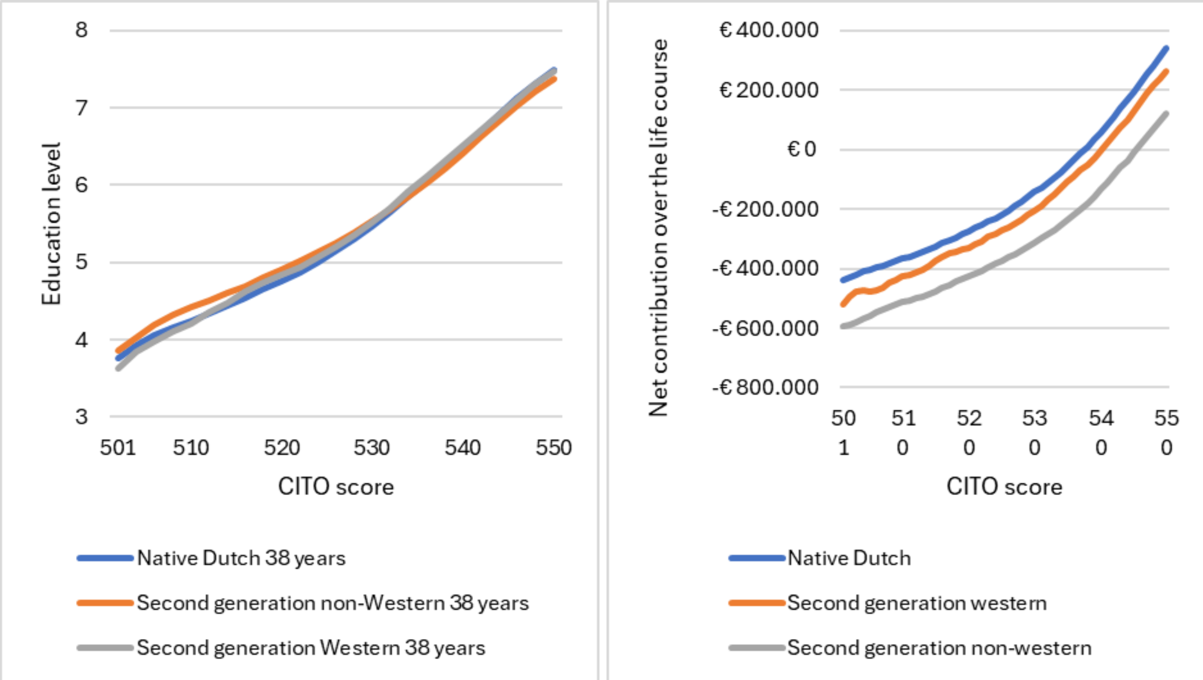

Figure 5. Average level (CBS 8-part division) of education (left), and net contribution over the life course (right) by CITO score for native Dutch people and people with a second-generation Western and non-Western immigration background (smoothed).

To assess differences in rewards to human capital, we compute the net contribution per CITO score, per age year and per immigration background and allows us to compute the net contribution over the life course per CITO score. For given levels of CITO scores, the differences in net contribution by migration background are large, as Figure 5 (right) shows. However, for 38-yearolds, differences in highest attained level of education are relatively small (Figure 5, left). Only for low CITO scores, second-generation non-Westers 38-yearolds have a somewhat higher level of education, but those CITO scores are rare: only 10% of the population scores 522 or lower and only 20% scores 527 or lower. If we weight[48] average level of education of 38-yearolds by the CITO distribution of natives, the average level of education for 38-yearolds hardly varies: 6.17 for natives, 6.20 for Western and 6.16 for non-Western second generation.

[48] For those not studying, weights 1 to 8 are used, for those studying, weights of corresponding educational level is diminished by 1.

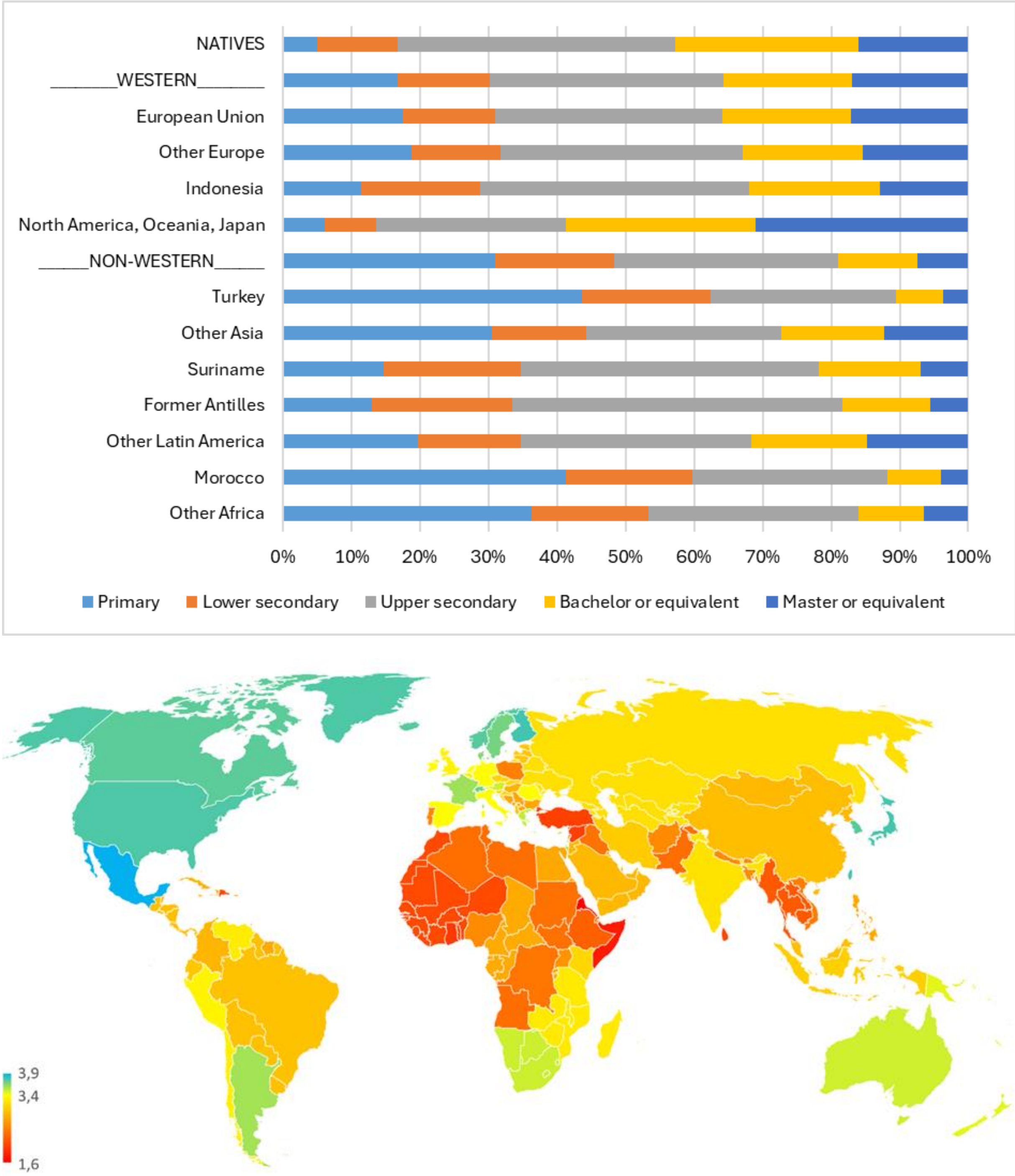

Figure 6. Education level according to the CBS 5-part division of first-generation immigrants, aged 25 to 65: a. Bar chart above: by R12 immigration background. b. World map below: by R87 immigration background, weighted average: primary education = 1 and master's degree = 5. Source: Our own calculation based on CBS-microdata.

We will now, to the extent possible with our data, try to disentangle effects of initial human capital, schooling level and returns to human capital on differences in net contributions by ethnicity. As first-generation immigrants will not take the CITO test if they arrive after the testing age of around 12, we will start characterisation of immigrants with their schooling levels. As Figure 6a (above) shows for R12, compared to natives, only immigrants from the region North America, Oceania and Japan have a much higher share of the highest education level relative to natives. Other Western immigrants have comparable share of the highest education level relative to natives, but much higher share of the lowest level. The same holds for immigrants from Latin-America and even stronger for immigrants from Asia: comparable share of the highest level, much higher share of the lowest level. Other non-Western immigrants have substantially lower share of the highest level and much higher share of the lowest level of education. If we consider the share of highest level (master or equivalent) in R42, quite a few regions of origin have comparable or higher shares than natives: almost all Western countries (notable exceptions are Poland, Portugal, Former Yugoslavia and Indonesia), East Asia, Latin-America (except for the Caribbean), and Eastern and Southern Africa. Conversely, EFTA is the only R42 region with a lower proportion with at most primary education than natives. Figure 6b (below) shows that from few R87 regions in the world, immigrants have comparable or higher average level of education than native Dutch (yellow, green, blue). This map also shows that variation can be considerable within such crude categories as 'Other Latin America'.

Table 5. CITO scores by immigration motive and first and second-generation immigration background, 2006-2018.

	Immigration background								
	Non-Western			Western			Total		
	M	*(SD)*	*N*	*M*	*(SD)*	*N*	*M*	*(SD)*	*N*
Native Dutch							535,9	(9,6)	1.393.678
Second generation									
Labour	533,8	(10,6)	5.022	537,2	(9,4)	8.960	536,0	(10)	13.982
Study	534,6	(10,2)	4.396	537,5	(9,5)	2.074	535,5	(10,1)	6.470
Asylum	533,1	(9,9)	6.910	533,0	(10,3)	1.570	533,1	(9,9)	8.480
Family	530,9	(10,5)	62.825	535,7	(9,9)	11.488	531,7	(10,6)	74.313
Other	533,1	(10,2)	6.676	534,9	(9,9)	4.023	533,8	(10,1)	10.699
Unknown	529,8	(10,7)	27.881	534,7	(10,3)	5.980	530,6	(10,8)	33.861
First generation									
Labour	–	–	–	–	–	–	–	–	–
Study	–	–	–	–	–	–	529,9	(11,7)	25
Asylum	530,7	(10,5)	3.468	530,9	(10,8)	624	530,7	(10,6)	4.092
Family	529,5	(10,9)	10.326	533,0	(10,8)	9.076	531,1	(11)	19.402
Other	531,4	(10,4)	2.097	531,5	(10,3)	1.928	531,5	(10,4)	4.025
Unknown	–	–	–	–	–	–	533,3	(8,8)	15

CITO scores of immigrants can be characterised from the data as available for all pupils who took the test around the age of 12 between 2006 and 2018 (Table 5). For second generation immigrant children this is the same condition as for Dutch children (no immigrant background): they were born in the Netherlands. But for first generation immigrants, the age condition implies selectivity: we do not observe immigrants who were older than 12 when they arrived. The data will also be biased as schools are known to seek good CITO averages by preventing low scoring pupils from taking the test. This will tend to reduce the negative average distance to native Dutch to low scoring source countries and increase the positive average gap to high scoring source countries. Among first generation immigrant children, the gap with native Dutch children is about half a standard deviation (it’s only smaller for the family motive); this holds both for Western and non-Western immigrant children. Among second generation immigrant children, the gaps are smaller; second generation Western immigrants originating in (parental) labour and study motives score even higher than native Dutch children.

Details on the regional differences, by source countries, are given in two maps. As Figure 7 shows the differences in CITO scores for the first generation are substantial. The benchmark value (yellow shades) is the average score for native Dutch people (536). The difference between the highest and the lowest score is significantly different from zero, at approximately 13.5 points (1.4 standard deviations).

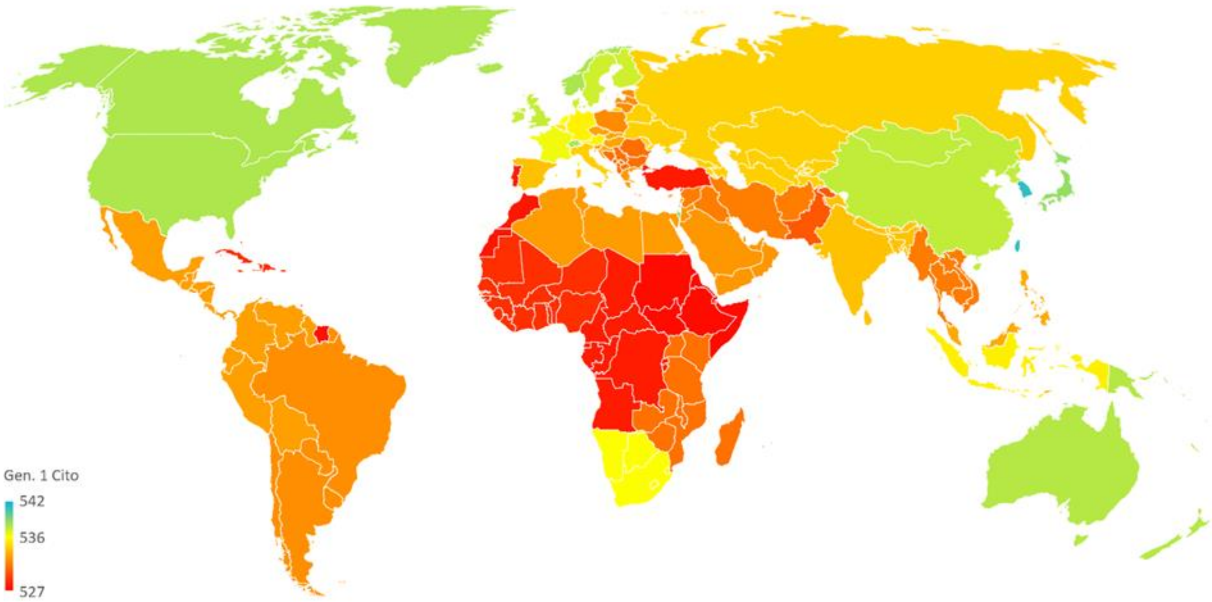

Figure 7. CITO scores of people with a first-generation immigration background, by R42 region of origin, 2006-2018. Source: own calculation based on CBS-microdata.

We find high CITO scores for the Anglo-Saxon and Scandinavian source countries, Israël, Switzerland. and a group of East Asian countries. The highest CITO scores (541) are achieved by first-generation children from South Korea, Taiwan, Hong Kong and Singapore. The lowest CITO scores (from 527 to 530) are obtained by students from the former Antilles, the Caribbean, Suriname, Portugal, Turkey, Pakistan, Morocco, Central and West Africa and the Horn of Africa region and Sudan.

Figure 8 shows also substantial differences in CITO scores between regions of origin for the second generation, but as found in Table 5, on average the differences are smaller than for the first generation.

We conclude that first generation Western immigrants are fairly well educated. The share of immigrants with an academic master's degree is about equal to that of native Dutch, but their share with a bachelor's degree is lower and the share of primary education is substantially higher. The distribution by education level for the Western aggregate is virtually identical to that for EU immigrants. Education levels for non-Western immigrants are much lower, with substantially lower shares of master's and bachelor's degrees, and dramatically higher share of primary education, in particular for the continent of Africa and the countries Morocco and Turkey. CITO scores for first generation immigrant children are about half a standard deviation lower than scores for native Dutch children, while second generation Western immigrants originating in (parental) labour and study motives score even higher than native Dutch children.

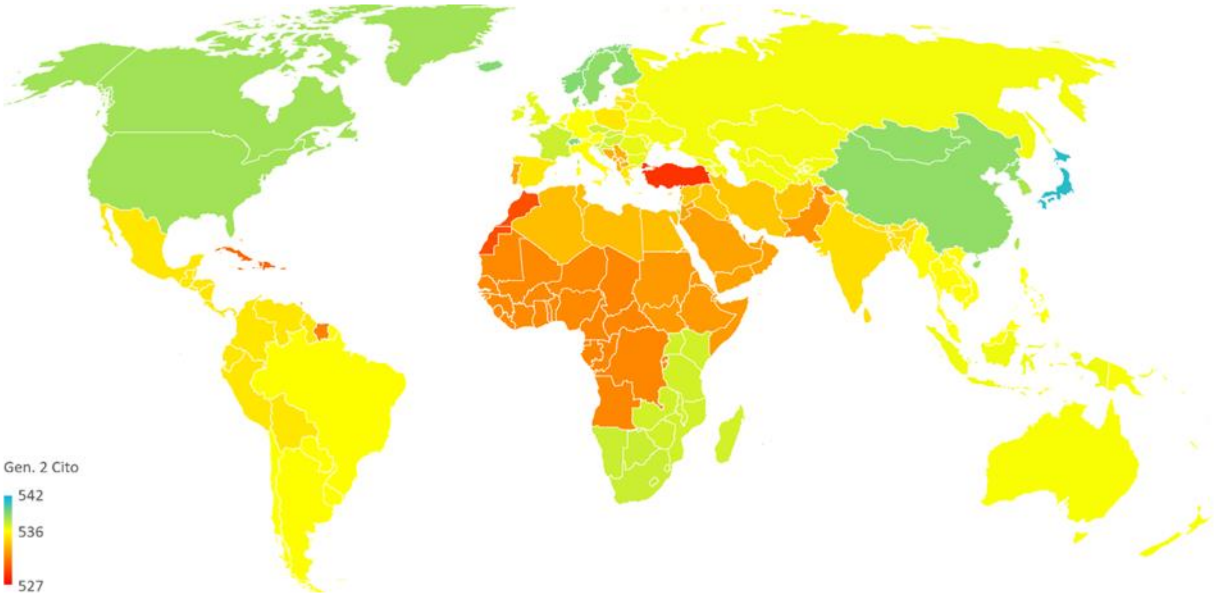

Figure 8. CITO scores for second-generation immigrants, by R42 region, 2006-2018. Note: scale is same as scale 1st gen. and does not reflect lowest/highest values. Source: own calculation based on CBS-microdata.

CITO scores are key indicators of ultimately attained level of schooling, precisely as intended. But as we saw before, for given levels of CITO scores, attained levels of schooling are not really different among Western and non-Western second-generation children and native Dutch children. One might conjecture that differences in the CITO scores are a product of the education system and that the immigration background has an effect on the CITO score. Recent research by CPB[49] into differences in cognitive skills (language and arithmetic) and non-cognitive skills (behaviour and work ethic), however, shows that this is only the case to a very limited extent. After correction for gender, household income and education level of the parents and the urbanity of the place of residence, pupils with a Western immigration background perform "only very slightly different from pupils without an immigration background"[50]. For students with a non-Western immigration background, there is a disadvantage in both cognitive and non-cognitive skills at the start of primary school, but these children almost catch up during primary school.[51] At the end of primary school – when the CITO score is determined – the children perform slightly better in math[52] and work ethic and slightly worse in language and behaviour. In second-generation non-Western boys and girls from families that are comparable to native Dutch people in terms of income, education and living environment, there are virtually no differences with native Dutch children. While differences in CITO scores by level of socio-economic background are indeed considerable[53], this relationship is not different by ethnic background.[54]

With CITO scores for immigrants comparable to CITO scores for native Dutch with similar socio-economic background and attained levels of schooling for given CITO scores neither very different, differences in net contribution will not root in the education system. They must emerge in the labour

[49] Zumbuehl, M. & Dillingh, R. (2019)
[50] Zumbuehl, M. & Dillingh, R. (2019), pg. 10-11
[51] Zumbuehl, M. & Dillingh, R. (2019), pg. 10-12
[52] The difference for maths is in the 95% confidence interval.
[53] With correction for the other variables.
[54] Income only affects cognitive skills (language and maths, approximately 0.2 SD). Education level of the parents has an effect on both cognitive skills (language and maths, approx. 0.4 SD) and non-cognitive skills (behaviour and work ethic, approx. 0.2 SD), Zumbuehl, M. & Dillingh, R. (2019), pg. 8-10

market. There may be several reasons why given levels of education bring different labour market returns and different net contributions for students with different ethnic backgrounds. First, there may be effects of heterogeneity and group composition within education levels. There may be differences in field of education (e.g. arts or accountancy). Schooling choices after elementary education are determined by ranges of CITO scores, and ethnic groups may locate differently within a range. Some Western immigrants are in the high end of the range that leads to university (e.g. Japanese immigrants), some non-Western immigrants score at the low end (e.g. immigrants from Turkey). We coined this the ‘CITO distribution effect’. For the Japanese and Turkish second generation in the 5-CITO-point wide VWO-range, this effect is for example 0,7 CITO points. Second, there may be cultural differences that affect choices and returns. And third, there are clear indications of discrimination, in particular against immigrants from non-Western regions.

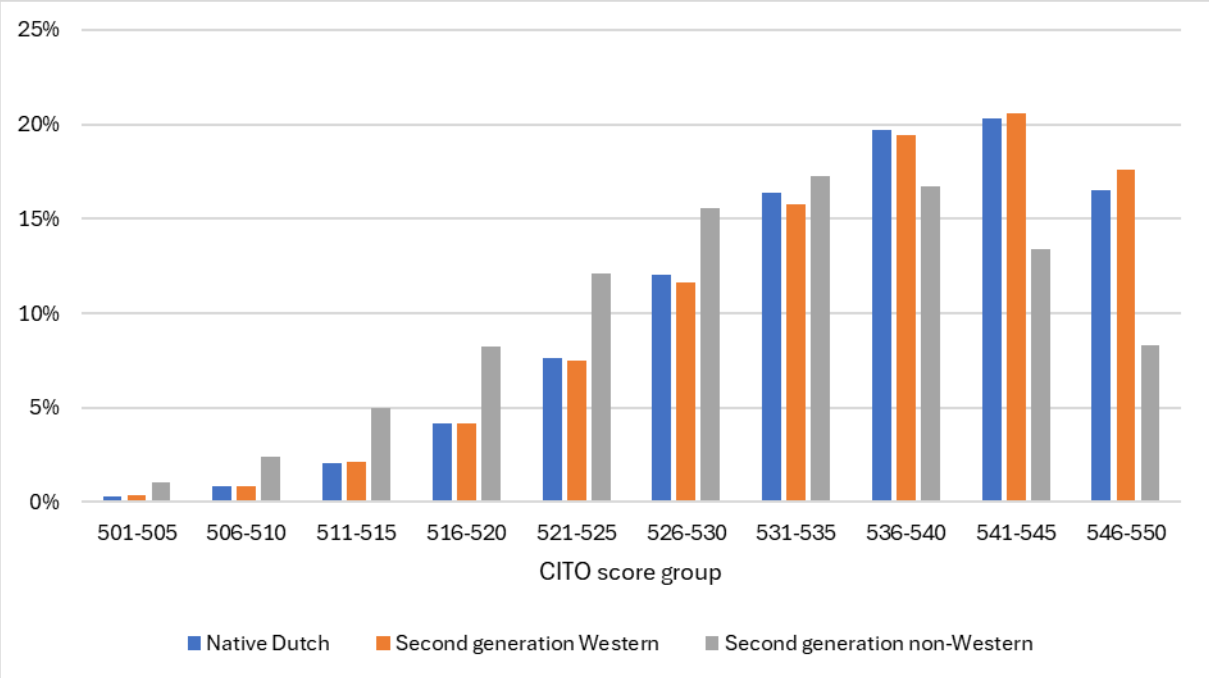

Figure 9. Distribution of CITO scores, split by immigration background, aggregated per 5-point range.

We now give a decomposition of differences in lifetime net contribution between natives and Western and non-Western second generation.[55] In general, differences in net contribution per CITO score may rise from a different distribution over CITO scores (Figure 9), a different distribution over educational

[55] In the Report, we show that differences in lifetime net contribution that arise in the Dutch education system are negligible relative to the differences that arise in the labour market or come from group differences in first-generation educational attainment and offspring CITO scores. However, in those calculations, the effects for second generation are not given per individual, but as an effect of the immigration of one first generation immigrant, and remigration chances, number of children per first-generation woman and the fact that an estimated one-third of those children belong themselves to the first generation, are all weighted in, which drastically reduces the outcomes for the second-generation. Since the emphasis here is on CITO as a measure of initial human capital, we focus our decomposition to second-generation individuals, who are born, raised and educated in the Netherlands, and extend it a bit further, including the effect of different pathways through the Dutch educational system.

levels[56] per CITO score and age year, and differences in net contribution per educational level and age year. To disentangle those differences, we take a two-step approach.

In the first step, we decompose in differences rising from the distribution over CITO scores $501 \leq c \leq 550$ denoted by D_c and differences rising from in net contribution over the life course per CITO score denoted by N_c. We can write the lifetime net contribution LNC for a second-generation group as:

$$LNC = \sum_{c=501}^{550} D_c \cdot N_c = \sum_{c=501}^{550} (D_c - \overline{D}_c + \overline{D}_c) \cdot (N_c - \overline{N}_c + \overline{N}_c)$$

in which $\overline{D}_c$ is the distribution over CITO scores of natives and $\overline{N}_c$ is the net contribution over the life course per CITO score of natives. With $\Delta D_c = D_c - \overline{D}_c$ and $\Delta N_c = N_c - \overline{N}_c$ this can be rewritten to:

$$LNC = \sum_{c=501}^{550} (\Delta D_c \cdot \overline{N}_c) + \sum_{c=501}^{550} (D_c \cdot \Delta N_c) + \sum_{c=501}^{550} (\overline{D}_c \cdot \overline{N}_c)$$

Hence the difference between LNC and the lifetime net contribution of natives $\overline{LNC}$ can be written as:

$$LNC - \overline{LNC} = \sum_{c=501}^{550} (\Delta D_c \cdot \overline{N}_c) + \sum_{c=501}^{550} (D_c \cdot \Delta N_c)$$

The first term gives the difference due to a different distribution over CITO scores, which is €5,000 for Western and –€83,000 for non-Western second generation. The second term gives the difference due to a different lifetime net contribution per CITO score and is –€60,000 for Western and –€175,000 for non-Western second generation.

The second step is to decompose lifetime net contribution per CITO score in differences arising from the educational system and differences arising from the labour market. We do this by computing the first and regarding the latter as a residual category.[57]

Let H_{alc} (for natives $\overline{H}_{alc}$)[58] denote the distribution over highest educational level attained, for age a, per CITO score, were l iterates through 8 levels of education for those who are studying and 8 levels

---

[56] That is, educational level currently followed for those studying (8 levels), and highest attained educational level for those not studying (also 8 levels).

[57] That is: the effect that arises from the labour market is found by subtracting the effects arising from the educational system from the effect that arises from a different lifetime net contribution per CITO score. Obviously, this is an approximation, because we do not cover all possible sources of differences arising from the educational system, like choice of field of education (e.g. arts or accountancy) and the beforementioned 'CITO distribution effect'.

[58] For ages 21-38 the values of those distributions are directly observed. For ages 39-99 the values are based on the observations for age 38, as follows. Based on available microdata on educational participation D_L for ages $0 \leq L \leq 99$, a profile $\overrightarrow{P_L}$ can be established with $P_L = 1$ for ages $L \leq 38$ and $P_L = D_L/D_{38} < 1$ for ages $L > 38$. The profile $\overrightarrow{P_L}$ decreases gradually until age 65 to almost 0, but with a long tail to age 85, where it becomes 0. This profile gives the proportion of students in the total population for 39 years of age and older and is used to gradually decrease the proportion of students and increase the proportion of non-students accordingly, where students participating at a certain educational level are added to non-students at the corresponding level. For non-students, full profiles for $\overline{N}_{al}$ are available, for students, the value for $\overline{N}_{38l}$ is taken, unless that value is higher than the value for non-students at the corresponding educational level. For further details, see §2.4 of the Technical Appendix.

for those who are not studying, so 16 possibilities in total (though for higher ages the share of active students can be very small, see Figure 10). Let $\bar{N}_{al}$ denote the net contribution of natives with age a and level l.[59] Then, the difference arising from the educational system is approximated[60] by:

$$\sum_{a=21}^{99} \sum_{c=501}^{550} \bar{D}_c \cdot \sum_l \bar{N}_{al} \cdot (H_{alc} - \bar{H}_{alc})$$

which delivers €10,000 for Western and –€4,000 for non-Western second generation.

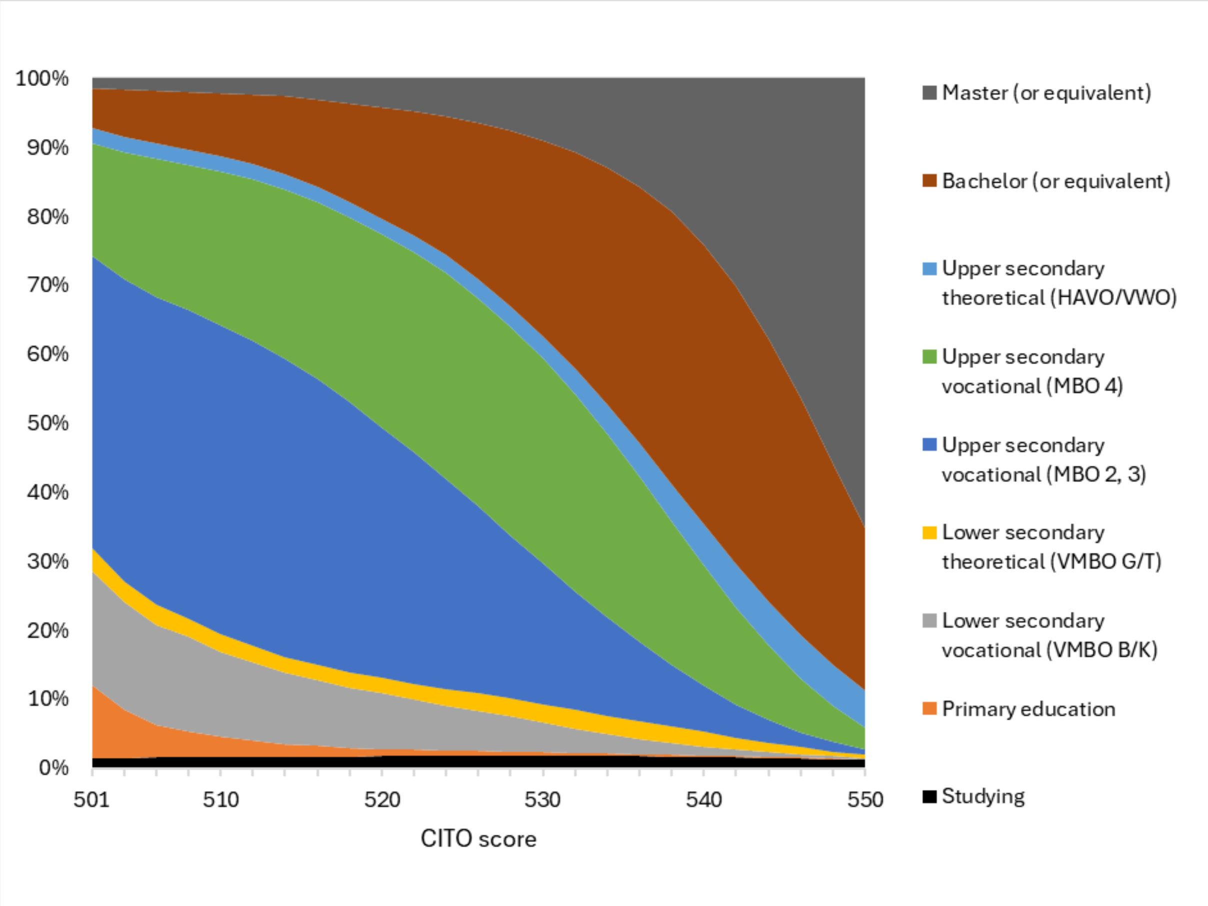

Figure 10 Distribution of highest education attained and current level of education for those studying, for 38-year-olds in the Dutch population, according to the CBS 8-part division of educational levels, by CITO score (smoothed, synthetic). Note: due to the very low number of observations for active students, the 8 categories have been condensed into one category 'Studying'. Source: our own calculation based on CBS-microdata.

We can split this sum further in group differences arising from different pathways through the Dutch educational system per CITO score for ages 21-38 and group differences arising from different highest

[59] That is: net present value for age year a, at birth, taking into account mortality probabilities.

[60] Approximated, since differences for ages 0-20 are very small. For primary school-aged children, the additional primary education funding for children of low-skilled parents is the only source of difference in net contribution between natives and the second generation for which data is available, and that difference does not arise as a result of passage of the child through the education system per se, and is therefore not considered. For secondary school-ages, direct observations of net contribution per CITO score and age show negligible differences for ages up to and including 17 years. For ages 18-20, we find almost negligible differences for Western second generation and small differences for non-Western second generation, of which –€500 can be (and is) attributed to different educational pathways, estimate found by comparing direct observations of net contribution per CITO score with pathway effects for ages 21-22.

educational attainment per CITO score of 38-yearolds (cf. Figure 5 left) for ages 39-99. For Western second generation we find that at a negligible extra cost (pathway effect –€1,000) a somewhat higher level of education at 38, delivers €11,000 higher net contribution over ages 39-99. For non-Western second generation it takes slightly longer (pathway effect –€9,000) to reach an educational level like natives, which is partly offset by a somewhat higher (€5,000) net contribution over ages 39-99. All in all, the effects arising in the educational system are relatively small.

Tabel 6 summarizes our findings. For Western second generation, the effect of a different CITO distribution (€5,000) and the effect that arises in the educational system (€10,000) are both small. Most of the difference with natives in lifetime net contribution arises in the labour market (–€71,000). For non-Western second generation, the effect that arises in the educational system is also small (–€4,000). Almost one-third of the difference with natives arises from a different distribution over CITO scores (–€83,000), while two-thirds come from the labour market (–€171,000).

Table 6 Decomposition of the differences in lifetime net contribution between natives and second-generation Western and non-Western immigrants. Possible difference due to rounding. Source: our own calculation based on CBS-microdata.

	Second generation	
Difference with natives arises from:	**Western**	**Non-Western**
All causes	–€55.000	–€259.000
Distribution over CITO scores	€5.000	–€83.000
Lifetime net contribution per CITO score	–€60.000	–€175.000
Educational system	€10.000	–€4.000
Educational pathways	–€1.000	–€9.000
Ultimate attained education	€11.000	€5.000
Labour market	–€71.000	–€171.000

11 Cultural distance

We calculate the cultural distance of immigrant source countries to the Netherlands, based on data from the World Value Survey (WVS), a large-scale and long-term survey of values and norms in a large number of countries.[61] Values and norms have been measured in a set of indicators that can be compressed into two axes called *Traditional versus Secular-Rational* and *Survival versus Self Expression*, within the WVS project also referred to as the variables *Secular Values* and *Emancipatory Values.* The map in Appendix 2 pictures classification of societies based on the two axes, with labels for nine clusters of related societies. For this computation we use a division of the world in 87 countries and regions. We excluded the Netherlands, lumped Former Yugoslavia and Albania together due to lack of data on education, excluded South Africa and Indonesia because the immigrant-groups from those countries in the Netherlands are highly non-representative for their countries of origin and excluded Israël and the region comprising Malaysia because we could not decide to which cluster they belong. Pertaining to the WVS clusters, the Orthodox and Baltic clusters have been taken together, as the number of observations within each cluster is very small. Furthermore, we took countries in the African

[61] For details see https://www.worldvaluessurvey.org. The values are subject to change, but more or less stable clusters can be observed over a longer period of time, see for an animation: WVS, Live cultural map over time 1981 to 2015, retrieved 22-12-2024 from: https://youtu.be/ABWYOcru7js

Islamic cluster together with Suriname, the Dutch Antilles, the Dominican Republic and the region Other Caribbean, thus forming the AIC+ cluster.

Table 7. Average net contribution by source country on dummies for cultural distance, average schooling level and average CITO score.

	Model 1 (only dummy variables)		Model 2 (educational level added)		Model 3 (CITO distribution effect added)		N (number of observations)
R^2	0,72		0,83		0,86		
R^2 adjusted	0,69		0,81		0,84		
F	26,45	***	47,41	***	47,41	***	
Intercept	–€5.517		–€976.973	***	–€737.734	***	81
Culture cluster							
AIC+[1]	–€296.636	***	–€229.859	***	–€181.233	***	30
Orthodox+[2]	–€134.702	**	–€85.215	*	–€84.401	*	5
Latin-America[3]	–€94.834	*	–€76.892	*	–€61.726	*	12
South Asia	–€118.107	*	–€91.625	*	–€56.334		5
Catholic Europe	–€85.982	*	–€30.395		–€18.012		10
English Speaking	–€42.260		–€7.449		–€10.435		6
Confucian	€30.228		–€10.535		€6.655		7
Educational level		***	€268.124	***	€195.530	***	81
CITO distribution effect		***			€263.800	***	81

Reference cluster is Protestant Europe

[1]Incl. Suriname, Caribbean [2]Incl. Baltics [3]Excl. Suriname, Caribbean

* $p < .05$; **; $p < .01$; ***: $p < .001$

The first column of Table 7 shows regression results with region dummies only: differences in average net contributions from net contributions of immigrants from Protestant Europe. The differences among source region effects are substantial, from almost –€300,000 to €30,000. Average education and CITO-distribution-effect explain a large part of these gaps, but even with these controls added, they remain large. The cultural distance dummies neatly follow cultural proximity, with small effects for Confucian, Catholic Europe and English-speaking culture clusters, intermediate effects for South Asia, Latin-America and Orthodox plus Baltic culture clusters and large effects for the AIC+ culture cluster (see map in the Appendix). The negative effect of African Islamic countries and the positive effect of Confucian countries stand out. The model is somewhat sensitive for the choice to add Suriname and the Caribbean regions to the African Islamic culture cluster; ascribing them to Latin-America decrease R^2 adjusted from .84 to .82 and renders Orthodox+Baltic not significant.

Another approach is to lump culture clusters together in three groups: one with low cultural distance to the Netherlands, comprising the Protestant Europe, Catholic Europe, English-speaking and Confucian clusters (reference category), one with intermediate cultural distance comprising of Orthodox Europe, Baltic, Latin America and South Asia clusters (dummy), and lastly the African-Islamic cluster (dummy). A multiple regression for all R87 second-generation groups shows that educational level and both dummies are significant predictors of net contribution ($p < .0001$, R^2 (adjusted) = .77). as illustrated in Figure 11, the African-Islamic cluster has a €201,000 lower average net contribution than the reference category, while for the group comprising the Orthodox Europe, Baltic, Latin America and South Asia clusters the gap with the reference category is €79,000.

Yet another approach is to measure cultural distance between country of origin and the Netherlands in two ways: (i) As the 'Euclidean distance' between the Netherlands and the other countries, i.e., the square root of the sum of the square of the vertical distance and the square of the horizontal distance in the culture map in Appendix 2 (i.e., by applying the theorem of Pythagoras) and (ii) the arithmetic mean of the vertical distance and the horizontal distance. To have more observations, we average WVS wave 4 to 7, which results in estimates for 67 of the R87 regions. Regression controlling for educational level is significant for both measures of cultural distance and the control variable (for both regressions $p < 10^{-8}$, R^2 (adjusted) = .68).[62]

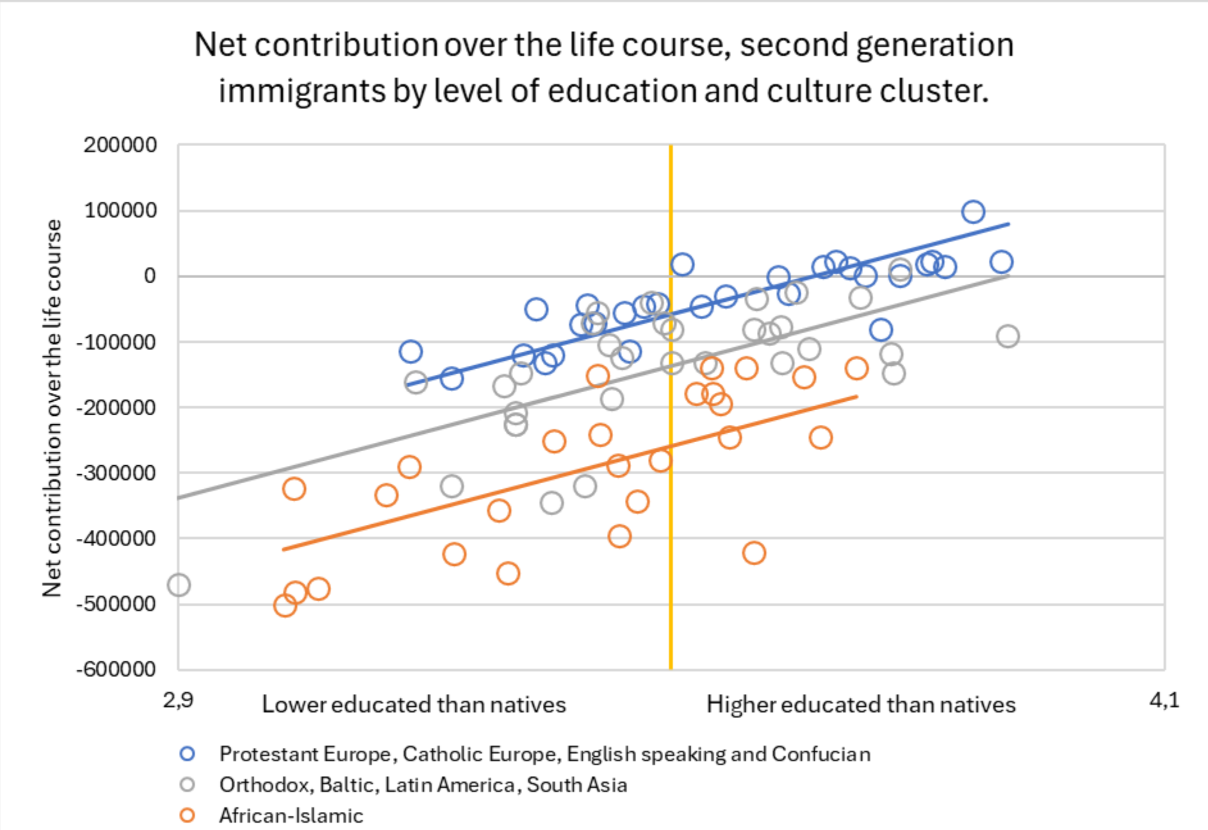

Figure 11. Regression of net contribution (vertical axis) on educational level (horizontal axis) and three groups of culture clusters. The yellow line represents the average level of education of Dutch Natives.

12 Conclusions

Surveys generally conclude that the fiscal impact of immigrants is quite small, confined to the interval of plus or minus 1% of GDP (OECD 2013, Hennessey and Hagen-Zanker 2020, Edo, Ragot, Rapoport, Sardoschau and Steinmayer 2018, Vargas-Silva 2015). Yet they also conclude to wide variation in estimated effects, depending on composition of immigrant populations, nature of the labour market

[62] Excluding South Africa and Indonesia raises R^2 (adjusted) to .71 for Euclidean and .72 for arithmetic mean.

and welfare state provisions in the host country, methodology and even political stances of the researchers or their institutions.[63] Vargas-Silva (2014) opens his paper with a strong statement: "All existing (and likely all future) analysis of the fiscal impact of immigration has a common characteristic*: implicit and explicit assumptions which are highly questionable.* This fact does not imply that all previous analysis has been mediocre and bias, but just reflects the substantial complexity of the topic." We have, obviously, aimed for the highest standards of honesty and in particular, tried to be as transparent as possible on assumptions and choices we made. In this article, we cannot possibly discuss all details, but full acknowledgement is given in the Technical Appendix.

We estimate the discounted lifetime net fiscal impact of the immigrant population present in the Netherlands in 2016. The results differ dramatically by immigration motive. Labour migrants who enter before age 60 make a positive net contribution to the government budget, more than €100,000 per immigrant when they arrive between ages 20 and 50. Immigrants with other motives (study, family, asylum, other) all bring negative net contributions irrespective of arrival age. Up to arrival age 70, it is around €400,000 for asylum seekers and around €200,000 for family migrants. The negative contribution is especially large for asylum seekers from Africa and the Middle East.

The educational level of immigrants is very decisive for their net contribution to the Dutch treasury, and the same applies to their children's CITO scores (scores on a 50-point scale for assessing pupils in primary education). If the parents make a positive net contribution, the second generation is usually comparable to the native Dutch population. If the parents make a strongly negative net contribution, the second generation usually lags behind considerably as well. Therefore, the adage 'it will all work out with the second generation' does not hold true. High fiscal costs of immigrants are not that much caused by high absorption of government expenditures but rather by low contributions to taxes and social security premiums. We also find evidence for a strong relationship of average net contributions by country with cultural distance, even after controlling for average education and the cito-distribution-effect. The cultural distance to African- Islamic countries is large, and their emigrants bring large net fiscal cost, the distance to Confucian countries is modest and their emigrants on average bring the largest net benefits.

Our results also indicate that differences among immigrants and native Dutch cannot be blamed on the school system, as at the end of elementary education, immigrant children have aptitude scores very similar to native Dutch children with the same socio-economic background and schooling levels attained for given aptitude scores are also very similar among immigrant children and native Dutch children. Hence, for second generation immigrants, the differences emerge from differences in the benefits from human capital. Immigrants differ strongly in scholastic aptitude scores by region. Parents from regions with low fiscal cost have children that gravitate in fiscal burden to the level of native Dutch, parents with high cost have offspring that also will have high cost: negative selection is perpetuated. It is clear that this and the other results we have presented have high policy relevance. Indeed, to stimulate evidence-based policy making it would be most useful to repeat and update the calculations at regular time intervals. And as it would be most interesting to learn the effect of different

[63] "Finally, a large share of the work in the area has been conducted by think-tanks and other policy focused groups. Most of these organizations have a set agenda in favour or against increased immigration. Unsurprisingly, those organizations with a favourable view of immigration tend to find that immigrants make a positive contribution to public finances, while those campaigning for reduced immigration tend to find the contrary." Vargas- Silva (2014, preliminary version)

political and institutional contexts, application of our methodology to other countries this would also be highly relevant. It would certainly give the migration debate in the EU a stronger factual basis.

Appendix 1. On CITO scores

As a measure of initial human capital we can use the so-called CITO score, measured in a test of scholastic ability. The CITO test is the '*CITO Eindtoets Basisonderwijs*' (CITO's End-of-Primary-School-Test[64] or CITO test or End Test for short). The CITO End Test is a 50-point scale – running from 501 to 550 – for the assessment of pupils in primary education. The test has been developed by the Dutch CITO organisation specialised in testing for education. It is taken in the last year of primary school (age 11-12 years). A peculiarity of the Dutch school system is that the primary school advises students/parents as to what secondary education the student should pursue in the highly stratified Dutch school system. This 'school advice' is based on the teachers' judgment and the CITO score.[65] For this reason, CITO scores play an important role in the ultimate level of education attained. After primary school, children can continue at five main levels of secondary education, each associated with a specific CITO range: range 501-523 corresponds to VMBO-B[66] (lower secondary vocational basic), 524-528 corresponds to VMBO-K (lower secondary vocational advanced), 529-536 corresponds to VMBO-G/T[67] (lower secondary theoretical), 537-544 corresponds to HAVO[68] (upper secondary theoretical) and 545-550 corresponds to VWO[69] (upper secondary university track). The teachers' school advice may be expressed as a combination of school types (and hence overlapping CITO score-intervals) – for example HAVO/VWO, see table below – leaving open the possibility to choose between the school types HAVO and VWO. Transferring to another school type may be possible, based on the school results achieved during the first year(s) in secondary education. Although this gives some leeway, the CITO Test is fairly decisive in determining the highest level of education a pupil will eventually achieve later in life. It is not likely that bias in the teachers school advice is responsible for lower educational outcomes. As research by the CPB shows, "with equal skills, … students with a migration background receive on average higher advice", in which 'skills' does not refer to CITO, but

[64] Compare: Lek, K. (2020) pg. 1

[65] Note: This report uses CITO scores from CBS-microdata for reporting years 2006-2018. Starting from reporting year 2015, the system of school counselling changed: "In 2014/2015, the way of school counselling changed. In that school year, the importance of the CITO final test was curbed. Schools could now choose from several final tests as well as the teacher's advice. The advice from the final test became a kind of 'second opinion', only meant to adjust the school's advice upwards if necessary". The effect of this change on the scores and the school advice is probably limited, partly because it only concerns about 30% of the reporting years and partly because the differences are not very large anyway (among other things because the teacher's advice is also based on school results in, for instance, the pupil monitoring system and those results are, of course, also strongly correlated with the score on the End Test). Lek, K. (2021), compare Lek, K. (2020)

[66] VMBO is the abbreviation for 'pre-vocational secondary education' (*Voorbereidend middelbaar beroepsonderwijs*), Retrieved 12-1-2022 from: https://www.government.nl/topics/secondary-education/different-types-of-secondary-education/pre-vocational-secondary-education-vmbo

[67] The G/T-level is further subdivided in a purely theoretical learning path (T stands for Theoretical) and a 'mixed' theoretical/practical learning path (G stands for *Gemengd* = mixed).

[68] HAVO is the abbreviation for 'senior general secondary education' (*Hoger algemeen voortgezet onderwijs*). Retrieved 12-1-2022 from: https://www.government.nl/topics/secondary-education/different-types-of-secondary-education/senior-general-secondary-education-havo-and-pre-university-education-vwo

[69] VWO is the abbreviation for 'pre university education' (*Voorbereidend wetenschappelijk onderwijs*). Retrieved 12-1-2022 from: https://www.government.nl/topics/secondary-education/different-types-of-secondary-education/senior-general-secondary-education-havo-and-pre-university-education-vwo

cognitive skills measured with the so-called ‘Non-School Cognitive Capacities Test’.[70] The CITO test is not an IQ test (intelligence test). CITO even chose the scale of 501-550 in order to avoid the End Test being interpreted as an IQ test.[71] According to CITO, the main difference is that in the End Test the focus is on achieved learning progress, while in the intelligence tests also developed by CITO, the focus is on reasoning skills that are relatively little influenced by what is offered at school. Nonetheless, the End Test correlates rather strong with the ‘CITO Intelligence Test Secondary Education’ (*CITO Intelligentietest Voortgezet Onderwijs*, $r = .76$, $N = 761$ for age-based IQ-score and $r = .74$, $N = 175$ for grade-based IQ-score), and with the ‘CITO Intelligence Test End-of-Primary-School-Test’ (*CITO Intelligentietest Eindtoets Basisonderwijs*, $r = .72$, $N = 520$). Both types of tests are used to support the advice on placement in secondary education. For example, the IQ-ranges in the leftmost column in the table below can be used for advisory purposes.[72] IQ-testing is mandatory for two school types not discussed yet: PRO and LWOO. PRO (practical education) aims at pupils with a primary school learning delay of three years or more and an IQ between 55 and 80. [73] LWOO (learning support education) is a special track within VMBO-B/K that aims at pupils with a primary school learning delay of one and a half to three years and either an IQ between 75 and 90, or an IQ between 91 and 120 combined with learning-impeding social-emotional problems.[74] The CITO data will be biased as schools prevent low scoring pupils from taking the test, partly because they are known to seek good CITO averages. This will tend to reduce the negative average distance to native Dutch to low scoring source countries and increase the positive average gap to high scoring source countries.

Relationships between school type, school advice, cito range and IQ.

	Observed age-IQ in pupils per school-advice level[1]				CITO range associated with		
School-advice & school type (bold)	*N*	%	IQ (*M*)	IQ (*SD*)	school-advice[2]	school type[2]	IQ-range associated with school type[3]
Practical education (PRO)							**[55-80][4]**
VMBO-B with LWOO							[75-90][5] 70-86
VMBO-B	**18**	**3,50%**	**88,9**	**10,7**	**501-520**	**501-523**	**77-90**
VMBO-B/K	37	7,2%	89,1	9,0	519-525		
VMBO-K	**48**	**9,3%**	**96,7**	**9,2**	**524-528**	**524-528**	**85-98**
VMBO-G/T	**122**	**23,7%**	**100,6**	**9,1**	**529-533**	**529-536**	**95-109**
VMBO-G/T / HAVO	60	11,7%	102,5	9,2	532-536		
VMBO-G/T / HAVO / VWO	12	2,3%	107,9	10,8	535-541		
HAVO	**63**	**12,2%**	**109,1**	**9,6**	**537-540**	**537-544**	**99-113**
HAVO / VWO	87	16,9%	114,4	9,7	540-545		
VWO	**68**	**13,2%**	**120,9**	**8,8**	**545-550**	**545-550**	**107-125**
Total	515	100,0%					

[1]Hop, M., Van Boxtel, H. W., Bechger, T. & B. Hemker (2013), pg. 74

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[70] See: Zumbuehl, et al. (2022).

[71] Cito (2014) *Dossier Eindtoets Basisonderwijs 2014.* Retrieved 16-12-2024 from: https://adoc.pub/dossier-eindtoets-basisonderwijs-2014.html

[72] Hop, M., Van Boxtel, H. W., Bechger, T. & B. Hemker (2013), compare: Van Boxtel, H. W., & Hemker, B. T. (2009)

[73] Central government (*Rijksoverheid*). Retrieved 2-1-2022 from: https://www.rijksoverheid.nl/onderwerpen/passend-onderwijs/vraag-en-antwoord/hoe-krijgt-mijn-kind-praktijkonderwijs

[74] Compare: *Criteria pro en lwoo.* Retrieved 16-12-2024 from: https://www.koersvo.nl/images/documents/Landelijke-criteria-pro-en-lwoo.pdf

²Van Boxtel, H. Engelen, R. & De Wijs, A. (2010), pg. 55

³IQ-ranges (not in square brackets) are derived from Hop, M., Van Boxtel, H. W., Bechger, T. & B. Hemker (2013), pg. 80

⁴For Practical Education (see corresponding term in Glossary) having an IQ within the given IQ-range (in square brackets) is part of the admission criteria provided by legislation.

⁵For Learning Support (see corresponding term in Glossary) having an IQ within the given IQ-range (in square brackets) is part of the admission criteria provided by legislation. Admission is also possible for pupils with an IQ in the 91-120 range if those pupils have 'learning-impeding social-emotional problems'. Learning support is often combined with VMBO-B, but can also be combined with other school types.

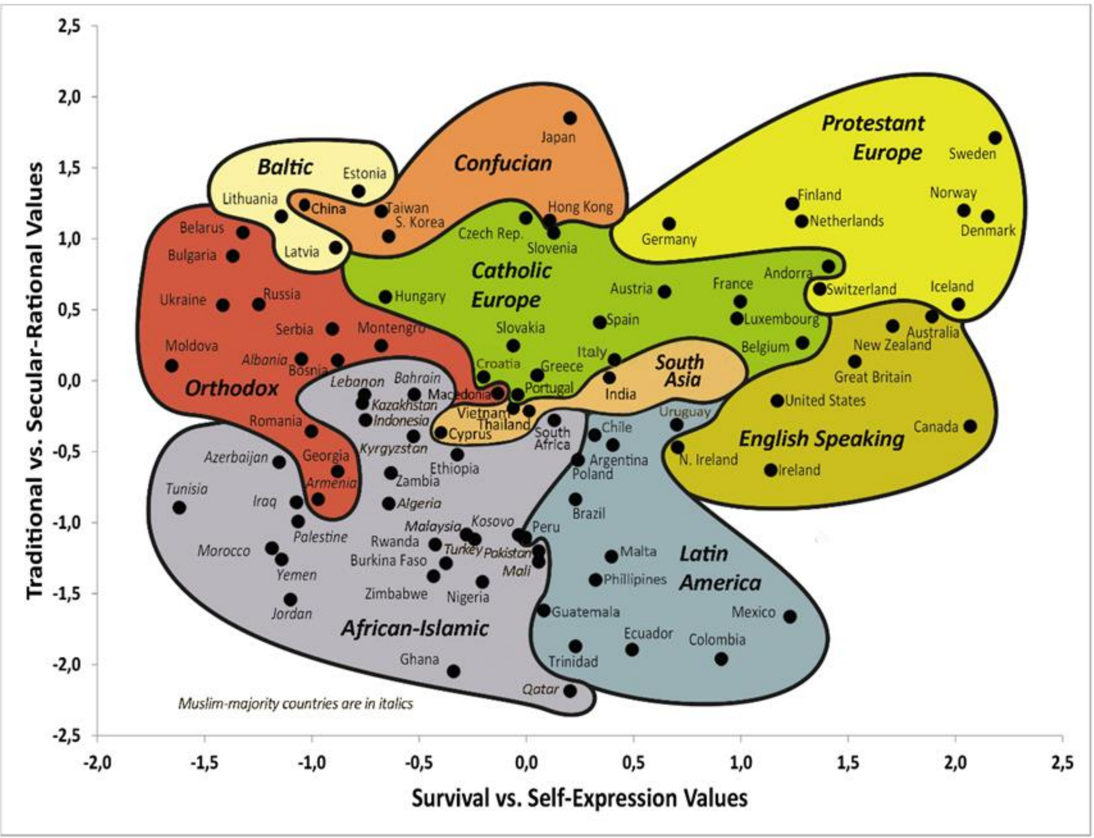
From CBS-microdata we know CITO scores for all pupils who took the test in the years 2006-2018. We aggregate the scores to mean levels by source region, differentiated by first and second generation and some other individual characteristics recorded at the time of testing. Averaging over 13 years is sensitive to cohort effects and possibly varying cohort weights over time. Traditional source regions may have a stable balanced composition over the years of testing, recent source regions will be dominated by more recent arrival years. The effect will depend on the extent to which immigrant populations have varied over time.

To compute net contribution for every possible value of the CITO score (501-550), we must accept some approximation, as full longitudinal observations for individual immigrants are not available. Instead, we used data for all pupils who took the test in the years 2006-2018, to compute or estimate net contribution per CITO score. For ages 0 to 4 years, we set net contribution for all possible CITO scores equal to the net contribution of the entire population for ages 0 to 4 years separately. For ages 4 to 12 years, net contributions per CITO score are derived indirectly from differences in health care costs, participation in relative expensive special primary education, and additional funding for primary education for children of low-educated parents, which are the only cost items that differ significantly between individuals for this age group. For individuals in the CBS-microdata 2016 population who took the test between 2006 en 2018, we can link net contributions directly to their own individual CITO score for ages 12 to 21 years[75]. For ages 21 to 39 we first determine for each possible CITO score either the current level of education for those who are studying (10 levels), or the highest level of education attained for those who are not studying (9 levels), split by migration background, for CITO-tested individuals who are 20, 21 or 22 years old ultimo 2017. Using data on educational participation (2007-2017) from three other cohorts of around half a million people in total, we then predict for each of those 19 levels separately, a frequency distribution of either the current level of education (8 levels), or the highest level of education attained (8 levels), by individuals who were at the same stage in their schooling career at ages 20, 21 or 22, split by migration background, and for ages up to 28, 29 or 30 years respectively. This step is repeated to make similar frequency distributions up to age 38. Then we compute net contribution per CITO score using observed age-specific net contributions per current and highest attained level of education and per migration background.[76] A similar procedure was followed for ages 39 and older, with some changes (a very small proportion of those still studying is attributed to the most likely highest attained level of education). This gives the net contribution per CITO score, per age year and per immigration background and allows us to compute the net contribution over the life course per CITO score.

[75] Actually also for ages 10-11 and 21-23, but those values are not used in this computation.

[76] Due to a lack of data, for more advanced ages we use observed net contributions per age year, per migration background only.

Appendix 2. Cultural distance



Appendix 3. Net lifetime contribution for the second generation

To overcome lack of data and cohort effects for second-generation R42-groups, we assumed that their net contribution age profile is a linear combination of the age profiles of Dutch natives and the non-Western first generation, which is fitted on observed net contributions over the first half of life. This procedure results in an integration parameter for each R42 region. For 5 source regions we differentiate between one or no native Dutch parent (Surinam, Turkey, Morocco, (former) Dutch Antilles, and Indonesia), which results in 46 groups (R42 minus Netherlands, with five countries with two observations).

To minimize cohort effects and to find objective ways to decide how to weight age groups with few observations, we made use of the strong correlation between net contribution and CITO scores. By law, a child about to leave grade school, around age 12, must take an achievement test that can be used to advise on the type and academic level in the highly stratified Dutch secondary education system (see Appendix 1). The CITO test is the test most taken. Across the 42 regions, average net revenues by age for second generation immigrants from a region correlate strongly with average CITO scores (averaged over second-generation immigrants from that region taken in the years 2006-2018). For ages between 4 and 55 years the correlations are strong and significant at $p < .01$. For ages between 7 and 47 the correlations are very strong (between .69 and .89) and significant at $p < .0001$ for all 46 groups used in the computation[77]. This observation is used to estimate the age profile for net

[77] For age 0 correlation was .5 and significant at $p < .01$, for ages 2, 4, 5 and 6 correlations are around .6 and significant at $p < .0001$. For ages 48 to 55, data was available for at least 70% of the groups and correlations were between .45 and .55 and significant at $p < .01$.

contribution that best fits the net contribution over the first half of life. In a similar fashion, the observed (strong) correlation between net contribution and average school performance of 15-year-olds was used.

Four methods were used to fit the beforementioned synthetic profile on observed net contribution data to estimate the integration parameters for the 46 second-generation groups. The first method uses a variant of least squares, solves the problem of few observations and cohort effects by including only observations up to the first age where the number of observations per age year is less than a certain threshold $t \in (5, 10, 20, 50, 100, 200)$ and maximizing the sum of squares for a wide range of maxima M. For every M this gives up to 6 estimates (for some combinations of M and t there is no solution) which are averaged after removal of the highest and lowest estimate. Then the optimal M is found by maximizing the correlation of the resulting integration parameters with CITO scores for the 46 second-generation groups. The second method uses a weighted variant of least squares, includes only observations up to the first age where the number of observations per age year is less than ten, weights into the sum of squares when the number of observations per age year falls below 100, and also weights into the sum of squares the correlation[78] between net contribution for that age year and CITO score. The third method follows the design of the second method, but without including the correlation between net contribution and CITO score.[79] The fourth method is based directly on the observed net contribution summed over ages from 0 to L, where L ranges from 20 to 48 years and the optimal L is determined based on the strength of the correlation of the resulting integration parameter with the educational level of 15-year-olds.[80] The four methods yield estimates for the integration parameter for the second generation that are highly correlated with each other (correlations between .95 and .99) and are averaged to obtain the final integration parameter. This integration parameter is used to construct integration parameters for other groups, like the regional aggregates R19, R12 and R2. For further details, see §4.2 of the Technical Appendix.

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[78] Squared i.e. R^2 of the regression of net contribution per age year on CITO.
[79] Note that unlike the first two methods, this method does not use *a priori* information on the correlation with CITO scores, but the resulting integration parameters still correlate very strong (.90) with CITO scores. This shows that the correlation between CITO and the integration measures found in the first two methods is not an artifact of calibration on the CITO.
[80] This correlation is strongest for L = 41.

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