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Tax Incentives and Return Migration *

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Abstract

We study how tax incentives affect the return migration of high-skilled expatriates to their home country, exploiting a generous income tax break for returnees in Italy. Using administrative data and a Triple-Difference design, we estimate a migration elasticity to the average net-of-tax rate just below one. Responses are sizable across the upper half of the earnings distribution, indicating that tax-induced migration is not limited to top earners. A cost-benefit analysis reveals that, while costly in the short term, the scheme pays for itself in present value if a sufficiently large fraction of returnees remains after the scheme elapses.

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1 Introduction

Free labor mobility areas, such as the European Union, create opportunities for high-skilled individuals to achieve their full potential by migrating to locations where their productivity is the highest (Docquier, Ozden and Peri, 2014; Docquier and Rapoport, 2012; Dorn and Zweimüller, 2021). At the same time, they can deprive origin countries of human capital and skills ("brain drain"), at least in the short run (Batista et al., 2025).

Several countries use preferential tax schemes to influence the location choices of high-skilled individuals.[1] Yet, while top earners are known to be geographically mobile in response to tax differentials (Akcigit, Baslandze and Stantcheva, 2016; Kleven, Landais and Saez, 2013; Kleven et al., 2014), there is limited evidence on the migration responses of broader segments of the population, such as young college graduates. Furthermore, it is unclear whether tax schemes are an effective policy to attract high-skilled individuals in countries experiencing a brain drain.

In this paper we study the migration response to a preferential tax scheme designed to bring young high-skilled expatriates back to their home country, Italy. The policy, introduced in 2010 and named *Controesodo* ("counter-exodus") due to the brain drain context, granted a generous income tax break to returnees, exempting three-quarters of their labor income for 3-5 years, which translates into a 43% higher net-of-tax rate on average. The tax break is sizable throughout the income distribution, offering a unique opportunity to study migration responses across a broad population.

To identify the effects of the tax scheme, we leverage the two main eligibility requirements – holding a college degree and being born on or after 1969 – in a Triple Difference-in-Differences design. Thus, we compare the difference in return migration flows of college graduates born before and after 1969 to the difference between high school graduates born before and after 1969, in the post-2010 period relative to the pre-2010 period. The joint presence of the two requirements cre-

[1] Initially designed to attract high-skilled *foreigners* (Belgium 1983, Netherlands 1985, Denmark 1991), these schemes have become widespread in Europe (Finland 1999, Sweden 2001, Spain 2004, France 2008), including to attract high-skilled *expatriates*, such as in the case of Portugal (2009), Italy (2011), and, more recently, Belgium (2022), Cyprus (2025), and Croatia (2025).

ates compelling quasi-experimental variation, as it allows to control for unobserved time-varying determinants of return migration by birth cohort and education, such as differential labor demand shocks. The absence of pre-trends in all specifications supports the parallel-trends assumption, and we show empirically that spillover effects between eligible and ineligible groups are negligible.

We use two complementary data sources in our empirical analysis. The first is the Italian administrative data on return migration flows, which provides information on the returnees' birth cohort, education, and origin country; we combine these data with the stocks of Italians resident abroad from foreign census data.[2] The second is social security records on the universe of Italian workers in Germany, which is a major destination for Italian expatriates.[3] The German data allow us to explore heterogeneity in migration responses depending on labor market outcomes abroad, assess the selection of tax-induced returnees, and test the robustness of our empirical strategy in several dimensions. Overall, the similarity between the two sets of results lends credibility to our analysis.

We find that the 2010 tax scheme increased return migration among eligible Italian expatriates, relative to ineligible expatriates. In our preferred specification using the Italian data, we estimate that about a quarter of eligible returnees post-2010 would not have returned absent the tax scheme. The effect translates into an elasticity of migration flows to the average net-of-tax rate of 0.9, and it is driven by Italians returning from other European countries such as Germany, Switzerland, and the United Kingdom. The results are robust to different specifications and sample compositions.

Using the German data, we find that eligible Italians were more likely to return to Italy after 2010 compared to ineligible Italians, as well as to a placebo group of Spanish citizens with the same age and education. We then leverage information on the labor market outcomes of Italians in Germany to explore heterogeneous responses. We find that tax-induced returnees are positively selected, as they are disproportionately from the upper half of the earnings distribution. The migration elasticity is increasing in the earnings level, indicating that above-median earners are more

[2]Since we study return migration, we refer to "origin countries" as the foreign countries where expatriates reside before returning to their home country.

[3]We proxy return migration based on the disappearance from the social security data, as in Bahar et al. (2024) and Dicarlo (2022). In Section 3, we validate this measure using international migration data.

responsive even after accounting for their larger tax incentives, and despite likely facing a greater gross-wage reduction when returning to Italy. Furthermore, the sectoral heterogeneity reveals sizable responses in key sectors associated with brain drain concerns, such as healthcare and high-patenting industries. Overall, we document migration responses for a broad group of workers, not limited to top earners or specific industries.

Finally, we evaluate the cost-effectiveness of the scheme and derive implications for optimal policy design.[4] We compare the foregone tax revenue from infra-marginal returnees – who would have returned anyway – to the additional revenue generated by marginal returnees, who would not have returned absent the tax break. We find that, while costly in the short-term, the 2010 tax scheme pays for itself in present value, provided a sufficiently large fraction of marginal returnees remains after the scheme elapses. We then assess the sensitivity to the key parameters, such as the out-migration rate post-scheme, the average age of returnees, and the duration of the tax break, which can be influenced by the policymaker with a careful design of the tax scheme. Overall, the net benefit is amplified by the positive selection of tax-induced returnees, as well as by their broader impact on the receiving country in the presence of positive human capital externalities.

Our paper contributes to several strands of the literature. First, to the growing literature in public finance on the migration responses to income taxation. Several studies find that the location choices of top earners are highly sensitive to tax differentials, both across (Advani, Burgherr and Summers, 2023; Akcigit, Baslandze and Stantcheva, 2016; Kleven, Landais and Saez, 2013; Kleven et al., 2014; Muñoz, 2023) and within countries (Agrawal and Foremny, 2019; Martínez, 2022; Moretti and Wilson, 2017; Rubolino and Giommoni, 2024; Schmidheiny, 2006; Schmidheiny and Slotwinski, 2018) [5], and especially in high-paying occupations such as inventors and football players. Yet, an open question is to what extent broader segments of the population move in response to tax differentials (Kleven et al., 2020). We show that tax incentives trigger large migration responses among young college graduates, high-skilled workers who are not typically

[4]We focus on the *direct* effect on income tax revenue. Tax-induced high-skilled immigration has also indirect effects due to human capital externalities, which are beyond the scope of this paper.

[5]In contrast, Young and Varner (2011) and Young et al. (2016) find limited migration responses of millionaires within the US.

top earners.

Second, we provide novel evidence of how taxes affect *return migration* decisions.[6] While smaller than the foreigner elasticities to preferential tax schemes for high-skilled immigrants (Giarola et al., 2023; Kleven et al., 2014; Timm, Giuliodori and Muller, 2025), our elasticities are significantly larger than previously estimated domestic elasticities (Kleven et al., 2020). A key feature in our setting, which can partially explain these differences, is the existence of a large diaspora of high-skilled Italians abroad. Our novel return migration response has important policy implications, as expatriates may differ from foreigners in their propensity to stay beyond the duration of the scheme, due to the strong ties, linguistic and cultural proximity to their home country.

Finally, we identify the causal effect of a large shock to net wage differentials on international migration in a context of unrestricted labor mobility. Cross-country migration flows are positively associated with income differentials (Docquier, Ozden and Peri, 2014; Dustmann, 2003; Grogger and Hanson, 2011; Ortega and Peri, 2013); however, the existing evidence is largely correlational due to the lack of exogenous variation. We also contribute to the literature on migrants' selection, and specifically to the selective return migration literature (Adda, Dustmann and Görlach, 2022; Akee and Jones, 2024; Borjas and Bratsberg, 1996; Dustmann and Görlach, 2016), by documenting a positive selection among tax-induced returnees.

The remainder of this paper unfolds as follows. Section 2 illustrates the key features of the Italian tax schemes. Section 3 describes our data sources. Sections 4 and 5 discuss our identification strategy and present our main results. Section 6 explains the revenue analysis, while Section 7 concludes.

2 Tax incentives for return migrants

This section describes the tax incentives for return migrants, with a focus on the 2010 preferential tax scheme. We begin by documenting the "brain drain" context, and then we outline the evolution

[6] An exception is Del Carpio et al. (2016), who study the effects of a program to attract Malaysian nationals living abroad that offers tax deductions upon return.

and key features of tax regimes for high-skilled immigrants.

Context Historically a sending country during the Age of Mass Migration (1880-1920) and in the post-WWII period, Italy became a receiving country in the 1970s (Del Boca and Venturini, 2005). Since the early 2000s, however, the country has experienced a new emigration wave, driven by young high-skilled individuals attracted by higher salaries and better opportunities in countries such as the United Kingdom, Germany, and Switzerland.[7] The emigration rates among young college graduates rose sharply after the Great Recession (2007–08) and the 2011 Sovereign Debt crisis, reaching nearly 0.5% per year (Appendix Figure D.1). In response, the policymaker introduced fiscal incentives to encourage high-skilled expatriates to return.

2.1 The tax schemes

Figure 1 summarizes the timeline and key features of Italy's tax schemes for high-skilled returnees and immigrants, commonly referred to as *"rientro dei cervelli"* (brain return).[8] Appendix B provides additional details on each tax regime.

The 2010 scheme. In December 2010, Italy introduced the first preferential tax regime, named *"Controesodo"* (counter-exodus; henceforth "2010 scheme"). The 2010 scheme granted a large personal income tax exemption to young, high-skilled expatriates returning to Italy: 70–80% of their labor earnings were exempt from income tax.[9] This translates into a 26-percentage-point reduction in the average tax rate – or a 43% higher net-of-tax (retention) rate – for the average beneficiary. The exemption was expected to last between 2-4 years at the time returnees made their return migration decision, although the effective duration ended up being longer (5 years on average).[10]

[7] In addition to losing high-skilled citizens, Italy struggles to attract high-skilled foreigners; the share of foreign scientists in Italy is the lowest among EU countries (Franzoni, Scellato and Stephan, 2012).

[8] Researchers and university professors are eligible for a dedicated tax scheme since 2003, which is more generous than the general tax scheme (until 2019). Creanza (2024) analyzes the researchers' scheme.

[9] The exempted share is 80% for women and 70% for men. Labor earnings include employment, self-employment, as well as business income from unincorporated businesses (*società di persone*).

[10] This was the result of the tax scheme having a set expiration date, which was postponed several times. Appendix Figure B.2 shows the exact duration as a function of the year of return.

The 2010 scheme had two key eligibility criteria: holding a college degree (at least undergraduate) and being born on or after January 1st, 1969. In addition, it required 2 years of residence abroad, and 2 years of residence in Italy prior to moving abroad. Although all EU citizens were formally eligible, the pre-residency requirement effectively excluded most non-Italian citizens and foreign-born Italians. For this reason, we restrict the analysis to Italians born in Italy. Overall, the scheme targeted young, high-skilled Italian expatriates – whether they obtained their degree abroad or graduated in Italy and subsequently spent at least two years working abroad.[11]

The changes in 2015. In September 2015, the tax scheme was replaced by a new version called *"Impatriati"* (back to homeland), which affected returnees who moved to Italy from 2016. The 2015 version differed from the original scheme in three respects. First, it expanded eligibility by removing the birth-cohort restriction and allowing non-college graduates in managerial or other highly qualified occupations to qualify.[12] Second, it reduced the exempted share to 50%, which—although smaller—still implies a 20-percentage-point reduction in the average tax rate. Third, it introduced a fixed five-year duration (the year of arrival plus four additional years), removing the uncertainty that characterized the original scheme.

In our empirical analysis, the pre-period is 2006-2010 and the post-period includes both the post-2010 and post-2015 scheme years.[13] For consistency, we maintain the eligibility definition constant throughout the entire period. We pool the two schemes for two reasons. First, the two regimes are similar in generosity in present value: the 2015 scheme offers a lower exemption (50% vs 75%) but a longer duration (five years vs. 2–4 years).[14] Second, both schemes target high-skilled individuals with a college degree. Although the 2010 scheme included a birth-cohort restriction, it

[11]The 2010 scheme was framed by the media as targeting "college graduates under-40" (Appendix Figure B.1), despite the over-40 born on/after 1969 were eligible as well; we return to this point in Section 4.

[12]The latter group was eligible after 5 years of experience abroad, as opposed to 2 years required for college graduates. Also, the 2015 reform eliminated the requirement of pre-residency in Italy, making the scheme effectively available to foreigners.

[13]Our pre-period begins in 2006 to avoid capturing the researchers' tax scheme introduced in 2003. The researchers' scheme is more generous (exempted share 90% and duration 3-6 years) than the 2010 and 2015 schemes, therefore it should not affect our pre-post comparison.

[14]Appendix Figure B.3 shows that the average net-of-tax rate increase is nearly identical between the two schemes in present value, under reasonable discount factors.

was no longer binding by the time the 2015 scheme took effect in 2016.[15] Results are nonetheless robust when excluding post-2015 years.[16]

The changes in 2019 and 2023. While beyond our period of analysis, it is worth mentioning two recent changes to the tax regime. In April 2019, the *"Decreto Crescita"* expanded the scheme by (i) increasing the exempted share, (ii) extending the maximum duration to 10 years under some conditions, and (iii) removing the college-degree requirement; as a result, anyone moving to Italy after 2 years of residence abroad was eligible, regardless of their education level. In light of the mounting cost, the scheme was tightened in December 2023 by a government decree, which restored the main features of the 2015 scheme (college-degree only, 5 years duration, and 50% exempted share) and introduced a €600,000 earnings cap.

2.2 Income tax rates with the scheme

Figure 2 simulates the reduction in average and marginal income tax rates under the 2010 scheme, as a function of gross income for a representative single taxpayer with only employment earnings.[17] Panels (a) and (b) show the average and marginal tax rates, respectively. Solid lines depict the standard tax schedule, while dashed lines show the reduced tax rates under a 75% exemption.[18] The tax rates include compulsory employee social security contributions ("payroll taxes"), which are unaffected by the scheme.[19]

Two features of the Italian tax scheme are noteworthy. First, the tax cut is substantial across the entire income distribution. This is different from foreigner tax schemes implemented in countries such as Denmark and Spain, which typically entail a flat rate to high-income earners. As a result,

[15] The peak age at return is around 35 years old (Figure 4), well below 47 years old in 2016, which would have been the cutoff age had the cohort requirement still been in place.

[16] If anything, the inclusion of college-graduates born before 1969 in the controls post-2015 should bias the results towards finding no effect of the tax scheme.

[17] The tax schedule takes into account all the standard deductions of the Italian tax schedule, based on "OECD Taxing Wages" (OECD, 2011). The Stata code is available in the replication package.

[18] Formally, let w denote annual gross labor earnings and $T(w)$ the income tax due. Absent the incentives, the average and marginal tax rates are given by $T(w)/w$ and $T'(w)$, respectively. If only a fraction $s \in [0,1]$ of w is subject to income taxation, the resulting tax rates are $T(sw)/w$ and $T'(sw)$ respectively.

[19] Appendix Figures B.4 and B.5 show the income tax rates without payroll taxes, and for the 2015 scheme.

the tax break is appealing to a broad population rather than only to top earners. Second, the effective tax cut increases with income, even though the exempted share is fixed at 75%, due to the progressivity of the income tax schedule. For example, consider an eligible individual earning €100,000. Under the scheme, this individual is taxed as if they earn €25,000, and thus their tax liability is €5,000 (as the tax rate on €25,000 is 20%), resulting in an effective average tax rate of 5% instead of the 34%. By adding the 9% payroll tax, we obtain the 14% tax rate shown on the dotted line, almost 30pp lower than the 43% tax rate on the solid line.

Overall, the Italian tax scheme offers a unique opportunity to study migration responses of a broad population, beyond the very top of the income distribution. At the same time, because the tax break is increasing in the income level, it is important to convert our estimates into elasticities, thus taking into account the effective change in the net-of-tax rate along the income distribution.

3 Data

3.1 Italian migration data

Our first data source is administrative data on international migration of Italian citizens from the *Istituto Nazionale di Statistica* (Istat). We use a customized version of the Istat data, consisting of emigration and return migration flows of Italian citizens by year (2002-2018), country of destination/origin, birth cohort, education (less than high school, high school, college), sex, and a foreign-born indicator.[20] Importantly, we observe the key variables determining eligibility for the 2010 scheme: birth cohort, education, and year of return migration.

The Istat data is based on enrollments and disenrollments from the Registry of Italians residing abroad (AIRE, *Anagrafe degli Italiani Residenti all'Estero*). Italian citizens are required to enroll in the AIRE registry whenever they migrate abroad for more than six months, which results in an automatic disenrollment from the civil registry of their municipality of origin. Upon returning to

[20] In our data, the exact birth year is available for the top-5 countries only (Germany, Switzerland, UK, France, US), while for the other countries they are aggregated in 5-year bins (1964-1968, 1969-1973, etc.).

Italy, individuals are removed from the AIRE registry, which is our measure of return migration. Istat collects these individual records and aggregates them into emigration and return migration flows. Despite the substantial benefits of AIRE enrollment, there is evidence that a large fraction of Italians do not enroll when they move abroad (Anelli et al., 2023), and consequently do not appear in our return migration data.[21] Importantly, AIRE registration was not required for eligibility under the 2010 scheme, provided that beneficiaries could document their residence abroad (e.g., with pay stubs or a lease). Therefore, we should not expect changes in reporting incentives before and after 2010. In Appendix C we provide additional details and sanity checks.

To construct the estimation sample, we exclude individuals with less than a high school education to form a suitable comparison group for college graduates. We restrict the sample to individuals born between 1954 and 1988 who were 23–64 years old during 2006–2018, thus likely in the labor force. Finally, we restrict the sample to Italian citizens born in Italy to ensure they meet the pre-residency requirement for eligibility.

Finally, there is no information on the stock of Italian expatriates abroad in the Istat data, which we need to construct a return migration rate. For this reason, we use the *Database on Immigrants in OECD and non-OECD Countries* (DIOC) data from OECD (2016), which is based on destination countries' decennial censuses, and includes information on migrants' stocks by origin country, education, age, and sex. We use this data to estimate the stock of eligible and ineligible Italian expatriates who are resident in each origin country as of 2010, by age, education, and sex, as described in Appendix C.

3.2 German social security data

Our second data source are the "Integrated Employment Biographies" (henceforth IEB) provided by the *Institut für Arbeitsmarkt- und Berufsforschung* (IAB). The IEB data is based on social security records covering nearly all private sector employees in Germany, and have been used

[21] The main benefit of enrolling is that foreign earnings are not subject to income taxes in Italy, in addition to access to voting from abroad and consular services.

extensively in the literature.[22] The data include several employment-related variables, such as average daily wage, industry, occupation, begin and end dates of each spell, type of spell, reason of termination, as well as key demographics (date of birth, education, sex, and citizenship), which enables us to precisely identify Italians eligible for the tax schemes.[23]

For this paper, we use the full-count IEB data covering the universe of Italian citizens (as well as Spanish citizens) with at least one spell in the German social security records between 2006-2016.[24] For the analysis, we created a yearly panel, selecting the longest employment spell in the year and restricting the sample to individuals in the age range 23-64, who completed at least high school and were born between 1954-1988. Finally, we link each spell to firm characteristics – number of employees, sector, and AKM firm fixed effects (Abowd, Kramarz and Margolis, 1999) – using unique firm identifiers.[25]

Because we do not observe international migration in the IEB data, we assume that working-age Italians who disappear from the registry are return migrants to Italy.[26] While most Italian citizens who disappear from the data likely return to Italy, some could also migrate to other countries or simply exit the labor force. Although we cannot completely rule out this possibility, we take a number of steps to validate our return migration measure. First, as we observe the reason for termination, we exclude all individuals whose employment spells terminate for non-migration-related reasons (e.g., death, retirement, etc.). Second, in Appendix C we validate our return migration measure ("leavers") by comparing it with actual migration flows of Italian citizens from Germany to Italy from the OECD International Migration Database (based on the German migration data

[22] See Card, Heining and Kline (2013) and Dustmann, Ludsteck and Schönberg (2009) for a description of the full-count IEB data.

[23] Employers must report these data for each employee. Typically, reporting occurs once a year, although any contractual change is also reported, e.g. from part-time to full-time. In Appendix D, we explain in more detail how we prepared the data, including the imputation of top-coded wages and of education.

[24] As individuals may naturalize, we consider Italian (Spanish) citizens those with an Italian (Spanish) nationality in their first record.

[25] We use the terms establishment and firm interchangeably, following the literature (Card, Heining and Kline, 2013; Dustmann, Ludsteck and Schönberg, 2009).

[26] In a similar fashion, Bahar et al. (2024) use exits from the IAB data of Yugoslavian nationals to measure return migration to Yugoslavia; similarly, Dicarlo (2022) proxies migrants from Italy to Switzerland with exits from the Italian Social Security data.

from Destatis). [27]

Appendix Table A.1 shows the main characteristics of Italian citizens in Germany in our estimating sample, separately for the pre- and post-2010 period, and by eligibility. Relative to the ineligible, eligible Italians are younger and more likely to be female; they arrived later (likely after completing tertiary studies in Italy) and spent fewer years in Germany; they earn more, consistent with their higher education level (despite the younger age), and face a larger wage differential with Italy; [28] and they are more likely to be employed in large firms, and in the Finance and Healthcare sectors. We take these differences into account in our empirical analysis with the inclusion of a rich set of fixed effects, as we explain in the next sections.

4 Evidence from Italian migration data

In this section, we outline our empirical strategy and present visual evidence from the aggregate migration data, which supports the identifying assumptions. We then discuss our main results using the Italian migration data.

4.1 Empirical strategy and visual evidence

Our empirical analysis leverages the joint presence of the birth cohort and education requirements to identify the effect of eligibility on return migration. Let y_{gt} denote a return migration outcome for group g in year t, where g denotes either a binary classification (eligible vs ineligible) or finer groups defined by the interaction between birth cohort c and education level e (and origin country o in some specifications). Our starting point is a simple Difference-in-Differences (DiD) model:

$$y_{gt} = \beta Eligible_g \times Post_t + \gamma_g + \lambda_t + (\psi_{ct} + \phi_{et}) + \epsilon_{gt} \tag{1}$$

[27] Overall, while both the Italian migration data and the German social security data are imperfect measures of return migration, their limitations are nonetheless very different in terms of their underlying causes: under-reporting in the Istat data, imperfect proxy of migration in the IEB data. Therefore, it is reassuring that we find similar results in our empirical analysis.

[28] Appendix C describes the construction of earnings differentials between Italy and Germany.

where $Eligible_g = \mathbb{1}(c \geq 1969) * \mathbb{1}(e = college)$ is a dummy equal to 1 for the eligible group(s), college graduates born in 1969 or later; $Post_t = \mathbb{1}(t \geq 2011)$ is an indicator for post-period years; and γ_g and λ_t denote group and year fixed effects, respectively.

We then estimate richer Triple Difference-in-Differences (Triple Diff) models by including cohort-by-year (ψ_{ct}) and education-by-year (ϕ_{et}) fixed effects. These two-way interactions control non-parametrically for time-varying unobserved determinants of return migration across cohorts and education groups, such as changes in labor demand for college-educated workers in Italy. Importantly, ψ_{ct} fully absorbs age at return migration, a major determinant of migration decisions.

The coefficient of interest is β, which can be interpreted as the reduced-form intent-to-treat (ITT) effect of eligibility for tax incentives on return migration. We now describe the identification assumptions and show supporting evidence on their validity.

Parallel trends The Diff-in-Diff design relies on a parallel trends assumption (PTA), which requires that return migration among eligible and ineligible individuals would have evolved at the same rate absent the tax scheme.

Figure 3 provides *prima facie* evidence on the validity of the PTA using raw data. Panel (a) plots the number of eligible returnees over time relative to the ineligible (the latter series is standardized to match the eligible in 2010), while Panel (b) shows the growth rates and splits the ineligible into subgroups.[29] The vertical lines mark the introduction of the tax incentives in 2010 and their modification in 2015. Reassuringly, return migration flows are stable in the pre-period in both panels. The event studies discussed below formally confirm the absence of statistically significant pre-trends. In contrast, there is a clear divergence in the post-2010 years, when eligible expatriates become increasingly more likely to return to Italy relative to the ineligible.

Figure 4 displays the raw data in an alternative way, illustrating our identifying variation and corroborating the PTA further. The two panels plot return migration flows *for each birth cohort*, separately for college and high school graduates, (a) in the pre-period (2006-2010) and (b) in the post-period (2011-2015), respectively. Prior to the 2010 reform (Panel a), the birth cohort distri-

[29] Appendix Figure A.1 shows the levels by subgroup.

butions are similar between college and high school graduates, with no difference across the 1969 threshold. After 2010 (Panel b), the corresponding figure reveals a completely different picture. The two lines precisely overlap for returnees born prior to 1969, who are ineligible regardless of their education level. In contrast, they diverge starkly among the post-1969 born: college graduates (eligible) are systematically more likely to return than high school graduates (ineligible) in each birth cohort.[30] Appendix Figure A.2 show the corresponding graphs by age.

While the absence of pre-trends is reassuring, it does not completely rule out the existence of unobserved time-varying shocks returnees after the incentives are in place. This is potentially important, as the post-period includes the Sovereign Debt crisis, which peaked in 2011. For instance, if labor demand for college graduates in Italy was less impacted by the economic downturn than for high school graduates, we might overestimate the effect of tax incentives.

The Triple Difference specification credibly allays these concerns, as it requires a weaker assumption: *relative* parallel trends (Baker et al., 2025; Olden and Møen, 2022; Ortiz-Villavicencio and Sant'Anna, 2025). In our setting, it requires that the relative outcomes between younger and older cohorts among college graduates would have evolved similarly to the relative outcomes among high school graduates, absent the tax scheme. As an illustration, consider high-school graduates in Panel (b), Figure 3. Despite being ineligible, young high school graduates return more than their older counterparts in the post-period. The inclusion of cohort-by-year fixed effects in the DDD model fully absorbs these cohort-specific time trends, as long as they are similar to those among college graduates.

Overall, the raw data provide compelling evidence in support of the parallel trends assumption. Additionally, we show the absence of pre-trends when discussing event-studies, and we evaluate the robustness to potential deviations from parallel trends assumption using the "relative magnitudes" approach (Rambachan and Roth, 2023).

[30] There is only very a small difference at the exact discontinuity, i.e. between 1968 and 1969. This is possibly as a result of the scheme being advertised as the *under-40* tax scheme (Appendix Figure B.1). This is why we do not implement a regression discontinuity design.

Stable unit treatment value assumption (SUTVA) Our design further hinges on the absence of spillovers between eligible and ineligible returnees in their return migration decisions. Put differently, the introduction of tax incentives should not affect the return migration decision of the ineligible post-2010. If these spillovers exist, they would constitute a SUTVA violation.

Spillovers may plausibly occur in two settings: within co-worker networks and within households. In the workplace, the departure of eligible workers may affect the return migration decision of ineligible co-workers. Within the household, eligible partners may affect the return migration decision of non-eligible family members. Both sources of spillover are likely to affect positively the return migration of the ineligible group, therefore biasing our estimates *downwards*. In Section 5, we provide extensive evidence on the validity of SUTVA by documenting empirically the absence of workplace-level spillover using German social security data, and by assessing the robustness to plausible household-level spillovers, which we bound using the German Microcensus.

Emigration and strategic responses Finally, a potential concern with the interpretation of our estimates is that tax-induced return migration may be driven by changes in *emigration*. Such changes may occur if potentially-eligible Italian residents, anticipating the prospect of tax incentives upon return, become more inclined to leave after 2010, or to engage in "strategic emigration" by spending two years working or studying abroad.

To mitigate this concern, Appendix Figure D.3 shows a placebo version of Figure 4, displaying year-of-birth and age distributions among *emigrants* by education level pre- and post-2010. Reassuringly, the distributions of college and high school graduate emigrants fully overlap in both periods, in contrast to the stark post-reform divergence between eligible and ineligible returnees. Additionally, using the German social security data, we show in Section 5 that our results are not driven by Italians arriving in Germany after 2010 nor by university students. Overall, the evidence indicates that the prospect of a tax break upon return did not result in an unintended increase in emigration, at least in the years following the 2010 scheme introduction.[31] We provide an extended

[31] This is reasonable considering the uncertainty regarding how long the 2010 scheme would be in place, as discussed in Section 2. However, we cannot completely rule out tax-induced emigration for the post-2015 and post-2019 years,

discussion in Appendix D.

4.2 Effect of eligibility on return migration

We now turn to the regression results. Our preferred outcome is the return migration rate, which accounts for the stock of expatriates abroad; we also show results in levels (number of returnees). While the two sets of results are highly consistent, each outcome has distinct advantages and disadvantages. The rates are economically meaningful and directly comparable to our German evidence, while the levels closely mirror the raw data and enable us to obtain an elasticity comparable with previous work.

Main results Table 1 and Figure 5 display our main estimates. The dependent variable is the return migration *rate*, defined as the number of returnees in group g in year t divided by the stock of Italians abroad in group g in 2010, just before the tax scheme kicks in. The units of observation are group-by-year cells, where groups are defined by birth cohort (5-year bins), education level (college or high school), origin country, and sex. Because the regressions use grouped data, we weight observations by the stock of Italian expatriates in each group as of 2010 and cluster standard errors at the group level to account for within-cell serial correlation.

Table 1 shows the regression results, comparing Diff-in-Diff and Triple Difference specifications. In Column 1 (simple DiD), the eligible group is 0.52 percentage points more likely to return – a 62% increase relative to the baseline annual return migration rate (0.83%), consistent with the graphical evidence.[32] The remaining columns are Triple Difference specifications, obtained by including all the two-way interactions (cohort-year, education-year, origin-year, and sex-year FEs). In Column 2, the point estimate is lower (+0.38 pp) but remains statistically and economically significant – a 46% increase relative to the baseline. In Column 3, we fully saturate the model by including cohort-origin-sex-year and education-origin-sex-year fixed effects, thus absorbing *ori-*

when eligibility requirements were relaxed and duration was streamlined.

[32]The baseline return migration rate is quite low due to under-reporting in the AIRE data. However, this does not affect our estimates, as coefficients are identified based on *changes* in return migration flows.

gin country-specific unobservable determinants of return migration by cohort and education. Our results survive this demanding specification, with eligibility post-reform predicting a 39% increase relative to the baseline. Finally, Column 4 extends the post-period by including the post-2015 scheme years (2016-2018). The estimate is slightly larger, suggesting that the revised and more transparent policy triggered a stronger return migration response.

Elasticity and comparison with previous work The estimate in Column 3 translates into a (flow) elasticity of return migration with respect to the average net-of-tax rate of 0.91, which is the percent increase in the return migration rate for a 1% increase in the average net-of-tax rate. The elasticity is nearly identical using the specification in levels (Table A.2), discussed below.[33] In Section 5.3, we estimate separate elasticities for different earnings levels using the German data.

Our elasticity lies between the "foreigners" and "domestics" elasticities found in the literature, which usually are large for the former and close to zero for the latter (Kleven et al., 2020). Compared to other studies on preferential tax schemes, our elasticity is smaller than the foreigners' elasticities in the Danish case (1.59 in Kleven et al., 2014) and the Netherlands (≈2 in Timm, Giuliodori and Muller, 2025), but significantly larger and more precisely estimated than for returning expatriates (close to zero in the Danish case). A simple explanation for the latter is that the Italian diaspora is much larger than the ones from other countries (e.g., Denmark). For this reason, we also report the semi-elasticity, i.e., the *percentage-point* increase in the return migration rate for a 1% increase in the net-of-tax rate, which ranges between 0.008-0.012.[34] We use the latter to compare the Italian and the German results in the next section.[35]

[33]To obtain the elasticities, we divide the point estimates by the pre-period outcome mean for the eligible group (shown in the tables) to get a percent change, and then we scale it by the percent change in the average net-of-tax rate (0.43) for a representative returnee with gross earnings 57,600 euro. This is equivalent to regressing log return migration on the log average net-of-tax rate, instrumented by the $Eligible \times Post$ interaction.

[34]Notice that the coefficients are in percentage points ($\times 100$) for readability, while the semi-elasticities are not. Because the average net-of-tax rate increase is 43%, the semi-elasticity is approximately equal to the reduced-form estimates times two.

[35]Jakobsen et al. (2024) and Advani, Burgherr and Summers (2023) are among the few papers that report semi-elasticities; this is because they study *emigration* responses to taxes, and thus they observe the stock of potential emigrants, which is usually unobserved when studying *immigration* responses.

Event Study Figure 5 illustrates the heterogeneity over time and across groups. Panel (a) plots the coefficients of a dynamic event-study specification, where the $Post$ indicator is replaced with year dummies, excluding 2010. Consistent with the raw data in Figure 3, the coefficients increase over time, becoming sizable around 2014 and thereafter, except for a temporary dip coinciding with the 2015 policy change. Such a gradual response is consistent with the initial uncertainty regarding duration and eligibility (see Section 2), as well as with limited information and awareness in the initial years of the scheme.

Overall, the event studies lend support to the parallel trends assumption. The estimated pre-period coefficients are quantitatively small, particularly in the more restrictive triple difference specification. While some pre-period coefficients are statistically significant, in Appendix Figure A.3 we assess the sensitivity to potential violations of the PTA by implementing the Rambachan and Roth (2023) test, which bounds how large a PTA violation in the post-period would need to be to invalidate our results, relative to the maximum violation observed in the pre-period. Reassuringly, the estimate remains significant even if the post-period violation is twice as large (M=2).

Heterogeneity In Panel (b) we split the sample by sex and origin country of returnees, estimating separate regressions for each subsample. The baseline corresponds to Column 2 of Table 1. The estimates are not significantly different between women and men, despite the slightly larger tax incentive for women. In contrast, the return migration response differs across origin countries. The largest estimates are obtained for Italians returning from European countries, such as Germany and the United Kingdom, consistent with the absence of migration restrictions within the EU. Conversely, there is limited tax-induced return migration from non-EU countries, for which migration costs are plausibly higher due to distance and visa restrictions.[36]

Robustness checks Our results are robust to different specifications, time periods, and sample definitions. Appendix Table A.2 shows the estimates using return migration *flows* (instead of rates)

[36] Another reason for the precise-zero estimate for the United States is that U.S. citizens and resident aliens are taxed on their worldwide income, making the Italian tax scheme relatively unattractive for Italians with dual nationality or U.S. permanent residents (green card holders).

as outcome. Column 1 replicates the two-group DiD shown in Figure 3; Column 2 leverages the birth cohort variation shown in Figure 4, while Column 3 adds cohort-by-year and education-by-year FEs, and thus is a Triple Difference model. Columns 4-6 are identical but extend the sample period to include the post-2015 years.[37] The estimates are consistent with the results in rates, with migration elasticities between 0.9-1.1 for the Triple Difference specifications.[38] Appendix Figure A.4 shows the event studies corresponding to Columns 5-6; the dynamics are very similar to the ones in Panel (a) of Figure 5.

Next, Appendix Table A.3 shows the sensitivity of our results to excluding countries bordering Italy (Austria, France, Slovenia, and Switzerland), where concerns about tax evasion by misreporting fiscal residence to gain eligibility may be higher.[39] Reassuringly, the coefficients are very stable, and only slightly smaller when Switzerland is excluded.

Finally, Appendix Figure A.5 shows that the effect persists when restricting the birth-cohort bandwidth around the 1969 discontinuity, although the point estimate becomes smaller, consistent with the raw data in Figure 4.

5 Evidence from German social security data

We now turn to the second part of our analysis, focused on Italians in Germany, a key destination for Italian expats. This complementary analysis has two major advantages relative to the Italian analysis. First, exploiting detailed individual-level characteristics of Italians in Germany, we can document how tax incentives affect the selection of return migrants, in terms of earnings and sectoral composition; the earnings heterogeneity is especially important since it enables us to construct

[37] In the level specifications, Columns 2-3 and 5-6, observations are disaggregated by *exact* birth year and education but not by origin-country, reflecting the variation shown in Figure 4. This is different from the rates specification, where observations are disaggregated by origin-country (and sex), but with birth cohorts grouped in 5-year bins. The treatment definition is identical.

[38] The simple DiD estimates are also fully in line with the raw data: for instance, Column 2 shows an average yearly increase of 55 returnees *in each birth cohort*, which aligns with the post-2010 difference in Figure 4. Notice that the figure cumulates the 2011-2015 years, so the coefficient must be multiplied by 5.

[39] Notice that earnings need to be sourced in Italy to be tax exempted under the scheme, and thus cross-border workers are generally ineligible. However, if a cross-border worker switches to an Italian employer and can prove two years of residence abroad, they would qualify.

plausible migration elasticities. Second, we can credibly address key threats to our identification strategy.

5.1 Effect of eligibility on the probability of leaving Germany

Using the universe of Italian workers in Germany, we estimate the individual-level equivalent of the (Triple) Difference-in-Differences specification in Section 4, using as outcome the individual probability of leaving the register in year t. Let L_{igt} be a dummy equal to 1 if an individual i's last spell in the data is in year t, conditional on being employed in $t-1$.[40] The estimating equation is:

$$L_{igt} = \beta Eligible_g \times Post_t + \gamma Eligible_g + \psi' X_{igt} + \lambda_t + \epsilon_{igt} \tag{2}$$

where $Eligible_g$ and $Post_t$ are indicators for the eligible groups (born on/after 1969 with a college degree) and post-2010 years respectively, X_{igt} is a vector of individual- and group-level controls, and λ_t are year fixed effects.[41] The coefficient of interest, β, captures the change in the probability of leaving among eligible Italians before-after 2010, relative to the ineligible. We cluster standard errors at the individual level due to the longitudinal structure of the data.

Table 2 shows the main results. The specification in Column 1 is a simple DiD model, while Columns 2-5 are Triple Differences estimates, as they include two-way interactions between birth cohort, education, and year fixed effects, as well as additional FEs. We find a positive and statistically significant effect of eligibility on the probability of leaving the register. Eligible Italians are 0.35 percentage points more likely to leave after 2010 compared to the ineligible, a 13% increase relative to the baseline probability of leaving of 2.67.[42] The estimated effect is robust to the inclusion of two-way interactions between education, birth cohort, and year fixed effects, as well as

[40] This restriction ensures that eligible individuals meet the minimum 2 years of stay abroad. Results are robust to using the employment spell two years before leaving (Appendix Table A.6).

[41] Baseline controls include birth cohort, education, sex, age at entry, and years in the registry FEs. In addition, we include cohort-by-year and education-by-year FEs (to mimic the Italian-data Triple DiD specifications), as well as sector-year, occupation-year and local labor market by year FEs in some specifications.

[42] Despite the smaller percent increase, the point estimate (the percentage-point increase) is very similar to the Italian data (Table 1). We perform a full comparison below when discussing the semi-elasticities.

industry-year, occupation-year and local labor market by year fixed effects.

The corresponding event studies show no evidence of pre-trends, supporting the parallel trends assumption, and reveal a gradual migration response that intensifies over time. Appendix Figure A.6 plots three sets of coefficients: (i) a raw Diff-in-Diff without controls, (ii) with the baseline controls of Table 2 (Column 1), and (iii) with the most restrictive fixed effects (Column 5). While confidence intervals naturally get larger in the tighter specifications, they all deliver a similar picture, with a gradual response building up post-2010, consistent with the Italian evidence. Additionally, the test suggested by Rambachan and Roth (2023), reported in Appendix Figure A.7, confirms the robustness of our results to potential parallel trend violations.

Alternative specifications We perform a series of robustness checks to alternative specifications, reported in Appendix Table A.4. The first column shows the baseline effect. One concern is that the response may be entirely driven by Italians who arrived in Germany post-2010, strategically moving abroad for two years to gain eligibility for tax incentives. To rule out this concern, in Column 2 we restrict the sample to individuals who arrived before 2010; the coefficient is even larger.[43] In Column 3 we exclude individuals who were university students in the previous two years, to ensure that our results are not driven by Italians studying abroad to pay lower taxes upon return.[44] In Column 4, we restrict the birth cohort bandwidth, trimming the youngest and oldest cohorts, while in Column 5 we exclude the 1969-1970 birth cohorts, whose eligibility was not salient in the media (as they were over-40). Finally, in Column 6, we exclude 2016, when the modified 2015 tax scheme took effect. All these specifications deliver very similar coefficients to the baseline.

[43] Additionally, Appendix Figure A.8 shows the event study for the subsample of individuals arrived in Germany before 2010, and Appendix Table A.5 shows how the point estimates change when adding progressively post-2010 arrival cohorts to the sample. The coefficients are remarkably stable, confirming that our results are not driven by year-to-year changes in sample compositions due to new arrivals. This analysis is not affected by concerns related to policy-induced emigration (and subsequent return) or by measurement error in eligibility status that could arise if recent arrivals to Germany were incorrectly classified as eligible.

[44] We identify university students if they have at least one spell recorded by the employer as "working university student" (*Werkstudent*) and if they entered the register after 2009 and before turning 31.

SUTVA validity checks We assess the robustness to potential SUTVA violations (discussed in Section 4.1), which may occur if tax incentives affect not only the eligible, but also the ineligible due to spillover effects within the workplace and households.

To test for spillovers in the workplace, we first identify eligible and non-eligible co-workers using unique establishment identifiers. Then, we construct a measure of firm-level exposure to tax incentives, as the share of the workforce eligible for tax incentives in the pre-period (2007-2010). Finally, we compare the share of leavers across establishments with a positive vs zero share, interacting the exposure dummy with year fixed effects. Appendix Figure A.9 displays the results, separately for (a) eligible and (b) ineligible workers. Consistent with the individual-level regressions, exposed firms are more likely to lose eligible workers in the post-2010 period. In contrast, we see no difference in the share of ineligible workers leaving the establishment, neither in the pre- nor in the post-2010 period. Overall, these findings provide compelling evidence of the absence of spillover effects within the workplace.

We then assess the sensitivity of our estimates to intra-household spillovers due to joint moves. First, we quantify the share of eligible Italians whose partner is ineligible, or whose parents are also in Germany, using the Microcensus data (as the IEB data do not have household identifiers).[45] Appendix Table A.7 summarizes the key statistics: while the share of eligible whose parents live abroad is negligible, 20.73% of those partnered (55.5%) has a partner with a high school diploma, implying that a potential SUTVA violation due to education may occur for at most 11.5% of the eligible sample (assuming that *all* of them move back to Italy jointly). Next, we compute the implied number of eligible leavers who may violate SUTVA in the IEB data in each post-2010 year, and we randomly pick an equal number of ineligible leavers (i.e., their hypothetical partners moving jointly) for whom we set the outcome to 0; that is, we pretend they stay in Germany. We then estimate our baseline regression using the adjusted outcome. Finally, we repeat the full procedure varying the share of eligible-ineligible couples.

The results are displayed in Appendix Figure A.10. Reassuringly, our main estimate is remark-

[45]The German Microcensus collects detailed information on 1% of the resident population, including immigrants, and includes information about partners and parents' education, age and location of residence.

ably stable across a plausible range of shares of eligible individuals with a non-college-educated partner: using the 11.5% obtained with the Microcensus (dotted line), the resulting point estimate increases to 0.426, which is not statistically different from our baseline. Even if the share was twice as much ($\approx 20\%$), the point estimate would be 0.505, still within the baseline confidence interval.[46]

Finally, 11% (15.8% $\times$ 70.4%) of college-educated individuals born before 1969 (ineligible) have a younger partner eligible for tax incentives. Among them, 97% of their partners were born within 8 years (before 1977) of the cutoff. Therefore, in Appendix Figure A.11, we show that our baseline results are robust to the exclusion of birth cohorts closer to the cutoff, for whom this source of SUTVA violation is more prevalent.

Spaniards as Placebo A plausible threat to our identification strategy is that eligible Italians may have experienced differential labor market conditions relative to the ineligible after 2010, affecting their probability of return migration regardless of the tax break. For instance, if young college-educated expatriates were disproportionately employed in sectors facing negative demand shocks in the post-period (e.g., German banks being exposed to the Sovereign debt crisis), they may have been more likely to return to Italy than the controls for reasons unrelated to the tax incentives. Therefore, to further probe the validity of our design, we focus on Spanish citizens in Germany, who are a natural comparison group for two reasons. First, Spain experienced a double-dip recession similar to Italy, which triggered large emigration flows towards Germany (Bertoli, Brücker and Moraga, 2016).[47] Second, Spain did not have any preferential tax scheme targeted to young college graduates in this period.[48]

In Appendix Table A.8 we show three specifications using Spanish workers in Germany. In Column 1 we estimate a placebo version of our main regression using Spaniards instead of Ital-

[46] If the share of eligible-ineligible couples who actually jointly move is lower than 100%, the resulting estimate would be even closer to the baseline, *a fortiori*.

[47] Appendix Figure C.2 shows the aggregate migration flows of Italians and Spaniards to/from Germany.

[48] Since 2005, Spain has a preferential tax scheme (the "Beckham Law") which allows foreigners and long-term expatriates (with at least 10 years abroad) who relocate to Spain to be taxed at a flat income tax rate of 24% for 6 years. Importantly, eligibility is not based on education or age in the Spanish scheme.

ians. If the treatment effect in Table 2 was driven by differential shocks hitting young college graduates, we should see a significant effect for the Spaniards too. Reassuringly, the coefficient is statistically and economically insignificant. In Column 2, we keep eligible individuals only, and define a treatment indicator equal to 1 for Italians and to 0 for Spanish citizens. Finally, to deal with compositional differences, we estimate a Triple DiD on a 1:1 matched sample of Italians and Spaniards (Column 3).[49] In both cases, we obtain a treatment effect that is comparable in magnitude to our baseline.

5.2 Heterogeneity by earnings and sectors

Which profiles of workers are the most responsive to tax incentives? To shed light on the characteristics of tax-induced returnees, we estimate separate regressions for different subgroups of Italian workers based on their labor market outcomes in Germany. We split individuals by quartiles of earnings, as well as by firm size, sector, and AKM firm fixed effects, using all the employment spells in our sample period.[50]

Importantly, to construct earnings quartiles, we account for compositional differences between eligible and ineligible individuals (due to their age and education). Specifically, we compute separate distributions for each subgroup of eligible and ineligible, distinguishing by birth year (born before or after 1969) and education level (university degree or high-school diploma).[51] In this way, we compare eligible and ineligible Italians within corresponding quartiles (e.g., the top quartile among the eligible group with the top quartile among the ineligible group).

Figure 6 summarizes the heterogeneity by subgroup; the earnings heterogeneity is also shown in Table 3 discussed below. Panel (a) reveals that the effect is driven by workers in the upper half

[49] Matching variables: education, age at entry, birth cohort, sex, initial sector, initial occupation.

[50] Labor market outcomes change in proximity of return migration (Akee and Jones, 2024; Bijwaard, Schluter and Wahba, 2014) and are affected by return migration intentions (Adda, Dustmann and Görlach, 2022; Bassetto and Freitas Monteiro, 2025). For this reason, we use all employment spells in our time window, as opposed to the last spell before migration. For each individual, we take the mean for firm size and firm fixed effects, the mode for sector, and the median for annual earnings.

[51] We trim the bottom and top 1% of each distribution to reduce the influence of outliers, and exclude individuals with earnings from marginal employment only. Appendix C provides additional details.

of the income distribution: the reduced-form estimates are largest in the third (0.44) and fourth (0.52) quartiles (compared to a baseline of 0.37), while they are insignificant and close to zero for the bottom two quartiles. In terms of firms' characteristics, marginal leavers work in medium and large firms (20-100 and 100+ employees). Perhaps surprisingly, we find no heterogeneity by firm FEs: tax-induced returnees are equally likely to leave firms paying high vs. low wage premia.

The sectoral composition in Panel (b) shows that tax-induced leavers are disproportionally employed in commerce, service, education, and healthcare sectors. Finance and real estate also display larger point estimates than the baseline, though they are more imprecise due to smaller sample sizes. Finally, we distinguish between high- and low-innovation sectors (above vs below median patenting); the point estimates suggest a slightly larger response among high-patenting sectors in Germany.[52]

5.3 Elasticities by earnings

Are high earners truly more responsive to tax incentives, or do simply face stronger incentives to move? As the tax break is increasing along the income distribution (Figure 2), this could partially explain the observed heterogeneity by earnings. For this reason, we convert the reduced-form estimates into semi-elasticities, scaling the percentage-point effect by the change in the average net-of-tax rate for each quartile. The elasticities are displayed at the bottom of Table 3; the average semi-elasticity (0.008) is fully in line with the Italian-data estimates in Table 1 (0.008-0.009), despite the latter are based on all origin countries.

We find increasing semi-elasticities along the income distribution: higher earners are more responsive than lower earners, even after taking into account their larger increase in the net-of-tax rate. Specifically, the semi-elasticities are 0.001 and 0.005 for Q1 and Q2 (both statistically insignificant), and 0.011 for Q3 and Q4 (both statistically significant).[53] If migration costs are

[52] We compute the number of patents by sector from a dataset of linked inventors-establishments in Germany, provided by the IAB and described in Dorner et al. (2018). We find a similar pattern if we use patent-per-worker instead of total patents to classify sectors by the degree of innovation.

[53] Lehmann, Simula and Trannoy (2014) show that the profile of migration semi-elasticities matters for optimal taxation; however, their semi-elasticities are defined as log-level instead of level-log, which is standard in the empirical

homogeneous, a plausible explanation is that the smaller tax incentives for lower earners may not be enough to overcome the fixed cost of migration.

The elasticities are obtained by applying the Italian tax incentives to the German earnings. Cross-country wage differentials, however, imply that pre-tax earnings may be lower in Italy, resulting in a smaller effective net-of-tax rate change for some workers. For this reason, in Appendix Table A.9 we report the semi-elasticities with respect to the net-of-tax rate computed using the counterfactual Italian earnings, obtained by comparing the earnings distributions in Germany and Italy for young college graduates.[54] As higher earners face relatively larger wage differentials, using the counterfactual earnings in Italy translates into a lower change in their net-of-tax rate with the tax scheme. Thus, the resulting semi-elasticity gradient is steeper (0.015 and 0.013 for Q3 and Q4 respectively), confirming the larger responsiveness of above-median earners to the tax incentives.

Overall, we uncover a novel return-migration response to taxation, sizable throughout the upper half of the distribution, and increasing in the earnings level. While it is well established that top earners are internationally mobile (Kleven et al., 2020), we provide novel evidence that tax differentials affect the migration decisions of young high-skilled workers with above median earnings at destination, in spite of the plausibly lower gross earnings they experience by returning to Italy (Appendix Figure C.3).[55]

5.4 Selection and Implications for Brain Drain

The stated goal of the Italian tax incentives is to counteract the loss of human capital and skills due to emigration (brain drain). Our German analysis provides valuable insights in this regard along

literature. Using their definition, we also obtain increasing semi-elasticities.

[54] Appendix Figure C.3 shows the earnings distribution of eligible Italians in the German data, compared with the earnings distribution for the same group (young college-educated) among Italians in Italy, based on the Italian Labor Force Survey (described in Appendix C).

[55] Top earners in the literature earn on average over €160,000 (Kleven et al., 2014), €210,000 (Kleven, Landais and Saez, 2013), £370,000 (Advani, Burgherr and Summers, 2023), or over a million US$ (Akcigit, Baslandze and Stantcheva, 2016), well above our above-median earners (€50,000-75,000), which are similar to the "mid-level earners" in the literature (Giarola et al., 2023; Timm, Giuliodori and Muller, 2025).

two dimensions.

First, the earnings heterogeneity (Figure 6) implies that tax-induced returnees are positively selected, in terms of pre-return migration earnings. In Appendix Table A.10, we take a step further and quantify this selection, by regressing log annual earnings on the same variables as in Equation 2 but only for the subset of leavers. Consistent with the split-sample heterogeneity, eligible leavers earn 20% more than the ineligible after 2010, relative to the pre-2010 period. This positive selection is especially important because return migrants tend to be negatively selected (e.g., Bijwaard and Wahba, 2014).

Second, we find a sizable response in the healthcare sector, characterized by severe skill shortages in Italy and beyond, as well as in innovation-intensive sectors.[56] Our results suggest that tax incentives can reduce the medical brain drain by attracting healthcare personnel back. Similarly, the return-migration response in high-patenting sectors ameliorates the negative impact of brain drain on the creation of innovative firms (Anelli et al., 2023). In the next section, we evaluate the fiscal sustainability of tax schemes, incorporating the selection of tax-induced returnees.

6 Effects on income tax revenue and beyond

We have shown in the previous sections that the Italian tax incentives attracted a sizable fraction of expatriates back to their home country, and that tax-induced returnees are positively selected. Having established a migration response, we seek to answer the following question: are tax incentives a cost-effective policy? What can we learn about policy design and optimal taxation?

Our quasi-experimental design delivers the key statistic for the tax revenue analysis: the ratio of marginal to infra-marginal returnees (M/I). The former are those who returned to Italy *because* of the tax scheme and would not have returned absent the incentives, while the latter are those who would have returned anyway. Intuitively, the positive effects arise from marginal returnees,

[56] Every year around 1,000 medical doctors (a seventh of all new medical specialists) leave Italy, lured by higher salaries abroad (Bertoni, Chattopadhyay and Gu, 2023; Riccò, Vezzosi and Balzarini, 2020), with potential implications for the quality of services (Dodini et al., 2025).

high-skilled workers who would have remained abroad had the tax scheme not been in place. Conversely, while infra-marginal returnees also contribute to the receiving country, subsidizing them entails a cost because they would have returned even in the absence of the policy.[57]

We perform a simple accounting exercise to ascertain the income tax revenue effects of the 2010 scheme implied by our empirical estimates. Our revenue calculations include both personal income tax revenue and employee social security contributions, consistent with the tax rates shown in Figure 2 and with the elasticities.[58] While we focus on the *direct* fiscal impact of the tax scheme, we embed the selection of tax-induced returnees estimated with the German data, and we illustrate how human capital externalities would affect the calculations.

We begin by outlining the cost-benefit analysis setup and its baseline prediction, we then assess the sensitivity to parameter values, and we conclude with a discussion of its implications.

6.1 Cost-benefit analysis

Setup Our empirical design delivers an estimate of the ratio of marginal to infra-marginal returnees, reported in each regression table.[59] As an illustration, consider Panel (a) of Figure 3, which shows the eligible and ineligible returnees over time, with the latter normalized to match the eligible in 2010. The eligible series is the total number of eligible returnees, $M + I$, where M and I denote marginal and infra-marginal returnees respectively. Under the parallel trends assumption, the difference between the eligible and ineligible delivers M, while the ineligible in the post-period proxies I.[60]

Using this framework, we evaluate the economic costs and benefits of the preferential tax

[57] For simplicity, we abstract from intensive margin responses. This makes our net fiscal impact calculations more conservative, as infra-marginal returnees would have plausibly earned less absent the scheme.

[58] We abstract from cross-effects on other tax bases (VAT, capital income, etc.) and public spending (e.g. healthcare and education). Our framework can be easily extended to incorporate them.

[59] The distinction between marginal and infra-marginal returnees is based on the potential outcome framework, with the two groups corresponding to "compliers" and "always-takers". Formally, let Y_i^0 denote the probability that an eligible expatriate i returns to Italy absent the reform ($D = 0$), and Y_i^1 the probability of i returning with the incentives in place ($D = 1$). Under the assumption of no-defiers (i.e., $Y_i^1 \geq Y_i^0$), we have $i \in I$ if and only if $Y_i^1 = Y_i^0$, and $i \in M$ if and only if $Y_i^1 > Y_i^0$.

[60] The double difference takes care of the difference in the pre-2010 levels, which is absent in Figure 3(a) because the two series are standardized in 2010.

scheme. Let $T(sw_{it})$ denote the tax liability of an individual i with gross earnings w_{it} in year t, where $s \in [0, 1]$ is the taxable share (see Section 2). Let β be the government discount factor. For each arrival cohort, we compare the present-discounted costs and benefits of a tax scheme with a taxable share s and duration d years as follows:

$$\underbrace{\sum_{t=1}^{d} \beta^{t-1} \sum_{i \in M} T(sw_{it})}_{\substack{\text{Revenue from M} \\ \text{during scheme}}} + \underbrace{(1-\delta) \sum_{t=d+1}^{T} \beta^{t-1} \sum_{i \in M} T(w_{it})}_{\substack{\text{Revenue from M} \\ \text{after scheme}}} \geq \underbrace{\sum_{t=1}^{d} \beta^{t-1} \sum_{i \in I} [T(w_{it}) - T(sw_{it})]}_{\text{Foregone revenue from I during scheme}} \quad (3)$$

The cost (right-hand side) is the foregone tax revenue from infra-marginal returnees ($i \in I$), who would have returned even absent the incentives and who benefit from lower taxes during the scheme. This missing revenue is equal to the present-discounted difference between the full tax revenue $T(w)$ and the reduced tax revenue $T(sw)$, summed across I individuals throughout the duration d of the tax scheme.

The benefit (left-hand side) is the additional tax revenue generated by marginal returnees ($i \in M$), who would not have returned without the incentives, and consists of two components. The first component is the present-discounted value (PV) of the reduced tax revenue from M individuals during their first d years in the country, when they benefit from the tax scheme (taxable share s). The second term is the PV of the full tax revenue from M individuals after the scheme ends ($t > d$). Importantly, while we assume that marginal returnees remain throughout the tax-break duration, we allow a fraction δ to leave the country once the incentives elapse.

Since we do not observe the distribution of beneficiaries' earnings in Italy, we assume that individuals are identical within each group $\{M, I\}$, that earnings are constant over time, and that M individuals earn θ times more than I individuals. Formally, we have: $w_{it} = w_I \equiv w$ for all $i \in I$, $\quad w_{it} = w_M$ for all $i \in M$, and $w_M = \theta w_I = \theta w$. Importantly, the parameter θ – the ratio of marginal to infra-marginal earnings – captures the degree of *selection* among tax-induced returnees: when $\theta > 1$, positive selection increases the fiscal benefit.

We can then solve (3) for the M/I ratio such that the scheme breaks even (in present value) and

compare it with our empirical estimates. Appendix E shows formulas for the break-even threshold.

Baseline Our baseline uses the following parameter values (summarized in Table A.11). For duration d and taxable share s, we use the 2010 scheme's *effective* duration (5 years) and exempted share (75%), respectively. Next, we need the average age of returnees at arrival, a, which determines their remaining years in the labor force $T = 65 - a$, where 65 is the statutory retirement age. We set $a = 35$ based on the Italian migration data (Figure A.2). The average earnings of beneficiaries are $w = 57,600$ (€), based on publicly available data (INPS, 2025). The earnings multiplier is $\theta = 1.2$, derived from our estimated earnings selection among returnees in Germany (Table A.10). The out-migration rate after the scheme $\delta = 0.5$ is based on estimates from the literature.[61] Finally, we use $\beta = 0.99$ based on annual government bond yields in the 2010s.

Under the baseline parameter values, the break-even M/I threshold is 21.6%, that is, 22 marginal returnees for every 100 infra-marginal returnees.[62] As our most conservative estimates of M/I range between 31.9-37.6% (Tables 1 and A.2), our simple exercise suggests that the 2010 scheme pays for itself, in present value.[63]

Figure 7 illustrates the underlying tax revenue projections over time. The blue and red dots show the effects on tax revenue in each year since arrival (left axis), while the green dotted line (right axis) is the cumulated tax revenue.[64] The values are present discounted and computed using our estimated share of marginal returnees (24%, Column 3 of Table 1). The tax scheme entails an upfront cost during the first five years, while most of the benefits accrue in the post-scheme period. Based on our point estimate, the policy breaks even around year 25, resulting in a €107 million surplus by year 30. However, the cumulative net cost reaches €181 million in year 5 before starting to decline. The upper and lower bounds based on the 95% confidence interval

[61] The out-migration rate is 50-60% for the Dutch scheme (Giarola et al., 2023; Timm, Giuliodori and Muller, 2025) and 75% in Denmark (Kleven et al., 2014). These rates refer to *foreigners*; arguably, expatriates who return to their home country are more likely to stay beyond the duration of the scheme.

[62] Put differently, the overall share of marginal returnees $m = M/(M + I)$ needs to be at least 17.8%.

[63] The implicit assumption is that there is no tax-induced *emigration* due to the scheme, which we have shown to be negligible for the 2010-2015 period.

[64] The exact EUR amounts depend on the total number of beneficiaries; as an illustration, we use $N = 4000$ based on the average post-2010 number of eligible returnees in Figure 3 (a).

imply a €312 million surplus or a €97 million deficit by year 30, respectively.

Sensitivity and policy implications We then assess the sensitivity of the break-even condition to the parameter values. In Figure 8, we simulate the break-even M/I threshold for a plausible range of each parameter, keeping all the others fixed at their baseline value.[65]

Four parameters play a key role in the break-even calculations. First, the out-migration rate δ after the incentives elapse. Our baseline assumes 50%, based on out-migration rates of tax scheme beneficiaries in other countries. Nevertheless, a higher δ swiftly erodes the fiscal benefit. One way to limit out-migration is to design a gradual phase-out of the incentives, avoiding a sudden and salient drop in net earnings.

Second, the age of beneficiaries. The higher the average age, the fewer years marginal returnees remain in the labor force after the scheme ends, reducing the net fiscal benefit.[66] Importantly, the policymaker can influence this parameter by setting an age limit, as in the 2010 scheme.

Third, the selection of marginal returnees (θ): the higher their earnings relative to infra-marginal returnees, the more likely the policy is to pay off. If marginal returnees are positively selected ($\theta > 1$), the policy is more likely to break even. Positively selected marginal returnees are also likely to generate positive externalities, as we illustrate below.

Last, the duration of the tax break: intuitively, each additional year of incentives implies an additional year of reduced tax revenue. However, this mechanical effect abstracts from the behavioral response, as a larger duration plausibly results in a larger share of marginal returnees; the net effect depends on how the migration elasticity varies based on the scheme duration.[67] The same logic applies to the exempted share: while the figure shows a limited mechanical impact, a larger exemption would plausibly attract more returnees, as we illustrate in the next section.[68]

[65] As an alternative, in Appendix Figure A.13 we plot the cost/benefit ratios implied by our baseline M/I estimate, changing one parameter at a time. The baseline cost-benefit ratio is 0.69.

[66] Younger individuals may also be more mobile and thus have a higher probability of re-emigrating (i.e., a higher δ), which however we are unable to estimate with our data.

[67] Standard elasticities do not account for the duration, as they are based on a static change in the net-of-tax rate, as we explain below and in Appendix E.

[68] The other parameters play a more limited role. The discount rate β determines how costly is for the government to subsidize returnees today in exchange for larger tax contributions in the future. The average earnings (Appendix

Finally, we can use our framework to qualitatively assess the impact of subsequent policy changes. The 2015 reform removed the birth cohort requirement, increasing the average age of beneficiaries and thus worsening the fiscal sustainability of the scheme. The 2019 reform also eliminated the high-skilled requirement, likely reducing human capital externalities for a given fiscal cost of the policy. It also extended the duration for individuals with observable ties to Italy (having children and buying a house); while the aim is to keep out-migration low, the cost is the foregone tax revenue in the post-scheme years. In fact, the recent changes in 2023, which reintroduced more restrictive features (5 years max, high-skilled only), suggest that the 2019 scheme was deemed too costly for the Italian public finances.

6.2 Implications for optimal tax design

Our framework can be used to derive simple implications for optimal tax design.[69] Suppose the government's objective is to maximize the present-discounted tax revenue from a tax scheme offering a reduced tax rate τ for the first $d < T$ periods, and the standard tax rate $\bar{\tau}$ for the remaining $T - d$ periods. In Appendix E, we show that the revenue-maximizing tax rate is given by:

$$\tau^* = \frac{1}{1+\varepsilon} - (1-\delta)\frac{\varepsilon}{1+\varepsilon}\frac{\sum_{t=d+1}^{T}\beta^{t-1}}{\sum_{t=1}^{d}\beta^{t-1}}\bar{\tau} \tag{4}$$

where $\varepsilon = \frac{dN}{d(1-\tau)}\frac{(1-\tau)}{N}$ is the migration elasticity to the net-of-tax rate, $\bar{\tau}$ is the standard tax rate, and δ is the fraction of returnees that leave after the tax incentives end.

The formula in (4) has an additional term relative to a standard inverse-elasticity rule. If $\delta < 1$, the optimal tax rate τ^* is lower than the "static" revenue-maximizing rate $1/(1+\varepsilon)$: intuitively, if at least some individuals stay after the scheme, it is optimal to reduce the tax rate today (the first d periods), as this increases revenue not only today but also tomorrow (the remaining $T - d$ periods). Instead, if all beneficiaries leave after the scheme ($\delta = 1$), the optimal tax rate is equal to

Figure A.12) has little impact on the break-even condition due to the tax cut being stable along the earnings distribution (Figure 2) and to the assumption of homogeneous earnings.

[69] We focus on the revenue-maximizing rate, thus implicitly assuming a zero welfare weight on returnees.

the standard Laffer rate.

Using the baseline parameters ($d = 5$, $T = 30$, $\delta = 0.5$, $\bar{\tau} \approx 0.4$, $\beta = 0.99$), and assuming that the stock elasticity is close to our estimated flow elasticity ($\varepsilon \approx 1$), we obtain $\tau^* = 7\%$, which is not far from the 2010 scheme tax rate ($\tau \approx 10\%$), and much smaller than the static revenue-maximizing rate ($\tau^* = 50\%$), which implicitly assumes that everyone leaves post-scheme. Appendix Figure A.14 shows that the optimal tax rate increases in the out-migration rate, in the average age of returnees (through T), and in the discount rate.

6.3 Accounting for human capital externalities

Our fiscal analysis focuses on the direct income tax revenue effects of the tax scheme, abstracting from welfare and distributional aspects. However, a key justification for subsidizing high-skilled returnees hinges on the externalities – plausibly positive – they would exert on the receiving economy after returning to their home country.

High-skilled immigrants and returnees affect the receiving countries in different ways (Batista et al., 2025). At the firm-level, they may increase productivity due to innovation, entrepreneurship and knowledge spillovers (Bahar et al., 2024; Choudhury, 2016; Mayda, Orefice and Santoni, 2022; Terry et al., 2026), although they might affect the employment prospects of similar workers in the short-run (Doran, Gelber and Isen, 2022; Mahajan et al., 2024). At the local level, they may exert positive agglomeration spillovers (Moretti, 2004; Winters, 2014), but also create congestion if housing supply is limited.

Overall, the size and direction of human capital externalities matter for optimal policy design.[70] While estimating them is beyond the scope of this paper, in Appendix E we briefly outline how our analysis would change in the presence of human capital externalities. Estimating them empirically in the context of tax-induced migration will be a fruitful avenue for future research.

[70] Kleven (2025) offers a thorough analysis of optimal taxation in the presence of externalities from top earners.

7 Conclusions

In this paper, we investigate the effects of tax incentives on return migration decisions of young, high-skilled expatriates. We focus on a tax scheme implemented in Italy in 2010 that provided a large temporary income tax exemption to returnees with a college degree who were born on or after 1969. Exploiting these eligibility criteria in a Triple Differences design, we find that roughly one-quarter of returnees would not have returned absent the tax incentives. Our estimates imply that the 2010 scheme, while costly in the short run, pays for itself in the long run, provided that a sufficient fraction of returnees remain in Italy after the incentives expire.

Leveraging social security data from Germany, a key destination for Italian expatriates, we find that tax-induced returnees are positively selected in terms of earnings and are concentrated in key sectors typically associated with brain drain concerns. The migration elasticity is increasing and sizable throughout the upper half of the earnings distribution, implying that above-median earners are the most responsive, despite likely experiencing larger wage differentials. Overall, we show that tax-induced mobility is a broad phenomenon, not limited to top earners or specific industries.

A few limitations of our study warrant caution when interpreting our estimates. First, because we do not observe actual take-up, our estimates capture intention-to-treat effects of eligibility for tax incentives on return migration. Second, we do not observe how long eligible returnees remain in Italy, which is important for precisely estimating the fiscal impact of the scheme. Last, we are unable to estimate the spillover effects of marginal returnees, which are a key determinant of their broader impact on the receiving country.

Several countries have enacted preferential tax schemes to attract high-skilled expatriates and foreigners. Our findings show that well-designed tax incentives are an effective tool to increase return migration, even in contexts of brain drain and large wage differentials. Future research should examine the broader effects of tax-induced immigration on the receiving economy, which can further inform the design of preferential tax schemes.

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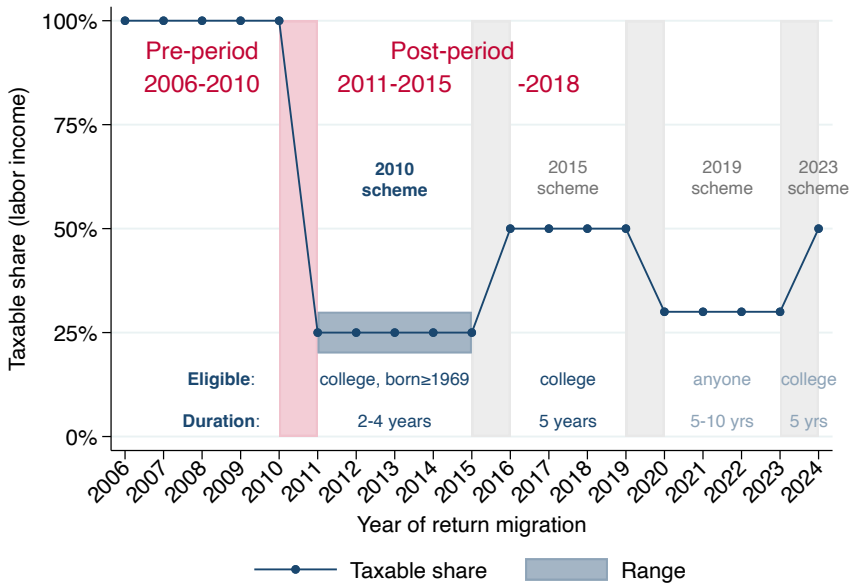
Figures

Figure 1: Preferential tax schemes for return migrants, by year of return migration

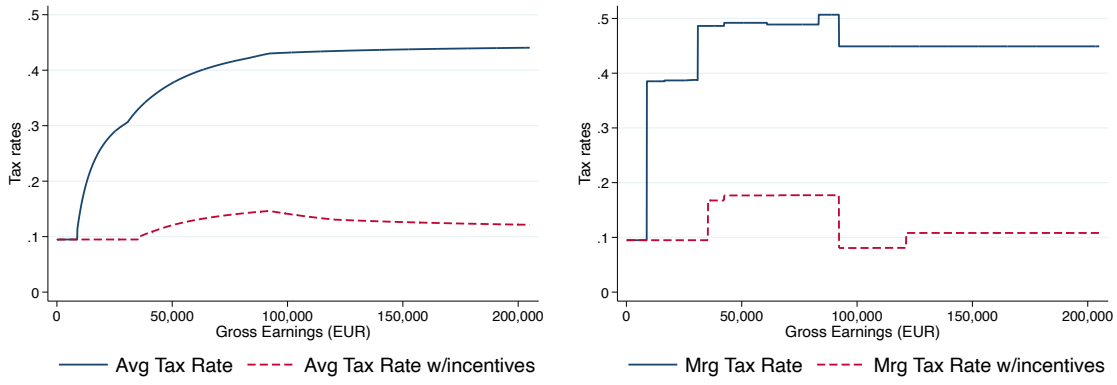


Notes: the figure shows the share of income subject to income taxation for eligible individuals moving to Italy, by year of arrival in Italy. The exemption applies to labor earnings only, and does not exempt social security contributions. For the 2010 scheme, the exemption shown (75%) is a simple average between the exemptions for women (80%) and men (70%). Section 2.1 and Appendix B provide additional details.

Figure 2: Income tax rates with the 2010 tax scheme, by gross earnings

(a) average tax rate

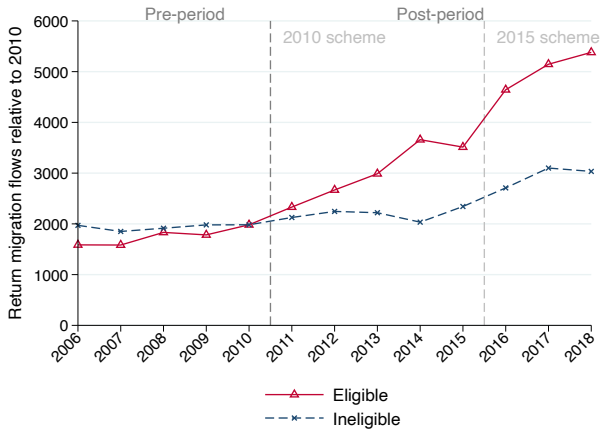
(b) marginal tax rate



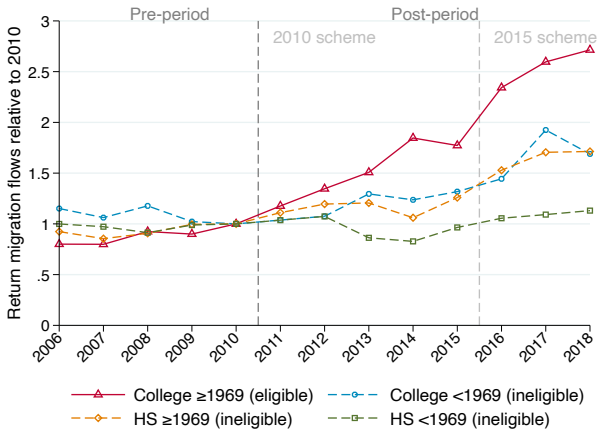
Notes: (a) average and (b) marginal income tax rates, including compulsory social security contributions (payroll taxes) paid by employees, based on the 2010 Italian tax schedule for an individual with no dependents. The reduced tax rates are based on an exempted income share of 75% (average between the 2010 scheme shares, 80% for women and 70% for men), and gross earnings are assumed to be from employment income. *Source*: authors' elaboration using OECD Taxing Wages (OECD, 2011).

Figure 3: Return migration flows over time, by eligibility for 2010 tax scheme

(a) levels (eligible)



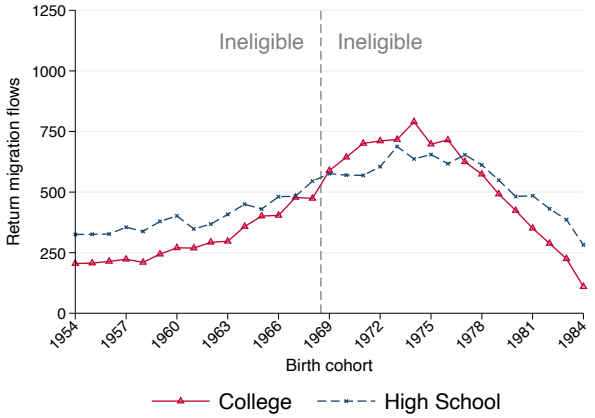
(b) growth rates, by subgroup



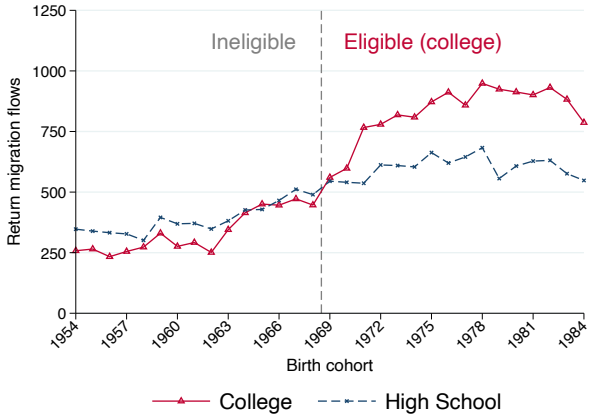
Notes: The figures plot the return migration flows of Italian citizens, 23-64 years old, born in Italy between 1954-1988, with at least a high school diploma, by eligibility for the 2010 tax scheme. Panel (a) shows the levels; the ineligible series is standardized to match the eligible in 2010. Panel (b) plots the growth rates relative to 2010 and partitions the ineligible into three subgroups by education (college vs. high school) and birth cohort (born before vs. after 1969). *Source*: authors' elaboration on Istat data.

Figure 4: Return migration by birth cohort, pre- and post-2010 tax scheme

(a) pre-period (2006-2010)



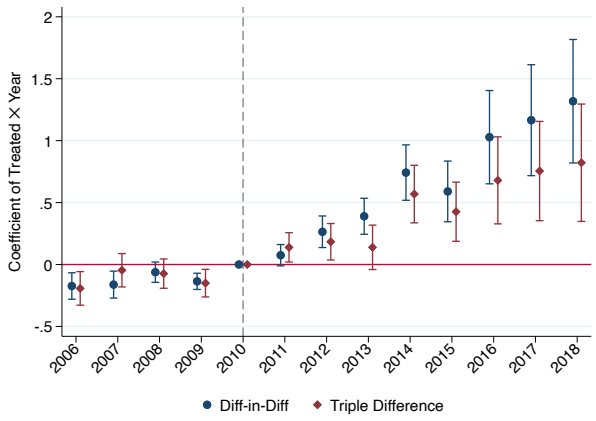
(b) post-period (2011-2015)



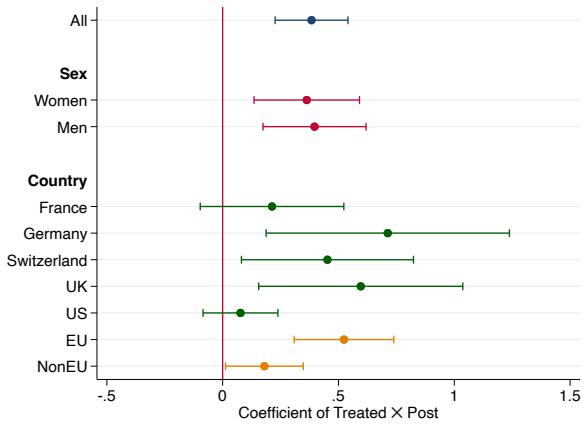
Notes: Figures (a)-(b) plot the total number of Italians 23-64 years old returning to Italy (a) between 2006-2010 and (b) between 2011-2015, by birth cohort (x-axis) and by education level (college and high school graduates). *Source*: authors' elaboration on Istat data.

Figure 5: Heterogeneity of the effect of eligibility on return migration (Italian data)

(a) over time



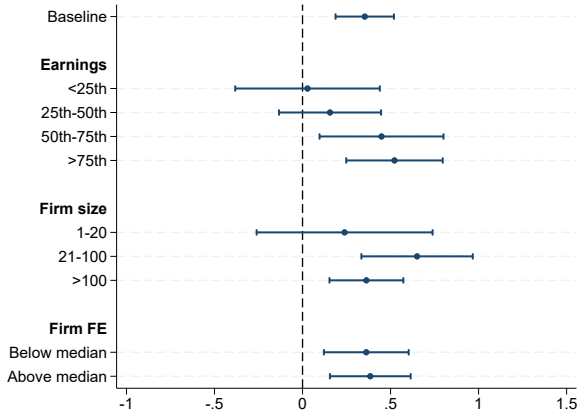
(b) by sex and country



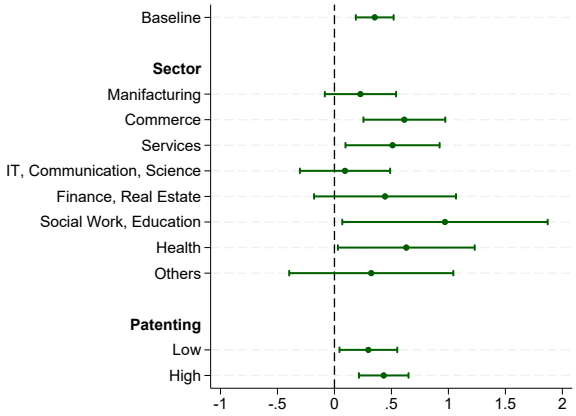
Notes: Figure (a) plots the estimated coefficients β_T (and 95% C.I.) of the interactions between the treated dummy and year dummies, for the DiD and Triple DiD specifications (Columns 1 and 2 of Table 1). Figure (b) plots the point estimate and the 95% C.I. of the Triple DiD coefficient (Table 1 Column 2) of separate regressions for different subgroups of returnees by sex and origin country, for the 2006-2015 period. Observations: group g by year t, where groups are combinations of birth cohort (5-years bins), education, origin and sex. The dependent variable is the number of Italian citizens 23-64 years old, born in Italy between 1954-1988 and with at least a high school diploma, moving to Italy from abroad in year t (Istat data), divided by the stock of Italian expatriates as of 2010 (OECD DIOC data), times 100.

Figure 6: Heterogeneity of the effect of eligibility on return migration (German data)

(a) by earnings and firms characteristics

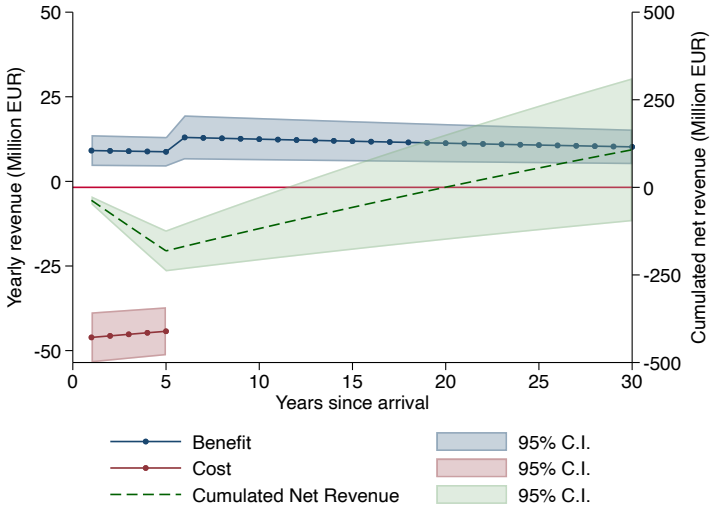


(b) by sector



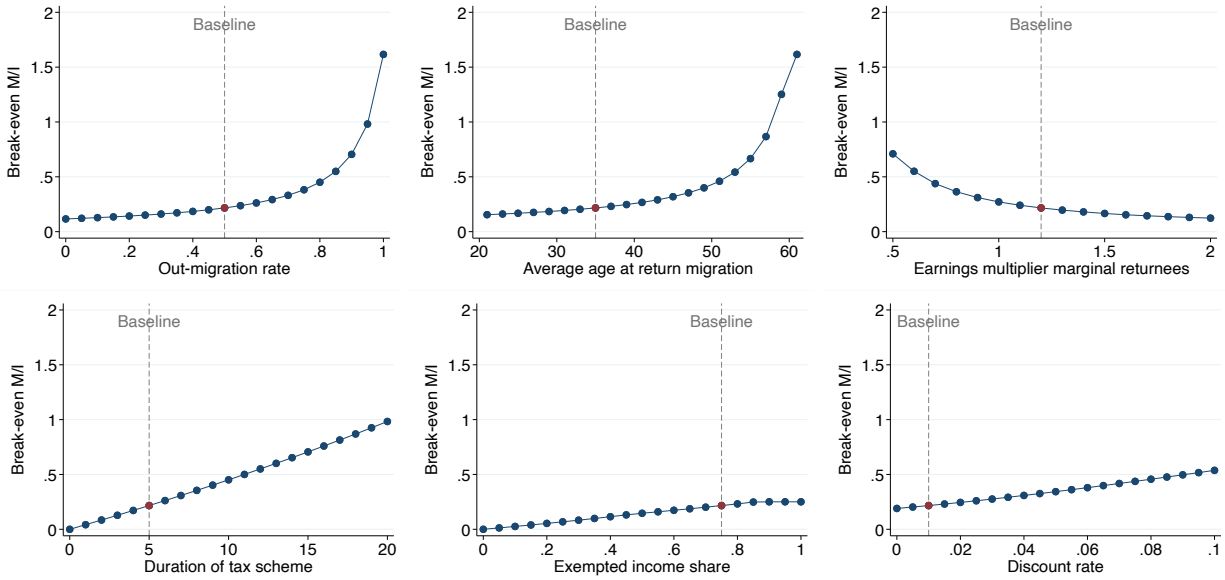
Notes: The figure plots the point estimate β and 95% C.I. of the interaction between the *Eligible* and *Post* (Equation 2), for the full sample (baseline) and for different subgroups. Source: IEB data. Observations: individuals by year (2006-2016). The dependent variable is the probability of leaving the register in year t conditional on being employed in $t-1$. Sample is Italian citizens born between 1954-1988, with at least high school diploma, and at least one employment spell in Germany between 2006-2016. Baseline controls include birth cohort, education, sex, age at entry, and years in the registry fixed effects. Standard errors are clustered at the individual level. Firm fixed effects (AKM) are constructed on the years 2007-2013.

Figure 7: Revenue impact of the 2010 tax scheme



Notes: revenue projections for a representative arrival cohort, based on the estimated share of marginal returnees m from our Triple Difference regressions (point estimate 0.24 and 95% confidence interval $[0.12, 0.36]$), a out-migration rate of $\delta = 0.5$ after 5 years, $\beta = 0.99$ as discount factor, and assuming $N = 4,000$ beneficiaries.

Figure 8: Sensitivity of break-even marginal-to-inframarginal ratio to parameter values



Notes: the graphs plot the break-even marginal/infra-marginal ratio M/I for different values of each parameter, keeping all the others fixed at their baseline value (Table A.11). In each graph, the vertical line indicates the baseline value of each parameter used to obtain the break-even threshold in Section 6.

Tables

Table 1: Effect of eligibility for tax incentives on return migration rates

	Outcome: Return Migration Rate			
	2010 scheme only			& 2015 scheme
	(1) DiD	(2) Triple Diff	(3) Triple Diff	(4) Triple Diff
Eligible $*$ Post	0.519***	0.384***	0.328***	0.411***
	(0.080)	(0.080)	(0.084)	(0.112)
Observations	7,280	7,280	7,280	9,464
R-squared	0.630	0.703	0.863	0.885
Avg Outcome Pre	0.832	0.832	0.832	0.832
Marginal/Inframarginal	0.620	0.395	0.319	0.319
Share Marginal	0.383	0.283	0.242	0.242
Year FE	✓	✓	✓	✓
Group FE	✓	✓	✓	✓
Cohort $\times$ Year FE		✓	✓	✓
Educ $\times$ Year FE		✓	✓	✓
Orig $\times$ Year FE		✓	✓	✓
Sex $\times$ Year FE		✓	✓	✓
Cohort $\times$ Orig $\times$ Sex $\times$ Year FE			✓	✓
Educ $\times$ Orig $\times$ Sex $\times$ Year FE			✓	✓
Elasticity	1.436	1.062	0.908	1.137
	(0.222)	(0.222)	(0.233)	(0.311)
Semi-Elasticity (in pp.)	0.012	0.009	0.008	0.009
	(0.002)	(0.002)	(0.002)	(0.003)

Notes: Observations: groups g by years t, where groups are combinations of birth cohort (5-years bins), education, origin country and sex. Years: 2006-2015 in Columns 1-3, 2006-2018 in Column 4. All columns include year and group fixed effects; Column 2 adds year by cohort and year by education FEs, as well as year by sex and year by origin FEs; Column 3 also includes year by origin by cohort and year by origin by education FEs. The dependent variable is the number of Italian citizens, born in Italy between 1954-1988 and with at least a high school diploma, moving to Italy from abroad in year t (Istat data), divided by the stock of Italian expatriates as of 2010 (OECD DIOC data), times 100. "Average Outcome Pre" refers to the treated group in the pre-period. M/I is the implied marginal-to-inframarginal ratio, obtained by dividing the Eligible $\times$ Post coefficient by the mean outcome for the treated in the pre-period plus the change in the mean outcome for the untreated. The elasticity is the coefficient in percentage of Average Outcome Pre, divided by the percent change in the average net-of-tax rate for an individual earning 57,600 euros; the semi-elasticity is simply the coefficient (divided by 100) scaled by the percent change in the net-of-tax rate. Observations are weighted by the stock of Italian expatriates in each group as of 2010, based on the OECD DIOC data. Standard errors (in parentheses) are clustered at group level. * p < 0.10 ** p < 0.05 *** p < 0.01.

Table 2: Effects of Tax Incentives on Italians leaving Germany

	Outcome: Probability of leaving				
	(1)	(2)	(3)	(4)	(5)
Eligible × Post	0.352***	0.320**	0.367***	0.371***	0.369***
	(0.085)	(0.133)	(0.133)	(0.133)	(0.133)
Observations	1,900,025	1,900,025	1,900,025	1,900,025	1,900,025
Individuals	279,443	279,443	279,443	279,443	279,443
R-squared	0.018	0.018	0.020	0.020	0.020
Avg Outcome Pre	2.673	2.673	2.673	2.673	2.673
Controls	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓
Cohort x Education FE		✓	✓	✓	✓
Cohort x Year FE		✓	✓	✓	✓
Education x Year FE		✓	✓	✓	✓
Industry x Year FE			✓	✓	✓
Occupation x Year FE				✓	✓
State x Year FE					✓

Notes: Observations: individuals by years (2006-2016). The dependent variable is the probability of leaving the register in year t conditional on being employed in $t-1$, times 100. Sample is Italian citizens 23-64 years old born between 1954-1988, with at least high school diploma, and at least one employment spell in Germany between 2006-2016. "Eligible" is a dummy equal to 1 if birth year is equal or greater than 1969 and education level is college and "Post" is a dummy equal to 1 for the post period years (2011 and after). Baseline controls include birth cohort, education, sex, age at entry, and years in the registry fixed effects. Year fixed effects are also included. Column 2 adds fixed effects for the two-way interactions between birth cohort, education and year. Columns 3, 4 and 5 add industry-year, occupation-year and state-year (Länder) fixed effects respectively. Standard errors are clustered at the individual level. * p < 0.10 ** p < 0.05 *** p < 0.01. *Source*: IEB data.

Table 3: Heterogeneity by earnings in Germany

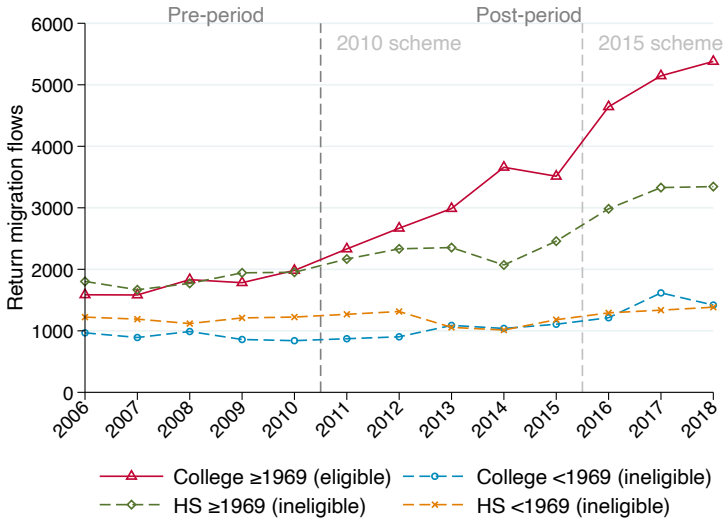
	Outcome: Probability of leaving				
	(1)	(2)	(3)	(4)	(5)
	Baseline	Q1	Q2	Q3	Q4
Eligible × Post	0.319***	0.027	0.160	0.444***	0.522***
	(0.058)	(0.183)	(0.118)	(0.100)	(0.083)
Observations	1,789,725	359,879	416,182	489,570	524,091
Individuals	256300	62767	65381	65381	62770
R-squared	0.018	0.015	0.016	0.027	0.022
Avg Outcome Pre	2.483	2.712	1.850	3.366	2.109
Controls	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓
Average earnings	46,940	17,267	31,079	45,158	76,839
Semi-Elasticity	0.008	0.001	0.005	0.011	0.011
	(0.001)	(0.009)	(0.004)	(0.003)	(0.002)

Notes: Observations: individuals by years (2006-2016). Column 1 is the same specification as Column 1 of Table 2, except that we exclude individuals who do not enter in the computation of earnings quartiles (as described in Section 5.1). Columns 2-5 show separate regressions for individuals in each quartile of the earnings distribution of Italians in Germany, based on the 2006-2016 period. The semi-elasticities are obtained by scaling the coefficients by the percent change in the net-of-tax rate with the Italian tax incentives based on the average earnings level in each quartile, using the tax schedule depicted in Figure 2. The dependent variable is the probability of leaving the register in year t conditional on being employed in $t-1$, times 100. Sample is Italian citizens 23-64 years old born between 1954-1988, with at least high school diploma, and at least one employment spell in Germany between 2006-2016. "Eligible" is a dummy equal to 1 if birth year is equal or greater than 1969 and education level is college and "Post" is a dummy equal to 1 for the post period years (2011 and after). Baseline controls include birth cohort, education, sex, age at entry, and years in the registry fixed effects. Year fixed effects are also included. Standard errors are clustered at the individual level. * p < 0.10 ** p < 0.05 *** p < 0.01. *Source*: IEB data.

Appendix - For online publication

A Additional Figures and Tables

Figure A.1: Return migration flows, by eligibility for 2010 tax scheme

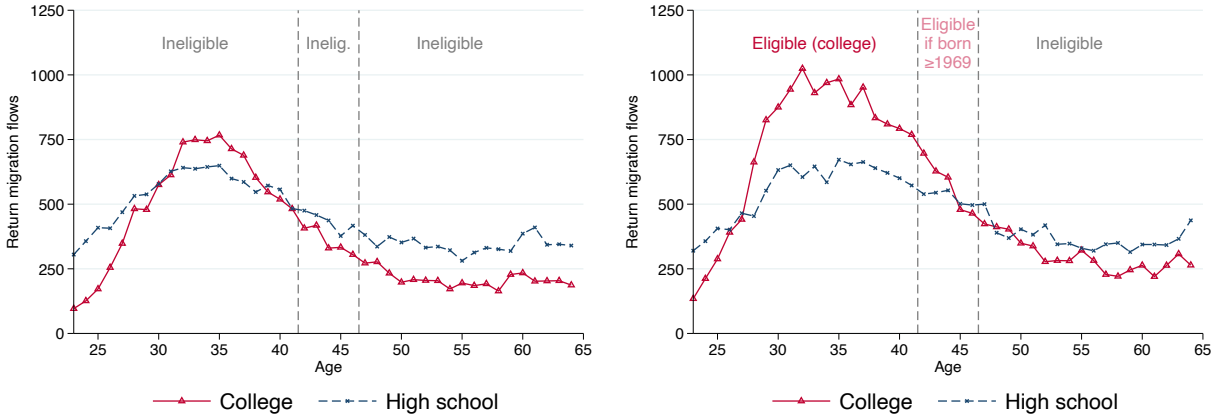


Notes: The figure plots the return migration flows of Italian citizens, 23-64 years old, born in Italy between 1954-1988, with at least a high school diploma, by eligibility for the 2010 tax scheme. Flows are displayed as raw levels, and the ineligible group is partitioned into three subgroups. *Source*: authors' elaboration on Istat data.

Figure A.2: Return migration by age, pre- and post-2010 tax scheme

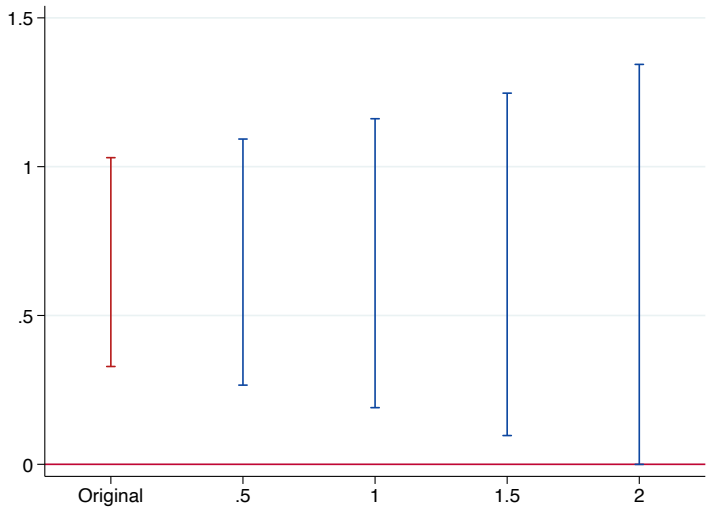
(a) pre-period (2006-2010)

(b) post-period (2011-2015)



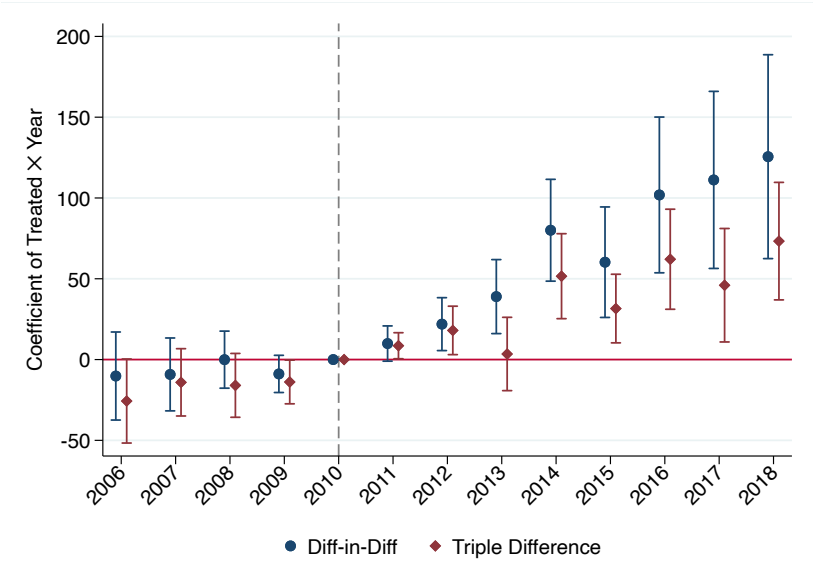
Notes: the figures plot the total number of Italians 23-64 years old returning to Italy (a) between 2006-2010 and (b) between 2011-2015, by age at return migration (x-axis) and by education level (college and high school graduates). *Source*: authors' elaboration on Istat data.

Figure A.3: Robustness: parallel trends sensitivity analysis (Istat data)



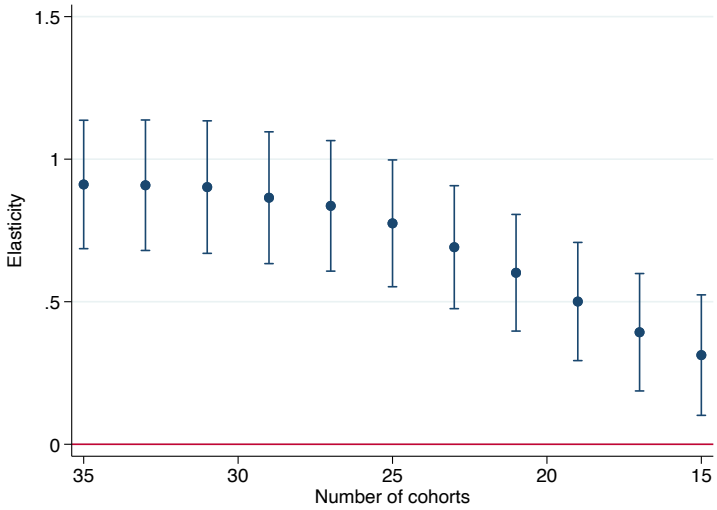
Notes: the figure implements the test suggested by Rambachan and Roth (2023), which bounds the relative magnitude of post-period violations of the parallel trends assumption relative to the maximum violation in the pre-period ($M = 1$ when they are equal), based on the Triple Diff point estimate for year 2016 (displayed in Figure 5(a)).

Figure A.4: Yearly effect of eligibility on return migration flows (in levels)



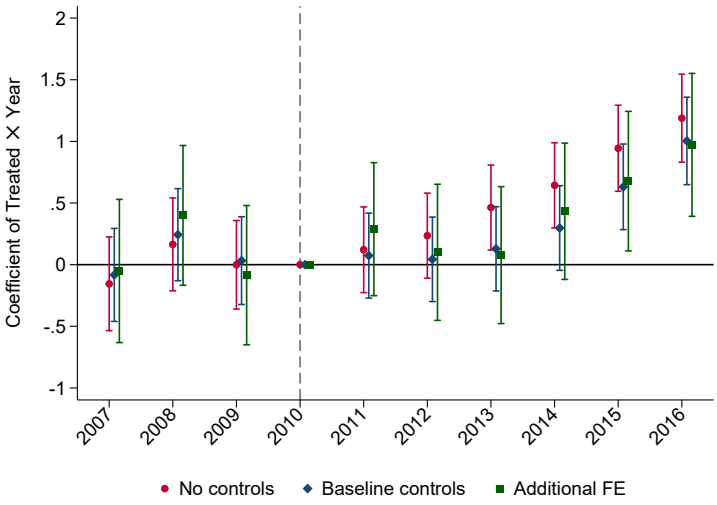
Notes: the figure plots the estimated coefficients β_τ (and 95% C.I.) of the interactions between the treated dummy and year dummies. Observations: year by birth cohort (exact) by education cells. The dependent variable is the number of returnees in each cell. The Diff-in-Diff regression includes year and group (cohort-education) fixed effects, while the Triple Difference also include cohort-year and education-year FEs. Standard errors are clustered at the cohort-by-education group (70 clusters).

Figure A.5: Robustness: restricting birth cohort bandwidth (Istat data)



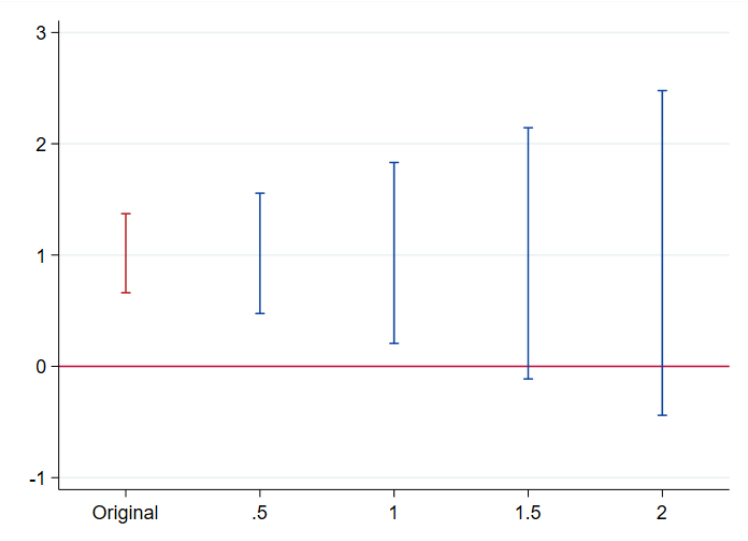
Notes: the figure plots the elasticity of return migration with respect to the average net-of-tax-rate and the 95% C.I. from the Triple DiD regression in Equation 1, where the unit of observation is a cell defined by education (high school and college), exact birth cohort, and year (2006-2015). The elasticity is obtained by dividing the $Eligible * Post$ coefficient by the average outcome in the pre-2010 period for the eligible, and scaling it by the percent change in the average net-of-tax rate for an individual earning 57,600 euros. Fixed effects included: cohort-education, cohort-year, education-year. Birth cohorts: the number in the graph refers to the number of cohorts (35 is 1954-1988, 33 is 1955-1987, .., 15 is 1964-1978). Sample: Italian citizens 23-64 years old, with at least a high school diploma, moving from abroad to Italy between 2006 and 2015 (Istat data).

Figure A.6: Yearly effect of eligibility on the probability of leaving Germany



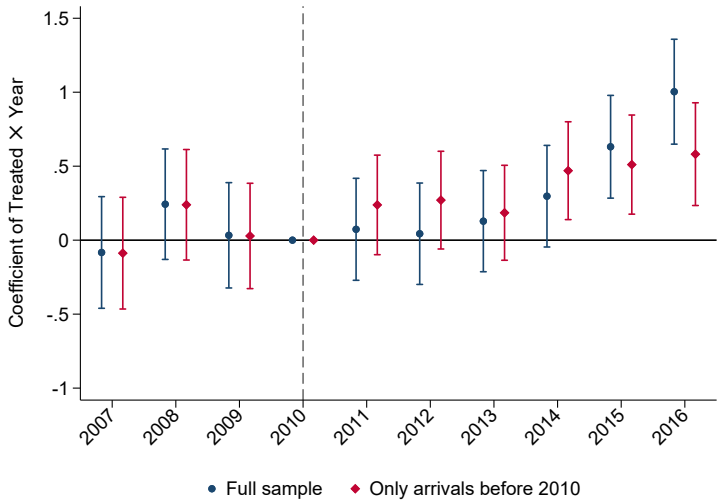
Notes: Observations: individuals by year (2006-2016). The figure plots the estimated coefficients β_τ (and 95% C.I.) from: $L_{igt} = \sum_\tau \beta_\tau Treat_g * \mathbb{1}(t = \tau) + \gamma_g + \psi' X_{igt} + \lambda_t + \epsilon_{igt}$. The dependent variable is the probability of leaving the register in year t conditional on being employed in $t-1$. Sample is Italian citizens 23-64 years old born between 1954-1988, with at least high school diploma, and at least one employment spell in Germany between 2006-2016. "Eligible" is a dummy equal to 1 if birth year is equal or greater than 1969 and education level is college. Baseline controls include birth cohort, education, sex, age at entry, and years in the registry fixed effects. Standard errors are clustered at the individual level. *Source*: IEB data.

Figure A.7: Robustness: parallel trends sensitivity analysis (IEB data)



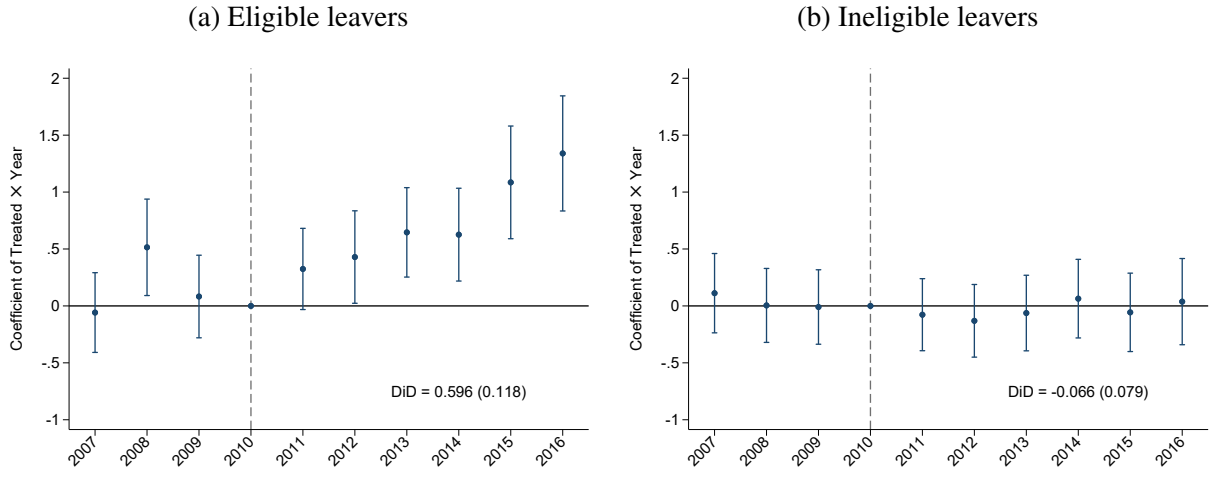
Notes: the figure implements the test suggested by Rambachan and Roth (2023), which bounds the relative magnitude of post-period violations of the parallel trends assumption relative to the maximum violation in the pre-period ($M = 1$ when they are equal), based on the point estimate for year 2016 (displayed in Figure A.6). *Source*: IEB data.

Figure A.8: Yearly effect of eligibility on the probability of leaving Germany, only arrivals before 2010



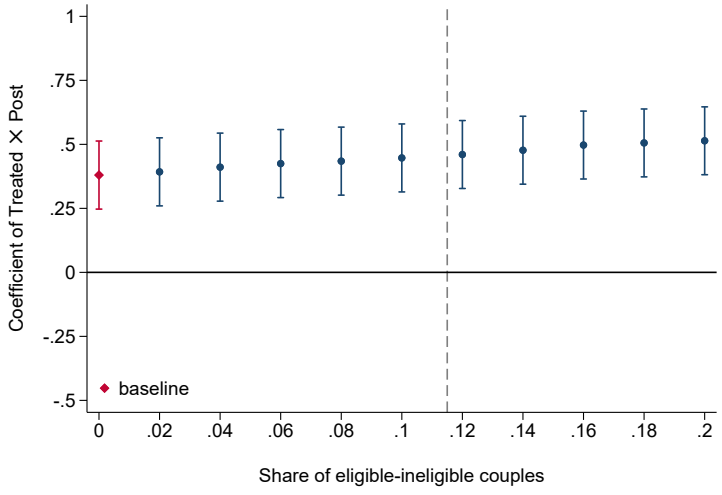
Notes: Observations: individuals by year (2006-2016). The figure plots the estimated coefficients β_τ (and 95% C.I.) from: $L_{igt} = \sum_\tau \beta_\tau Treat_g * \mathbb{1}(t = \tau) + \gamma_g + \psi' X_{igt} + \lambda_t + \epsilon_{igt}$. The dependent variable is the probability of leaving the register in year t conditional on being employed in $t-1$. Sample is Italian citizens 23-64 years old born between 1954-1988, with at least high school diploma, and at least one employment spell in Germany between 2006-2016, and who arrived in Germany before 2010. "Eligible" is a dummy equal to 1 if birth year is equal or greater than 1969 and education level is college. Baseline controls include birth cohort, education, sex, age at entry, and years in the registry fixed effects. Standard errors are clustered at the individual level. *Source*: IEB data.

Figure A.9: Spillovers in the workplace between eligible and non-eligible



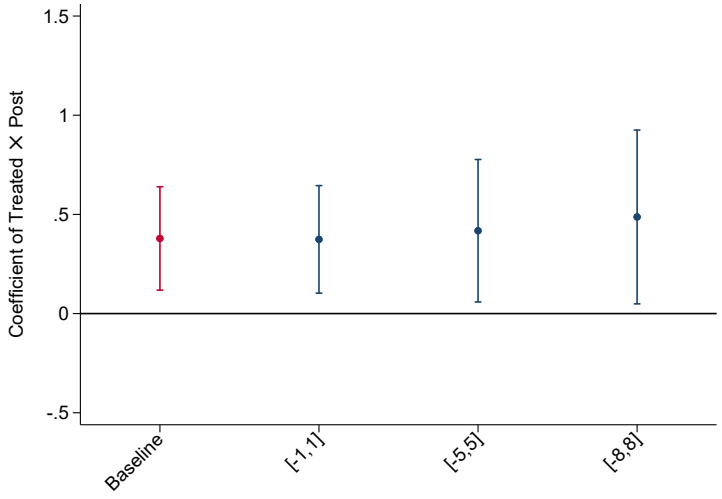
Notes: Observations: firm by year (2006-2016). The figures plot the estimated coefficients β_τ (and 95% C.I.) obtained from: $Y_{ft} = \sum_\tau \beta_\tau \, Exposure_f \times \mathbb{1}(t = \tau) + \gamma \, Exposure_f + \lambda' X_{ft} + \psi_{r(f)} + \epsilon_{ft}$, where Y_{ft} is the share of eligible or non-eligible leavers in firm f in year t, and $Exposure_f$ is a dummy that takes value 1 if firm f employed at least one eligible worker in the pre-2010 period, and 0 otherwise. $Exposure_f$ is interacted with year dummies for all $\tau \in [2007, 2016]$, excluding 2010. X_{ft} is a vector of time-varying firm-level characteristics including firm size and firm wage premia (AKM coefficients for the periods 2007–2013 and 2014–2017). $\psi_{r(f)}$ are region fixed effects, where $r(f)$ denotes the region (Land) in which firm f is located, and ϵ_{ft} is the error term. *Source*: IEB data.

Figure A.10: Bounding effects to SUTVA violations: eligible-ineligible couples



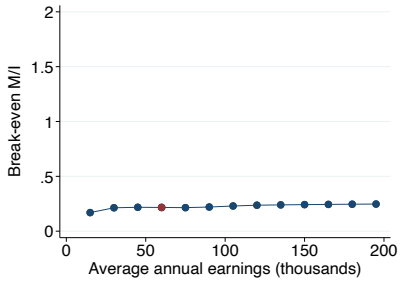
Notes: The figure reports the point estimates (and 95% C.I.) for specifications that account for different degrees of potential SUTVA violations. We vary the share of eligible-ineligible couple. Observations: individuals by year (2006-2016). The dependent variable is the probability of leaving the register in year t conditional on being employed in $t-1$. Sample is Italian citizens 23-64 years old born between 1954-1988, with at least high school diploma, and at least one employment spell in Germany between 2006-2016. "Eligible" is a dummy equal to 1 if birth year is equal or greater than 1969 and education level is college. Baseline controls include birth cohort, education, sex, age at entry, and years in the registry fixed effects. Standard errors are clustered at the individual level. *Source*: IEB data.

Figure A.11: Bounding effects to SUTVA violations: cohorts close to the 1969 cutoff



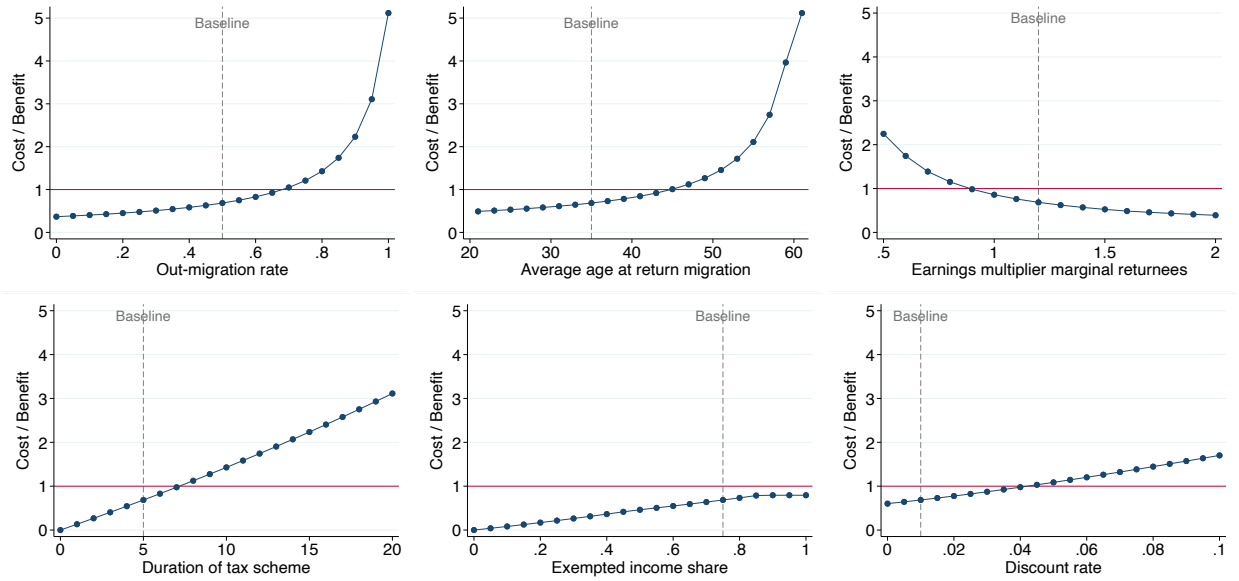
Notes: The figure reports the point estimates (and 95% C.I.) for specifications that exclude cohorts around the 1969 eligibility cut-off. The x-axis labels indicate the number of birth cohorts excluded on both sides of the cut-off. Observations: individuals by year (2006-2016). The dependent variable is the probability of leaving the register in year t conditional on being employed in $t-1$. Sample is Italian citizens 23-64 years old born between 1954-1988, with at least high school diploma, and at least one employment spell in Germany between 2006-2016. "Eligible" is a dummy equal to 1 if birth year is equal or greater than 1969 and education level is college. Baseline controls include birth cohort, education, sex, age at entry, and years in the registry fixed effects. Standard errors are clustered at the individual level. *Source*: IEB data.

Figure A.12: Sensitivity of break-even marginal-to-inframarginal ratio to the average earnings level



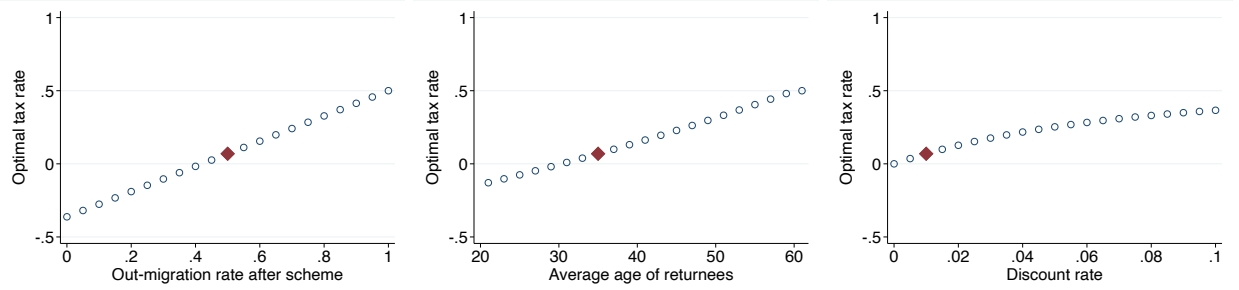
Notes: the graph plots the break-even marginal/infra-marginal ratio M/I for different values of average gross annual earnings, keeping all the others fixed at their baseline value (Table A.11). The red diamond indicates the baseline value used to obtain the break-even threshold in Section 6.

Figure A.13: Sensitivity of cost-benefit ratio to parameter values



Notes: the graphs plot the cost/benefit ratios, obtained using our estimated migration response (share of marginal returnees $\hat{m} = 0.241$), for different values of each parameter, keeping all the others fixed at their baseline value (Table A.11), denoted by the vertical lines. The horizontal lines at 1 indicate the break-even cost/benefit ratio.

Figure A.14: Revenue maximizing tax rate, depending on parameter values



Notes: the graphs plot the present-discounted revenue maximizing tax rate shown in Expression (4) for different values of each parameter, keeping all the others fixed at their baseline value (Table A.11).

Table A.1: Characteristics of Italians in the German Social Security Data

	Pre-period (2006-2010)		Post-period (2011-2016)	
	Eligible	Non-eligible	Eligible	Non-eligible
Demographic characteristics				
Female	0.43	0.37	0.43	0.38
Age	31.93	39.20	34.73	42.83
Age at entry	22.62	19.57	24.57	19.92
Years in Germany	8.45	18.81	9.30	22.08
Leavers	2.67	0.90	3.73	1.26
Earnings				
Gross annual earnings (FTE)	47703	31971	45002	31114
Net annual earnings (FTE)	28499	20234	27074	19798
Firm characteristics				
Average firm size	1574	1225	1531	1153
Firm size 1-20	0.13	0.26	0.13	0.26
Firm size 21-100	0.22	0.28	0.22	0.28
Firm size >100	0.65	0.46	0.64	0.45
Firm fixed effect	0.09	0.01	0.07	-0.01
Sector				
Manufacturing	0.21	0.29	0.18	0.27
Commerce	0.14	0.19	0.13	0.19
Service	0.14	0.29	0.16	0.31
IT, Communication, Science	0.25	0.05	0.26	0.05
Finance, Real Estate	0.05	0.03	0.04	0.03
Social Work, Education	0.09	0.02	0.10	0.02
Healthcare	0.08	0.07	0.08	0.07
Others	0.06	0.06	0.05	0.06
Observations	57085	630717	140806	1071418

Notes: the table displays the average characteristics of Italian citizens, 23-64 years old born between 1954-1988, with at least high school diploma, and at least one employment spell in Germany between 2006-2016, separately for the pre- (2006-2010) and post-period (2011-2016) and by treatment status: college graduates born in 1969 or after (eligible), high school graduates born in 1969 or after (ineligible), and college graduates born before 1969 (ineligible). Earnings are expressed in 2018 euros. *Source*: authors' elaboration on IEB data.

Table A.2: Effect of eligibility for tax incentives on return migration flows (levels)

	Outcome: N. of Return Migrants					
	2010 scheme only			2010 & 2015 schemes		
	(1) DiD	(2) DiD	(3) Triple Diff	(4) DiD	(5) DiD	(6) Triple Diff
Eligible × Post	763.6**	54.5***	40.8***	949.7***	74.1***	50.4***
	(280.7)	(12.3)	(8.6)	(204.2)	(17.1)	(11.0)
Observations	20	670	670	26	880	880
R-squared	0.965	0.729	0.929	0.978	0.661	0.940
Avg Outcome Pre	1753.2	103.1	103.1	1753.2	103.1	103.1
Marginal/Inframarginal	0.337	0.503	0.376	0.334	0.618	0.420
Share Marginal	0.252	0.360	0.269	0.251	0.391	0.266
Year FE	✓	✓	✓	✓	✓	✓
Group FE	✓	✓	✓	✓	✓	✓
Cohort × Year FE			✓			✓
Educ × Year FE			✓			✓
Elasticity	1.003	1.218	0.911	1.248	1.656	1.125
	(0.369)	(0.276)	(0.192)	(0.268)	(0.382)	(0.246)

Notes: Observations: groups g by years t, where the group is a binary treatment indicator in Columns 1 and 4, and a birth cohort (exact) by education cell in Columns 2-3 and 5-6. Sample years: 2006-2015 in Columns 1-3, 2006-2018 in Columns 4-6. The dependent variable is the number of Italian citizens 23-64 years old, born in Italy between 1954-1988 and with at least a high school diploma, moving to Italy from abroad in year t (Istat data) from all foreign countries. All columns include year and group fixed effects. Columns 3 and 6 include year by cohort and year by education FEs. "Average Outcome Pre" refers to the treated group in the pre-period. M/I is the implied marginal-to-inframarginal ratio, obtained by dividing the Eligible × Post coefficient by the mean outcome for the treated in the pre-period plus the change in the mean outcome for the untreated. The elasticity is the coefficient in percentage of Average Outcome Pre, divided by the percent change in the average net-of-tax rate for an individual earning 57,600 euros; the semi-elasticity is simply the coefficient (divided by 100) scaled by the percent change in the net-of-tax rate. Standard errors (in parenthesis) are robust in Columns 1 and 4, and clustered at the cohort-by-education group (70 clusters) in Columns 2-3 and 5-6. * p < 0.10 ** p < 0.05 *** p < 0.01.

Table A.3: Robustness: dropping border countries to Italy

	Outcome: Return Migration Rate					
	(1)	(2)	(3)	(4)	(5)	(6)
	Baseline	No Austria	No France	No Switzerland	No Slovenia	No All
Eligible $*$ Post	0.328***	0.324***	0.341***	0.307***	0.329***	0.315***
	(0.084)	(0.086)	(0.092)	(0.091)	(0.084)	(0.103)
Observations	7,280	7,000	7,000	7,000	7,000	6,160
R-squared	0.863	0.865	0.859	0.861	0.864	0.860
Avg Outcome Pre	0.832	0.842	0.826	0.845	0.832	0.852
Marginal/Inframarginal	0.392	0.382	0.415	0.370	0.394	0.383
Share Marginal	0.242	0.237	0.257	0.231	0.243	0.241
Year FE	✓	✓	✓	✓	✓	✓
Group FE	✓	✓	✓	✓	✓	✓
Cohort $\times$ Year FE	✓	✓	✓	✓	✓	✓
Educ $\times$ Year FE	✓	✓	✓	✓	✓	✓
Orig $\times$ Year FE	✓	✓	✓	✓	✓	✓
Sex $\times$ Year FE	✓	✓	✓	✓	✓	✓
Cohort $\times$ Orig $\times$ Sex $\times$ Year FE	✓	✓	✓	✓	✓	✓
Educ $\times$ Orig $\times$ Sex $\times$ Year FE	✓	✓	✓	✓	✓	✓
Elasticity	0.908	0.886	0.952	0.836	0.911	0.852
	(0.233)	(0.234)	(0.257)	(0.248)	(0.234)	(0.279)
Semi-Elasticity (in pp.)	0.008	0.007	0.008	0.007	0.008	0.007
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)

Notes: Observations: groups g by years t (2006-2015), where groups are combinations of birth cohort (5-years bins), education, origin country and sex. Column 1 is the baseline (i.e., Column 3 of Table 1); Columns 2-5 drop one bordering country at a time, while Column 6 drops all of them (Austria, France, Switzerland, Slovenia). The dependent variable is the number of Italian citizens, born in Italy between 1954-1988 and with at least a high school diploma, moving to Italy from abroad in year t (Istat data), divided by the stock of Italian expatriates as of 2010 (OECD DIOC data), times 100. "Average Outcome Pre" refers to the treated group in the pre-period. M/I is the implied marginal-to-inframarginal ratio, obtained by dividing the Eligible $\times$ Post coefficient by the mean outcome for the treated in the pre-period plus the change in the mean outcome for the untreated. The elasticity is the coefficient in percentage of Average Outcome Pre, divided by the percent change in the average net-of-tax rate for an individual earning 57,600 euros. Observations are weighted by the stock of Italian expatriates in each group as of 2010, based on the OECD DIOC data. Standard errors (in parentheses) are clustered at group level. * p < 0.10 ** p < 0.05 *** p < 0.01.

Table A.4: Robustness to alternative samples (German data)

	Outcome: Probability of leaving					
	(1)	(2)	(3)	(4)	(5)	(6)
Alternative samples:	Baseline	Entry < 2010	No uni students	1958-1984	No 1969-1970	No 2016
Eligible × Post	0.369***	0.445***	0.381***	0.310**	0.336**	0.300**
	(0.133)	(0.130)	(0.133)	(0.144)	(0.137)	(0.137)
Observations	1,900,025	1,824,903	1,898,576	1,579,533	1,769,663	1,684,329
Individuals	279443	249575	279031	224267	261510	270257
R-squared	0.020	0.010	0.020	0.019	0.020	0.019
Avg Outcome Pre	2.673	2.673	2.673	2.756	2.774	2.673
Year FE	✓	✓	✓	✓	✓	✓
Controls	✓	✓	✓	✓	✓	✓
Cohort x Education FE	✓	✓	✓	✓	✓	✓
Cohort x Year FE	✓	✓	✓	✓	✓	✓
Education x Year FE	✓	✓	✓	✓	✓	✓
Industry x Year FE	✓	✓	✓	✓	✓	✓
Occupation x Year FE	✓	✓	✓	✓	✓	✓
State x Year FE	✓	✓	✓	✓	✓	✓

Notes: Observations: individuals by years (2006-2016). The dependent variable is the probability of leaving the register in year t conditional on being employed in $t-1$, times 100. Sample is Italian citizens 23-64 years old born between 1954-1988, with at least high school diploma, and at least one employment spell in Germany between 2006-2016. "Eligible" is a dummy equal to 1 if birth year is equal or greater than 1969 and education level is college and "Post" is a dummy equal to 1 for the post period years (2011 and after). Baseline controls include birth cohort, education, sex, age at entry, and years in the registry fixed effects. All columns include fixed effects for the two-way interactions between birth cohort, education (college indicator) and year, as well as industry-year, occupation-year and state-year fixed effects. Column 2 limits the sample to individuals in the German data as of 2010. Column 3 excludes university students arrived after 2010. Column 4 restrict the birth cohort bandwidth to the 1958-1984 cohorts. Column 5 excludes birth cohorts 1969-1970. Column 6 excludes the calendar year 2016. Standard errors are clustered at the individual level. * p < 0.10 ** p < 0.05 *** p < 0.01. *Source*: IEB data.

Table A.5: Robustness: progressively including post-2010 arrival cohorts

	Outcome: Probability of leaving					
	(1)	(2)	(3)	(4)	(5)	(6)
Year of arrival in Germany:	<= 2010	<= 2011	<= 2012	<= 2013	<= 2014	<= 2015
Eligible × Post	0.379***	0.381***	0.401***	0.378***	0.383***	0.369***
	(0.130)	(0.131)	(0.132)	(0.132)	(0.133)	(0.133)
Observations	1,838,028	1,852,257	1,868,634	1,883,381	1,894,782	1,900,025
Individuals	252670	256525	261768	267841	274262	279443
R-squared	0.011	0.013	0.015	0.017	0.018	0.020
Avg Outcome Pre	2.673	2.673	2.673	2.673	2.673	2.673
Year FE	✓	✓	✓	✓	✓	✓
Controls	✓	✓	✓	✓	✓	✓
Cohort x Education FE	✓	✓	✓	✓	✓	✓
Cohort x Year FE	✓	✓	✓	✓	✓	✓
Education x Year FE	✓	✓	✓	✓	✓	✓
Industry x Year FE	✓	✓	✓	✓	✓	✓
Occupation x Year FE	✓	✓	✓	✓	✓	✓
State x Year FE	✓	✓	✓	✓	✓	✓

Notes: Observations: individuals i by year t. The dependent variable is the probability of leaving the register in year t conditional on being employed in $t-1$, times 100. Sample is Italian citizens 23-64 years old, born between 1954-1988 and with at least a high school diploma. Baseline controls include birth cohort, education, sex, age at entry, and years in the registry fixed effects. Each column progressively adds individuals in arrival cohorts from 2010 to 2015. The final column corresponds to the baseline estimate in Table 2. Standard errors are clustered at the individual level. * $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$. *Source*: IEB data.

Table A.6: Robustness: probability of leaving conditional on being employed in $t-2$

	Outcome: Probability of leaving				
	(1)	(2)	(3)	(4)	(5)
Eligible × Post	0.371***	0.372***	0.403***	0.402***	0.403***
	(0.082)	(0.126)	(0.126)	(0.126)	(0.126)
Observations	1,781,723	1,781,723	1,781,723	1,781,723	1,781,723
Individuals	264,018	264,018	264,018	264,018	264,018
R-squared	0.011	0.012	0.013	0.013	0.013
Avg Outcome Pre	2.123	2.123	2.123	2.123	2.123
Controls	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓
Cohort x Education FE		✓	✓	✓	✓
Cohort x Year FE		✓	✓	✓	✓
Education x Year FE		✓	✓	✓	✓
Industry x Year FE			✓	✓	✓
Occupation x Year FE				✓	✓
State x Year FE					✓

Notes: Observations: individuals i by year t. The dependent variable is the probability of leaving the register in year t conditional on being employed in $t-2$, times 100. Sample is Italian citizens 23-64 years old, born between 1954-1988 and with at least a high school diploma. Baseline controls include birth cohort, education, sex, age at entry, and years in the registry fixed effects. Column 2 adds fixed effects for the two-way interactions cohort-education, cohort-year, and education-year. Columns 3, 4 and 5 add industry-year, occupation-year and state-year fixed effects respectively. Standard errors are clustered at the individual level. * p $<$ 0.10 ** p $<$ 0.05 *** p $<$ 0.01. *Source*: IEB data.

Table A.7: Household-level characteristics of Italian immigrants in Germany (SUTVA)

	Treated (College, born $\geq$1969)	**Control (College, born $<$1969)**
Relationship status		
Partnered	55.52%	70.41%
Age difference		
Respondent's average age	34.96	53.93
Partner's average age	34.14	50.74
Partner's education		
No diploma	5.49%	3.14%
High school diploma	20.73%	33.43%
College	73.78%	63.43%
Partner born $\geq$ 1969 and college-educated	98.76%	15.77%
Parents		
Mother in Germany	0.32%	1.33%
Father in Germany	0.49%	1.33%

Notes: Observations: individuals in years 2007-2017. Sample is Italian citizens 23-64 years old, born between 1954-1988. Information on partners' education level is only available up to 2014. *Source*: Microcensus data (2007-2017).

Table A.8: Spanish citizens as control group and placebo

	Outcome: Log annual earnings		
	(1)	(2)	(3)
	Placebo	Eligible only	1:1 match
Treated × Post	-0.077		0.150
	(0.223)		(0.184)
Ita × Post		0.319**	-0.020
		(0.159)	(0.084)
Ita × Treated × Post			0.344*
			(0.182)
Observations	441,842	320,396	844,518
Individuals	76260	68245	152520
R-squared	0.037	0.025	0.031
Avg Outcome Pre	4.061	3.146	3.261
Controls	✓	✓	✓
Year FE	✓	✓	✓
Cohort x Education FE	✓	✓	✓
Cohort x Year FE	✓	✓	✓
Education x Year FE	✓	✓	✓

Notes: Observations: individuals by years (2006-2016). The dependent variable is the probability of leaving the register in year t conditional on being employed in $t-1$. "Italian" is a dummy equal to 1 for Italian citizens and 0 for Spanish citizens; "Eligible" is a dummy equal to 1 if birth year is equal or greater than 1969 and education level is college, and zero otherwise; "Post" is a dummy equal to 1 for the post period years (2011 and after). In Column 1, the sample is Spanish citizens only. In Column 2, the sample is Italian and Spanish citizens born on or after 1969 and with college education. In Column 3, we use a 1:1 matched sample of Italian and Spanish based on the following matching variables: education, age at entry, birth cohort, sex, initial sector, initial occupation. In all columns, the sample is limited to individuals 23-64 years old, born between 1954-1988, with at least high school diploma, and at least one employment spell in Germany between 2006-2016. Baseline controls include birth cohort, education, sex, age at entry, and years in the registry fixed effects. Standard errors are clustered at the individual level. * p < 0.10 ** p < 0.05 *** p < 0.01. *Source*: IEB data.

Table A.9: Semi-elasticity by earnings quartile, adjusted for earnings differentials

		Earnings quartile			
	All	1st	2nd	3rd	4th
Average earnings in Germany	45,657	17,267	31,079	45,158	76,839
Average earnings in Italy	29,314	17,125	24,032	29,726	44,736
$\%\Delta(1-\tau^{IT})$ using German earnings	0.395	0.200	0.309	0.393	0.473
$\%\Delta(1-\tau^{IT})$ using Italian earnings	0.298	0.198	0.266	0.300	0.391
Semi-Elasticity (using Italian earnings)	0.011	0.001	0.006	0.015	0.013

Notes: The table shows (i) the average earnings in Germany of eligible Italians (college graduates born in/after 1969) in the IEB data (average 2006-2016) by quartile, (ii) the average earnings of college graduates born in/after 1969 by quartile in the Italian Labor Force Survey (year 2010; see Appendix C for more details), (iii) the change in the average net-of-tax rate with a 75% exemption (2010 scheme) computed using the German earnings, (iv) the corresponding change in the average net-of-tax rate computed using the Italian earnings, and (v) the semi-elasticity obtained by scaling the reduced form coefficients in Table 3 by the values in (iv). *Source*: IEB data and Italian Labor Force Survey (IT-LFS).

Table A.10: Earnings selection among leavers

	Outcome: Log annual earnings	
	(1)	(2)
Eligible × Post	0.220***	0.206***
	(0.058)	(0.052)
Observations	22,313	22,308
R-squared	0.298	0.425
Avg Outcome Pre	48,521	48,521
Year FE	✓	✓
Controls	✓	✓
Cohort x Education FE	✓	✓
Cohort x Year FE	✓	✓
Education x Year FE	✓	✓
Industry x Year FE		✓
Occupation x Year FE		✓
State x Year FE		✓

Notes: The dependent variable is log annual earnings. Sample is Italian citizens 23-64 years old born between 1954-1988, with at least high school diploma, and at least one employment spell in Germany between 2006-2016. The sample only includes leavers; there is one observation for each individual, corresponding to the year in which the individual leaves the IEB data. "Eligible" is a dummy equal to 1 if birth year is equal or greater than 1969 and education level is college and "Post" is a dummy equal to 1 for the post period years (2011 and after). Baseline controls include birth cohort, education, sex, age at entry, and years in the registry fixed effects. Robust standard errors in parenthesis. * p < 0.10 ** p < 0.05 *** p < 0.01. *Source*: IEB data.

Table A.11: Baseline parameter values

Description	Parameter	Value
Duration	d	5
Exempted share	$1-s$	0.75
Average age at return	a	35
Annual earnings	w	57,600
Earnings multiplier M/I	θ	1.2
Out-migration rate	δ	0.5
Discount factor	β	0.99

Notes: Duration: average number of years of exemption under the 2010 scheme (see Appendix B for details). Exempted share: average between 0.8 (women) and 0.7 (men). Earnings (in EUR): average gross income of tax scheme beneficiaries (INPS, 2025). Earnings multiplier of marginal returnees relative to the infra-marginal estimated in Table A.10. Out-migration rate from the literature on foreigner tax schemes (Giarola et al., 2023; Kleven et al., 2014; Timm, Giuliodori and Muller, 2025). Discount factor: one minus the average annual interest rate on newly issued Italian government bonds between 2010-2020.

B The Italian tax schemes

In this Appendix we describe the preferential tax schemes for returnees and foreigners implemented in the 2010s, including detailed eligibility criteria and legislative changes. Table B.1 summarizes their key features.

The 2010 scheme "Controesodo"

Law 238/2010 (*Legge Controesodo*), approved by the Parliament on December 30, 2010, introduces the first tax scheme for return migrants not restricted to a specific occupation (a dedicated scheme for researchers and professors is in place since 2003). The stated goal of Law 238 was "to contribute to the country economic growth by rewarding the human, cultural and professional experiences gained by EU citizens who resided in Italy [..], study, work or graduated abroad, and who decide to move back to Italy".[71]

Eligibility. The 2010 tax scheme has five eligibility requirements: i) holding a university degree (at least a 3-year degree) earned in Italy or abroad[72]; ii) being born on or after January 1st, 1969; iii) being a EU citizen; iv) having resided in Italy for at least 2 years prior to moving abroad; v) having spent at least 2 years abroad prior to moving to Italy.[73] Importantly, despite the birth cohort restriction included all college graduates "born on or after January 1st 1969", the tax scheme was advertised by most media outlets as the tax scheme for the "under 40" graduates (*"laureati under 40"*), as shown in Figure B.1 for the prominent Italian economic newspaper (Il Sole 24 Ore) as well as for an online newspaper in Italian-language in Germany (Il Corriere d'Italia).[74]

[71] Law 238/2010 was a rare instance of a Law initiated by a group of members of Parliament, rather than by the government, and specifically a bipartisan group.

[72] Formally, Law 238/2010 states that the college degree had to obtained by "January 20, 2009", which would exclude most individuals who earned their degree abroad just before returning; however, this requirement was relaxed in early 2012 with Law 14/2012, which stated that individuals were also eligible if they obtained their degree "in the two years before returning". A clarification on this point was issued on May 4, 2012 with the *Circolare n. 14/E* of the Italian revenue agency (*Agenzia delle Entrate*).

[73] Additionally, Law 238 explicitly excludes employees who were temporarily abroad under a contract with their Italian employer while continuously hired (*tempo indeterminato*), unless they went to study abroad while on unpaid leave (*aspettativa non retribuita*).

[74] This was arguably due to the ambiguous wording of Law 238/2010, requiring the eligibility criteria – including being born on or after January 1st 1969 – to be satisfied "as of January 20th 2009", which was interpreted incorrectly

Income tax exemption. The exempted share is 70% for men and 80% for women. These exemptions apply to labor earnings (employment, self-employment, and income from a newly established unincorporated business) sourced in Italy. Figure 2 in the paper simulates the effect of a 75% exemption on the average and marginal income tax rates for different levels of gross earnings, for a representative taxpayer with solely employment earnings and no dependents. Figure B.4 show the corresponding graphs excluding compulsory social security contributions (payroll taxes) paid by the employee, which are unaffected by the tax schemes.

Duration. Law 238/2010 states that the tax incentives would expire on December 31, 2013.[75] This expiration date was postponed to December 31, 2015 by a *Milleproroghe* decree in late 2011.[76] Similarly, in late 2014 the expiration date was further extended to December 31, 2017 by another *Milleproroghe* decree (D.L. 192/2014). However, the latter eventually applied only to those who returned to Italy by the end of 2015, as those who returned afterwards were subject to the 2015 scheme (D.Lgs. 147/2015), which we discuss below. This sequence of adjustments implies that the effective duration of the scheme was quite uncertain (especially until early 2012), and eventually ended up varying based on the actual year of return migration. Figure B.2 displays the expected duration (*ex ante*), the tax-scheme years returnees were expecting at the time they returned, as well as the effective duration (*ex post*), the years they eventually benefited for, as a function of the year of return migration (vertical axis). The expected duration was between 2-4 years, with the shortest being for those who returned in the first half of 2014 (2 years) and the longest for those who returned in 2012 (4 years); a simple average across years 2011-2015 yields an **expected duration of 3 years**. Instead, the effective duration ranges between 3-7 years; a simple average across years 2011-2015 yields an **effective duration of 5 years**, which we use in our cost-benefit analysis.

as "being under 40".

[75]This was the original deadline in the first draft of *Controesodo*, discussed in the Parliament on January 20, 2009. Presumably, the policymaker had originally conceived a duration of 5 years.

[76]The *Milleproroghe* ("a thousands extensions") is is a government decree issued at the end of each calendar year to extend the deadline of several public programs. The 2011 edition was D.L. 216/2011 (Article 29), converted in Law on February 24, 2012 (Law 14/2012).

The 2015 scheme "Impatriati"

In late 2015, the tax scheme was replaced by a new scheme by Legislative Decree 147/2015 *Impatriati* ("back to homeland"; *D.Lgs. 147/2015, Articolo 16*). Returnees who moved back to Italy starting from 2016 were subject to this new scheme.

The 2015 scheme entails four key differences with the 2010 scheme. First, the exempted income share is lower: initially 30%, raised to 50% with an amendment in 2016. Second, the duration is 5 fiscal years (the year of return and the subsequent four), whereas the 2010 scheme was of an uncertain duration. Third, the birth cohort restriction, the pre-residency, and the EU citizenship requirements are eliminated.[77] Fourth, the high-skilled requirement is slightly less restrictive, as eligibility requires either: a) holding a college degree and having spent 2 years abroad; or b) being a "highly specialized worker", defined as working in a managerial or other highly specialized occupation (ISCO 1,2,3), and having spent 5 years abroad.

Overall, relative to the 2010 scheme, the 2015 scheme is less generous in terms of exempted income share, but it entails a longer and clear duration; Figure B.3 shows that, under reasonable discount rates, the two schemes are practically equivalent in terms of their tax rate reduction. The eligible pool is larger, as it includes all EU and non-EU citizens (regardless of any pre-residency in Italy), individuals born before 1969, as well as non-college-educated highly specialized workers.

The 2019 reform

In April 2019, the tax incentives were considerably expanded with the *Decreto Crescita* ("decree for growth"; D.L. 34/2019, converted to Law 58/2019). The 2019 reform modified the *Impatriati* regime in two key respects. First, it removed the high-skilled requirement; as a result, any Italian, EU or non-EU citizen who moves to Italy after 2 years of residence abroad is eligible for reduced income taxes on labor earnings, regardless of their age and education level. Second, it increased

[77] Non-EU citizens still need a visa, *permesso di soggiorno* or other legal status. In addition, with the 2015 scheme, Italian citizens are required to having been enrolled in AIRE to prove their stay abroad (which was not required by the 2010 scheme, nor after 2019). In addition, previously ineligible college graduates born before 1969 were allowed to access the 2010 scheme until its expiration in 2017, if they had returned until 2015.

the generosity, with an exempted share of 70%, increasing to 90% for individuals moving to the Southern regions of Italy.[78] While the standard duration remained 5 fiscal years, it can be extended up to 10 years if individuals meet specific criteria related to developing "ties" to Italy, such as having one or more children or buying a house designated as their primary residence in Italy.[79]

The 2023 reform

The generous regime was eventually tightened by a government decree in late 2023 (valid from January 1, 2024), which reinstated the key features of the 2015 scheme: the high-skilled requirement, the 50% exempted share, and a 5-year duration with no extension allowed. In addition, it increased the minimum stay abroad to 3 years (6-7 years in case of intra-group transfers), and it capped the tax exemption at €600,000 of gross earnings.

Table B.1: Tax schemes for return migrants in Italy

Year	Regime	Valid from	Exemption†	Duration‡	Eligibility requirements*
2003	Researchers and professors	2004	90%	4+ years	Researcher or university professor, 2 years abroad
2010	"Controesodo" (Law 238/2010)	2011	70-80%	3-7 years	College degree, born 1969 or later, 2 yrs abroad, 2 yrs in Italy before
2015	"Impatriati" (D.Lgs. 147/2015, Art. 16)	2016	50%	5 years	Either a) college degree + 2 yrs abroad, or b) highly specialized + 5 yrs abroad
2019	"Decreto Crescita" (DL 39/2019, Law 58/2019)	2020	70%	5-10 years	2 years abroad
2023	"Impatriati 2024" (DL 209/2023)	2024	50%	5 years	College degree or highly specialized, 3 years abroad

(*): eligibility for 2010 scheme also requires an EU citizenship, while the other schemes do not have any citizenship restrictions, as long as previous residence is not in a tax haven.
(†): the exempted percentages indicate the share of gross earnings exempted from income tax (IRPEF); payroll contributions are unaffected. Only labor earnings benefit from the exemption; this includes employment, self-employment, and some business income from unincorporated (*società di persone*) individual firms (*ditta individuale*). Exempted shares: 2010 scheme: 70% for men, 80% for women; 2015 scheme: 50% since 2016 (initially 30%); 2019 scheme: 50% for professional sport players, 90% if locate in Southern regions (Abruzzo, Molise, Campania, Basilicata, Puglia, Calabria, Sicilia, Sardegna).
(‡): Figure B.2 shows the exact duration for the 2010 scheme. For the 2019 scheme (2019-2023), the extended duration beyond 5 years is granted to individuals with children and/or who buy a property where they establish their primary residence. From 2019, these extensions apply to researchers and professors as well, with a maximum duration of 13 years.

[78] A subsequent change limited the exemption to 50% for professional sport players.

[79] The 90% exemption for Southern residents is limited to 5 years; the standard 70% exemption applies afterwards if eligible for the extension.

Figure B.1: Media coverage of the 2010 scheme

Il Sole 24 ORE

Data 24-12-2010
Pagina 31
Foglio 1

Fisco. Via libera definitivo del Senato al Ddl per incentivare il ritorno dei laureati

Arriva lo sconto Irpef per i rientri dei «cervelli»

Bonus diverso in base al genere e valido sino a dicembre 2013

Laura Cavestri
MILANO

Lasciare carriere, stipendi e opportunità professionali all'estero per uno sconto fiscale in Italia – differenziato tra uomini e donne – che durerà fino al 31 dicembre 2013.

articoli per favorire i laureati under 40 che hanno maturato esperienze all'estero e desiderano rientrare in Italia per attività di lavoro dipendente, autonomo o d'impresa.

Le categorie di beneficiari sono due. Innanzitutto cittadini-lavoratori, dell'Unione europea, laureati e nati dopo il 1° gennaio 1969, che hanno risieduto continuativamente per almeno ventiquattro mesi in Italia e che, sebbene residenti nei loro Paesi d'origine, hanno svolto un'attività dipendente, autonoma o di impresa in un Paese terzo negli ultimi due mesi. Seconda categoria sono di studenti

voro autonomo in Italia, trasferendovi il proprio domicilio, nonché la propria residenza, entro tre mesi e per almeno 5 anni. Solo così scatterà uno sconto Irpef del 30% sulla base imponibile per gli uomini e del 20% per le donne.

La norma esclude chi ha già usufruito, in passato, degli incentivi per il "rientro dei cervelli" stabiliti dal decreto competitività (185/2008) e quelli della Visco Sud. Inoltre, è fuori anche chi studia o lavora all'estero in funzione di un rapporto di lavoro a tempo indeterminato con pubbliche am-

gioni – nell'ambito della loro disponibilità – potranno destinare una quota degli alloggi di edilizia residenziale pubblica per non meno di 24 mesi ai giovani "cervelli" che rientrano.

Sul fronte previdenziale, invece, il Governo avrà l'obbligo di stipulare accordi bilaterali con gli Stati di provenienza per attuare la totalizzazione dei contributi nazionali con quelli versati a gestioni pensionistiche estere.

Chi ottiene il beneficio ma opta di ritrasferire all'estero domicilio o residenza prima che siano scaduti cinque anni dalla fruizione dello sconto fi-

Corriere d'Italia
Pubblicazione italiana in Germania

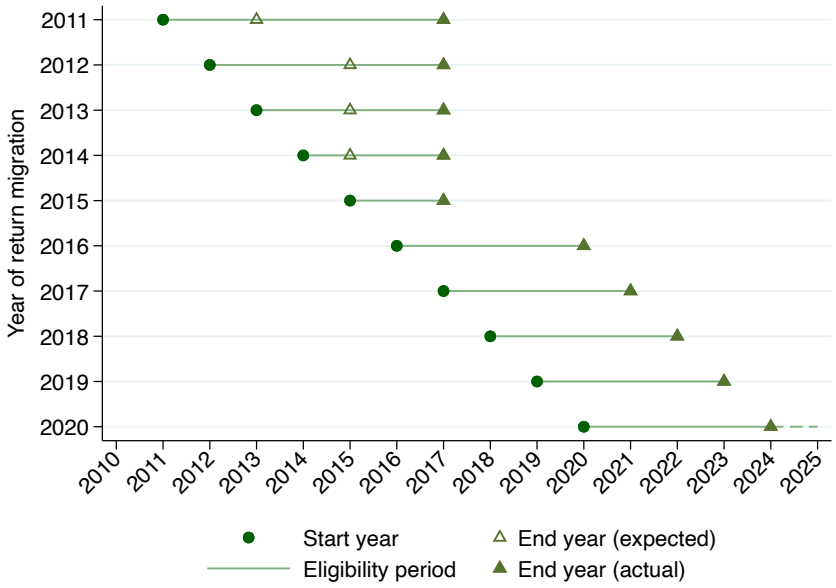
Giovani: incentivi per il rientro

13. Februar 2011 AUTORE Sabrina Sole 626 0

La norma si chiama "incentivi fiscali per il rientro dei lavoratori in Italia" e, caso ormai raro in Paese, è una legge bipartisan, voluta cioè da destra e sinistra italiane insieme. A potere godere delle agevolazioni non sono solo i cittadini italiani, ma anche quelli comunitari: un punto che serve a recuperare quei cervelli stranieri poco attratti dalle opportunità che gli riserva il Bel Paese. Entrambi devono essere però laureati e al di sotto dei 40 anni, devono aver risieduto in Italia per almeno 24 mesi e svolto un'attività di studio o di lavoro fuori dal Paese d'origine o dall'Italia per un altrettanto periodo. Per ottenere gli incentivi non basta solo tornare, ma occorre essere assunti come dipendenti, esercitare un'attività di impresa o di lavoro autonomo e trasferire il domicilio entro 3 mesi dall'avvio dell'attività o dall'assunzione. Gli incentivi sono sotto forma di riduzione del reddito imponibile, che viene calcolato solo al 20% per le donne e al 30% per gli uomini, per un periodo di tre anni e fino al 2013.

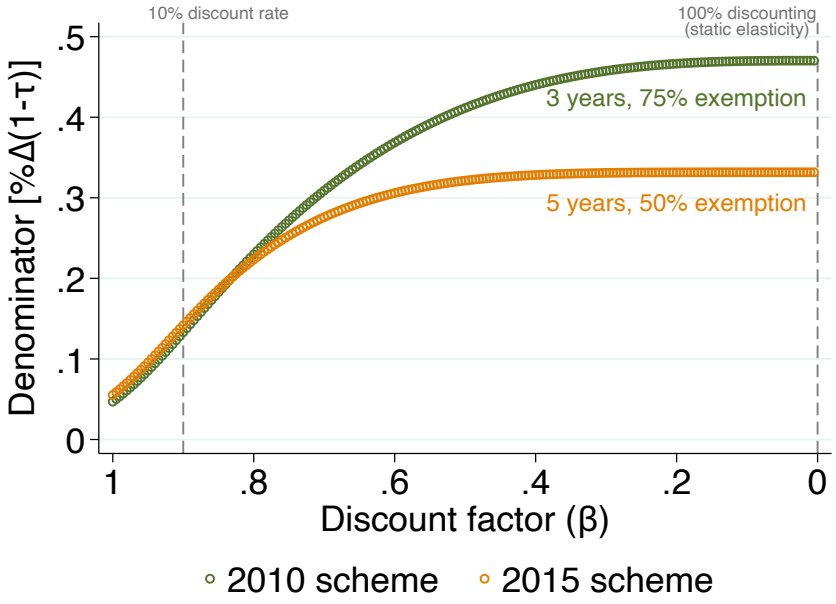
Notes: Sources: Il Sole 24 Ore and Corriere d'Italia (https://www.corriereditalia.de/).

Figure B.2: Duration of tax incentives for high-skilled returnees



Notes: The graph shows the start and the end year (as well as the expected end year, if different), depending on the year of return to Italy (on the vertical axis).

Figure B.3: Percent change in the present-discounted net-of-tax rate, by discount factor

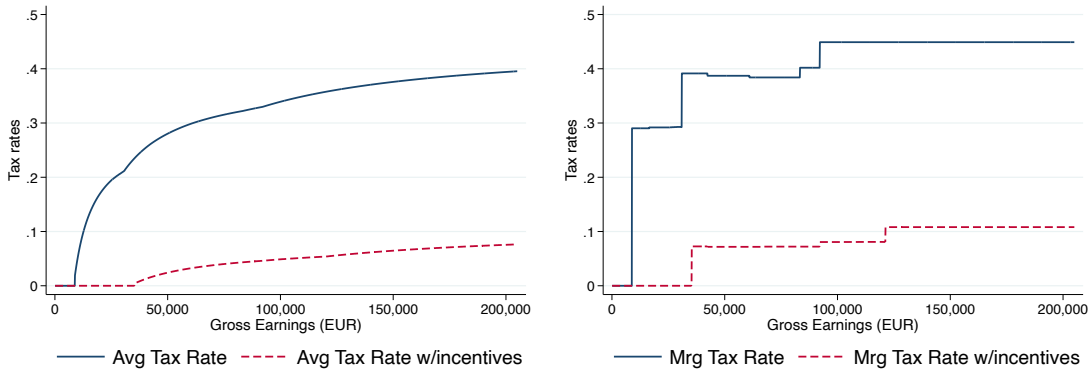


Notes: the figure plots the elasticity denominator, i.e. the percent change in the average net-of-tax rate, for each scheme (2010 and 2015), as a function on the discount factor β, for an individual earning 75,000 euros, taking into account both the *expected* duration (3 vs. 5 years) and the exempted share (75% vs 50%). The net-of-tax rate increase is calculated for a 35-year-old individual planning to retire at 65, thus over a 30-year horizon, and assuming no out-migration post-scheme ($\delta = 0$).

Figure B.4: Income tax rates under the 2010 tax scheme (excluding payroll taxes)

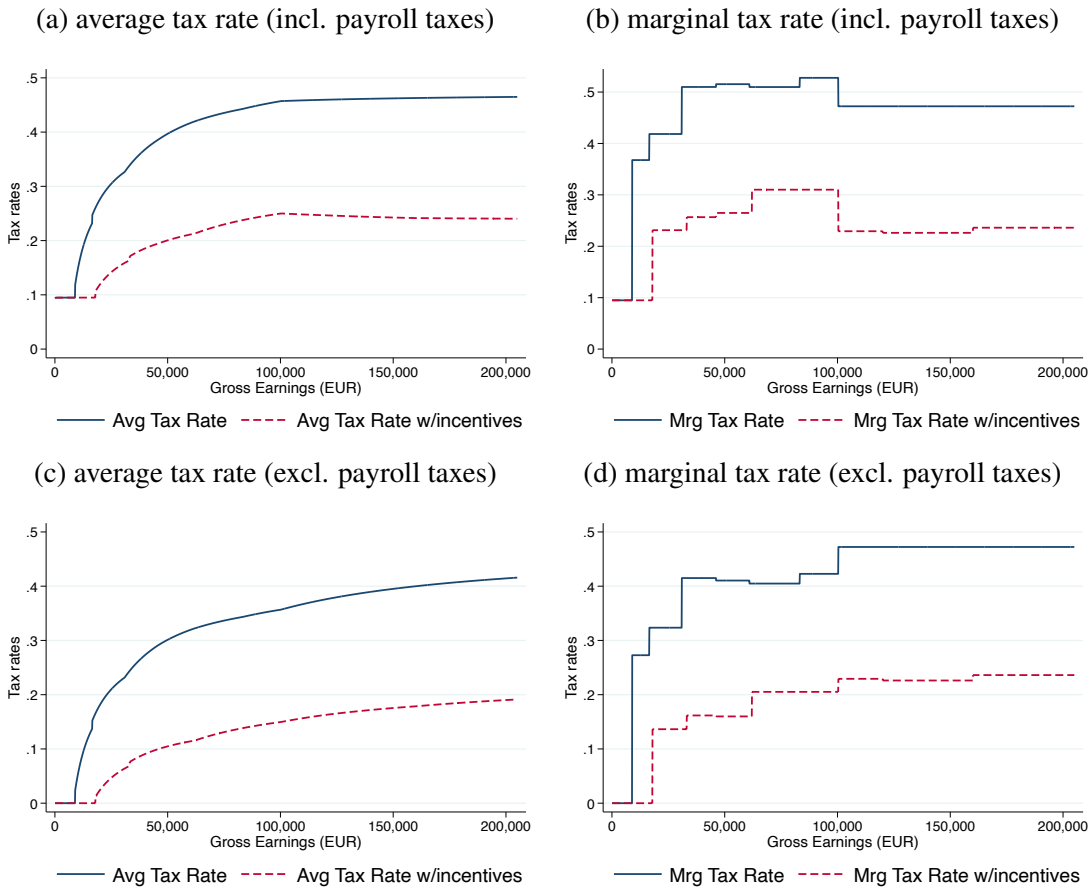
(a) average tax rate

(b) marginal tax rate



Notes: (a) average and (b) marginal income tax rates, excluding compulsory social security contributions (payroll taxes) paid by employees, based on the 2010 Italian tax schedule for an individual with no dependents. The reduced tax rates are based on an exempted income share of 75% (average between the 2010 scheme shares, 80% for women and 70% for men), and gross earnings are assumed to be from employment income. Source: authors' elaboration using OECD Taxing Wages (OECD, 2011).

Figure B.5: Income tax rates under the 2015 tax scheme (with and without payroll taxes)



Notes: (a)-(c) average and (b)-(d) marginal income tax rates, including (a)-(b) and excluding (c)-(d) compulsory social security contributions (payroll taxes) paid by employees, based on the 2017 Italian tax schedule for an individual with no dependents. The reduced tax rates are based on an exempted income share of 50%, and gross earnings are assumed to be from employment income. Source: authors' elaboration using OECD Taxing Wages (OECD, 2017).

C Data appendix

In this Appendix we provide additional details on the data sources used in this paper.

C.1 Italian migration data (Istat)

Our main data source is the Italian migration data, which we obtained from Istat, the Italian National Statistical Institute.[80] The Istat data is based on the enrollment and dis-enrollment from the *Anagrafe degli Italiani Residenti all'Estero* (AIRE; Registry of Italians Residing Abroad). Italian citizens are required by law to enroll in the AIRE whenever they migrate abroad for more than 6 months. The main benefit of enrolling is that foreign income is not subject to income taxation in Italy, in addition to access to voting from abroad and consular services., while the main drawback of enrolling is the loss of non-emergency health coverage in Italy (e.g. the primary care physician).

Despite the substantial benefits to enroll in the registry, there is evidence that a large fraction of Italians do not enroll when they move abroad (Anelli et al., 2023), and, consequently, they do not appear in the return migration data. While this is an important limitation, it does not constitute a problem for our identification strategy as long as it is not differential between eligible and non-eligible individuals pre- and post-2010. Importantly, registration in AIRE was not required in order to be eligible for the 2010 scheme, as long as beneficiaries were able to document proofs of residence abroad (e.g. pay stubs, lease) to the tax authority in case of an audit.[81] Therefore, we should not expect any change in reporting incentives before-after 2010. This is indeed what we find by comparing the Italian with the German data: in Figure C.1b, we show that the share of eligible among returnees is similar between the two data source - and, importantly, is symmetric before and after 2010 - which provides reassurance that our results are not driven by any change in

[80] In our version of the Istat data, there is a small inconsistency: the flows are about 25% lower in year 2011 when compared to publicly-available Istat data, while they are identical in all other years. We believe this inconsistency is due to our data recording only individuals who returned/emigrated before the census day (October 9, 2011). For this reason, in Figures 3, 4, A.2, D.2 and D.3, we interpolate 2011 by averaging the 2010 and 2012 values. In the regressions we use non-interpolated data, since year fixed effects take care of this issue specific to 2011.

[81] While registration was required to be eligible for the 2015 scheme, our results are robust to excluding the post-2015 years from the sample.

reporting incentives.

C.2 Database on Immigrants in OECD Countries (DIOC)

The Istat data measure the return migration *flows* of Italians; however, constructing a return migration rates requires information on the *stock* of migrants abroad. For this reason, we complement the Istat data with the OECD "Database on Immigrants in OECD countries" (henceforth DIOC OECD, 2016), a comprehensive database on immigrant stocks by destination country, origin country, age, sex, and education, based on destination countries decennial censuses (see Arslan et al. (2015) for a description).

Specifically, we use the DIOC data to measure of the stock of Italians resident in each destination country as of 2010, by age, education and sex. We use the 2010/11 release, which is based on the closest census wave to 2010 in each country.[82] We identify Italians based on their country of birth, as opposed to citizenship which is unavailable or incomplete for several countries. While this is a different definition than in the Istat data, which cover Italian citizens, in our analysis we exclude foreign-born Italian citizens from the Istat data, which makes the two sources comparable.[83]

Education is defined as in the Istat data, based on the International Standard Classification of Education (ISCED) definition. We keep individuals with at least high school education, resulting in two education groups, high school and college, with the latter group being eligible for tax incentives (if born in 1969 or later).

Age is classified in 10-year bins (e.g. 15-24, 25-34, 35-44, 45-54, 55-64). As eligibility is based on birth cohorts, we match these 10-year age bins to the 5-year cohort bins in the Istat data by apportioning each age group to the corresponding cohort bin based on age in 2010. For example, the age group 35-44 in 2010 is composed of individuals born in 1966-1975; we assign a half of

[82] The full methodology for the 2010/11 release is available at https://www.oecd.org/els/mig/DIOC-E-2010-11-methodology.pdf.

[83] As Italy does not grant birthright citizenship, the DIOC data may include some Italy-born individuals who are not Italian citizens; however, they are likely a negligible fraction relative to Italian citizens.

this group to the 1969-1973 cohort bin, and a quarter each to the 1964-1968 and 1974-1978 bins respectively. This leaves us with 7 five-year birth cohort bins, 4 eligible (1969-1973, 1974-1978, 1979-1983, 1984-1988) and 3 ineligible (1964-1968, 1959-1963, 1954-1958).

After matching the Istat and DIOC data, we construct the annual return migration rates by dividing the annual return migration flows (Istat) by the stock of Italians in 2010 (DIOC), for each destination country, birth cohort bin, education level and sex. The final dataset covers 26 OECD countries: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, UK, USA.[84]

C.3 German social security data (IEB)

C.3.1 Data preparation

To prepare the IEB data we follow standard procedures previously used in the literature. For the imputation of missing data on education, we follow the procedure suggested by Fitzenberger, Osikominu and Völter (2006). For the construction of the yearly panel, we follow Dauth and Eppelsheimer (2020). To deal with the wage top-coding we follow Dustmann, Ludsteck and Schönberg (2009) and Card, Heining and Kline (2013). The procedure to compute establishment fixed effects in the German social security records is described in Lochner, Wolter and Seth (2023). Additionally, for the analysis of spillovers in the workplace, we use data on the firm size from the Establishment Panel (Ganzer et al., 2020). We use the terms establishment and firm interchangeably, following the literature (Card, Heining and Kline, 2013; Dustmann, Ludsteck and Schönberg, 2009).

[84] We drop countries for which more than 10% of age-education-sex cells are missing, i.e. Chile, Cyprus, Estonia, Island, Israel, Malta, Poland, Romania and Turkey. Results are not sensitive to dropping these countries. For Germany, due to the high missing rate, we use IEB data instead of DIOC.

C.3.2 Validation of return migration measures

We validate our measure of return migration in the German social security data ("leavers") by comparing it with actual migration flows of Italian citizens from Germany to Italy from the OECD International Migration Database, which are based on data from the German migration data (Destatis).[85] The comparison is displayed in Figure C.1a. Reassuringly, the evolution (changes) of leaver and return migration flows is very similar in the two data sources throughout our sample period (2006-2016).[86] In addition, Figure C.1b shows that the share of eligible returnees in the IEB and in the Italian data is remarkably similar throughout the period, suggesting that measurement error is unlikely to be differential across groups over time.

C.3.3 Earnings in the IEB data

The IEB data reports gross daily earnings associated with each specific employment spell, and is subject to top-coding above the Social Security earnings maximum. Therefore, before creating the yearly panel, we transform gross daily earnings into full-time equivalent net annual earnings as follows. First, we deflate all reported earnings to correspond to the 2010 CPI and follow Dustmann, Ludsteck and Schönberg (2009) and Card, Heining and Kline (2013) to impute the upper tail of the wage distribution. Next, we scale up daily earnings by a factor of 2 if the employment spell is recorded as part-time, and multiply full-time equivalent daily earnings for the number of days of the corresponding employment spell (including weekends and holidays). Then, we obtain the mean daily earnings across all spells in year t, dividing the total full-time equivalent earnings in year t by the total number of days worked in year t. Finally, we scale up by a factor of 365 to obtain full-year equivalent annual earnings. For each individual, we take their median individual earnings throughout the sample period 2007-2016.

For the earnings heterogeneity, we compute separate earnings distributions for the eligible

[85] Unfortunately there is no information on education in the OECD-Destatis migration data. Therefore, we compare total leavers (IEB) and migration flows (OECD) flows regardless of education level.

[86] 2016 is the last year in our analysis since we condition on having an employment spell the year before leaving, and 2017 is the last year for which we can construct the proxy for leavers.

group (college graduates born on/after 1969) and for each ineligible subgroup, namely college graduates born before 1969, high school graduates born on/after 1969, and high school graduates born before 1969. Within each group, we assign individuals to earning quartiles based on the group-specific distribution, trimming the bottom and top 1% to reduce noise. In this way, we compare eligible and ineligible Italians within corresponding quartiles (e.g., the top quartile among eligible with the top quartile among ineligible). Table C.1 shows the earnings percetiles for each group.

Table C.1: Percentiles of gross annual earnings of Italians in Germany by eligibility group

	Percentiles				
Annual earnings (in euros)	1%	25%	50%	75%	99%
College, born >= 1969	9,601	27,601	41,580	59,109	135,966
College, born < 1969	9,281	29,377	49,493	81,917	153,591
High school, born >= 1969	8,964	20,494	28,501	37,258	73,215
High school, born < 1969	8,008	21,215	30,787	40,193	81,953

Notes: the table displays the minimum and maximum value at each quartile, excluding earnings below the 1st and the 99th percentile, separately for the treated and the control groups. Sample is Italian citizens, 23-64 years old born between 1954-1988, with at least high school diploma, and at least one employment spell in Germany between 2006-2016. For each individual we compute the median annual earnings in the time period 2006-2016. Earnings are expressed in 2018 euros. Source: authors' elaboration on IEB data.

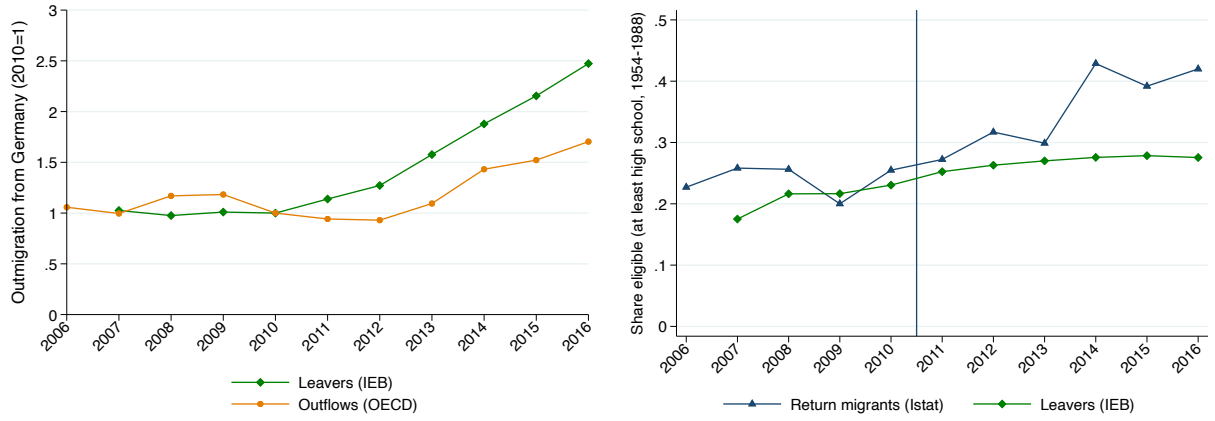
C.3.4 Earning differentials with Italy

We use the Italian Labor Force Survey (*Rilevazione sulle forze di lavoro*, IT-LFS) data to estimate the counterfactual earnings in Italy, which we use to construct wage differentials with Germany, as well as to compute the elasticities in Table A.9.

The IT-LFS is a quarterly survey based on a representative random sample of the Italian workforce. The dataset provides information on type of employment, net monthly income, sector, occupation as well as demographic characteristics such as age, sex and education. To construct Italian gross annual earnings, we proceed as follows. We pool together IT-LFS quarterly data for the year 2010, and we keep college graduates in the age groups 25-39 in full-time employment. The earnings variable available in the IT-LFS is the net monthly income. In our sample, it is non-missing for 119,481 individuals. As the variable is top coded at 3,000 EUR, we apply the same imputation

procedure as in the German social security data. To construct net annual earnings, we scale up by a factor of 13 the net monthly income, to include also the extra-month salary (*tredicesima mensilità*), a common feature of Italian employment contracts. Finally, we transform net annual earnings into gross annual earnings, using the Italian tax schedule from OECD Taxing Wages (OECD, 2011). We obtain the net earnings with tax incentives by applying the 2010 scheme exemption. In Figure C.3, we show the distribution of Italian and German gross annual earnings for young workers with a college degree (panel a), as well as the distribution of net annual earnings for the same group of workers (panel b); the Italian net annual earnings are shown both with and without the tax incentives.

Figure C.1: Return migration flows from Germany to Italy by data source

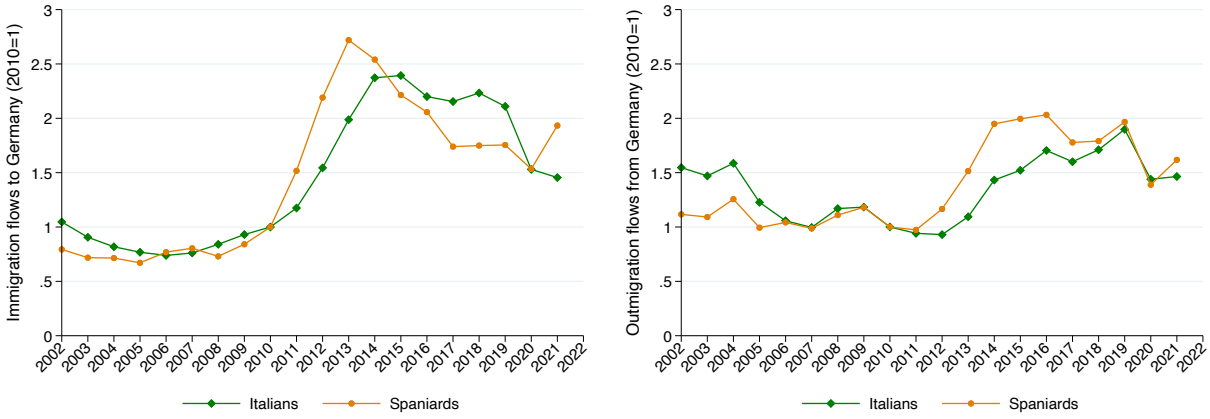


(a) return migration flows (IEB vs OECD)

(b) share eligible among returnees (IEB vs Istat)

Notes: Figure (a): The green line shows the number of Italian citizens leaving the German IEB data – relative to 2010 –, as measured by one year since last spell in the data. The orange line shows the outmigration flows of Italian citizens from Germany to Italy – relative to 2010 –, as measured in the OECD International Migration Data, which are based on data from the German Federal Statistical Office. Figure (b): the lines show the share of eligible (college graduates born on or after 1969) returnees among eligible plus ineligible (college graduates born before 1969 and high school graduates) returnees, by data source.

Figure C.2: Migration flows of Italians and Spaniards to/from Germany (OECD data)

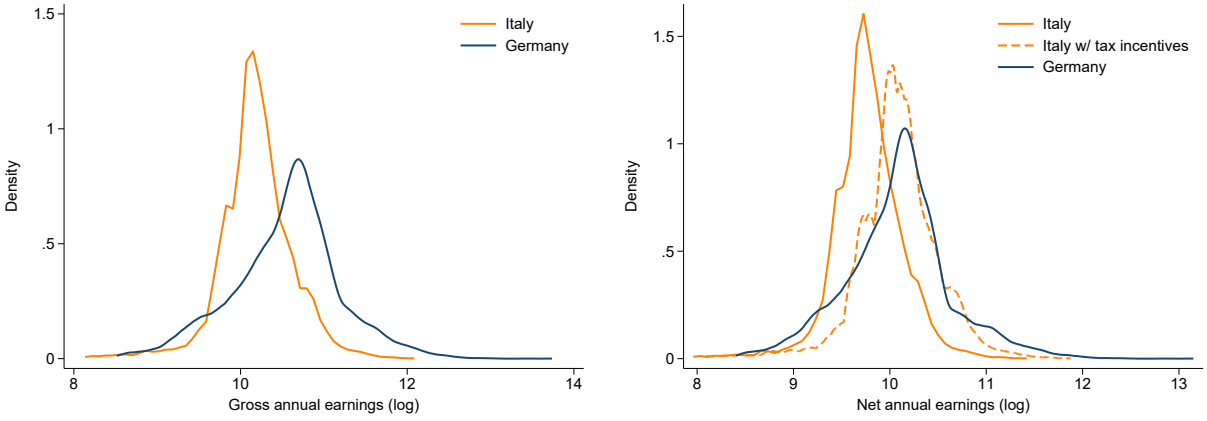


(a) Immigration to Germany

(b) Outmigration from Germany

Notes: number of Italian and Spanish citizens (a) immigrating to Germany and (b) emigrating from Germany, relative to 2010. *Source*: authors' elaboration on OECD International Migration Database data.

Figure C.3: Earnings of Italian young college graduates, by place of work



(a) Gross annual earnings

(b) Net annual earnings

Notes: The figure includes all Italians with a college degree and age 25-39 (following the age classes from IT-LFS). Data are for 2010 only. All included workers become eligible in 2011 when the tax incentives are introduced. Gross annual earnings from Germany exclude marginal employment spells (e.g., student mini-jobs). *Source*: IEB data and Italian Labor Force Survey (IT-LFS)

D Emigration

In this Appendix we describe the evolution of emigration flows from Italy around the 2010 reform, and we discuss the implications for estimating and interpreting the effect of tax incentives on return migration.

The twin recession experienced by Southern European countries induced high emigration rates from Italy (Anelli et al., 2023), particularly among younger and highly educated individuals, as shown in Figure D.1. As the 2010 scheme takes effect in 2011, the contemporaneous increase in emigration may complicate the interpretation of return migration flows. Specifically, one may worry that a simple before-after 2010 comparison between eligible and ineligible returnees may capture a "mechanical" increase in return flows due to the higher propensity of the former to emigrate after 2010.

Furthermore, the 2010 tax scheme may have induced Italian residents in the eligible group (college graduates born 1969 or after), who would have stayed in Italy absent the tax scheme, to leave the country in order to benefit from lower taxes upon return.[87] While an intriguing possibility, it is important to consider the uncertain duration of the 2010 scheme (with a fixed expiration date postponed several times), which likely deterred prospective emigrants to leave the country solely for a tax motive. However, we cannot exclude a priori the existence of such an unintended effect of the policy.

Empirically, it is hard to disentangle recession-induced emigration from the tax-induced unintended emigration. Nonetheless, we can compare the emigration and return migration flows among the eligible and ineligible groups: intuitively, if we see that net immigration *worsens* among the eligible relative to the ineligible, this would suggest that the tax schemes were ineffective in mitigating brain drain. This is what we do in Figure D.2, where we plot the emigration and return

[87] This is a similar mechanism as in the *brain gain* literature (Beine, Docquier and Rapoport, 2001): as highly educated workers benefit from increased migration opportunities due to selective immigration policies (e.g. points systems), the prospect of emigration induces individuals in developing countries to invest more in their education to increase their chances of getting a visa; as not everyone ends up emigrating, this results in higher education levels at home (brain gain). In our case the hypothesized mechanism is the opposite: tax schemes may induce more individuals to leave with the prospect of lower taxes upon return, but a large share of these extra emigrants may end up staying abroad, thus exacerbating brain drain.

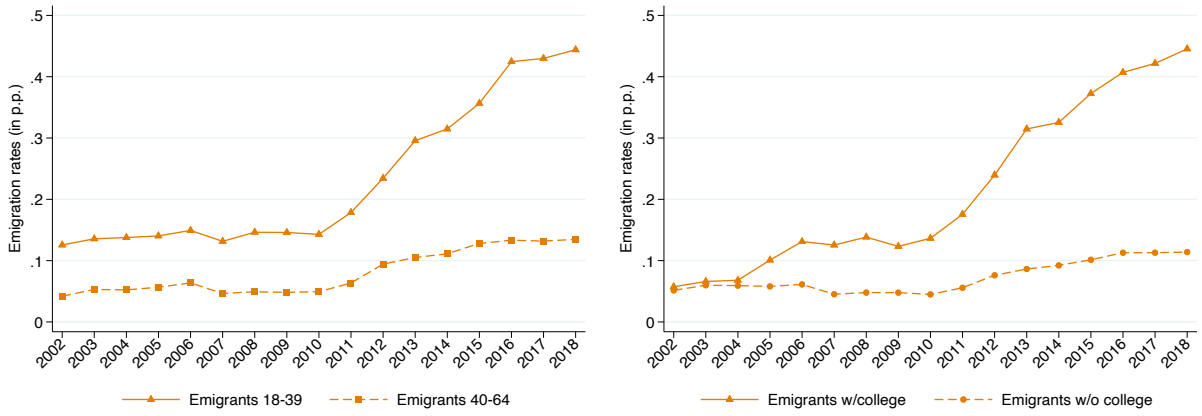
migration flows among college graduates under-40 (eligible) and high school graduates under-40 (ineligible).

The graph shows the severity of brain drain discussed earlier in the paper: emigration is larger than return migration throughout the period, and it worsens dramatically after 2010. However, the post-period outflows are not differentially higher among college graduates (eligible) than among high school graduates (ineligible), while return inflows are higher among the eligible group, consistent with the timing and eligibility for tax incentives.

Finally, in Figures D.3a and D.3b we show the year-of-birth distributions of emigrants by education level, pre- and post-2010. Reassuringly, we do not see any differential changes between college and high school graduates between the pre- and post-period. In a similar fashion, Figures D.3c and D.3d plot the age distribution of emigrants before and after 2010, again showing overlapping distributions between college and high school graduates both before and after 2010, with no increase among the college graduates under 40 years old in the post period.

Overall, three main conclusions emerge from comparing emigration and return migration flows around 2010. First, while the 2010 decade is characterized by a deteriorating brain drain, with a large and sudden increase in net emigration from Italy, the comparison between eligible and ineligible groups reveal that tax schemes likely contributed to mitigate the increase emigration flows. Second, while we cannot completely rule out that the tax incentives induced some unintended increase in emigration, such an effect is negligible relative to the increase in return migration among the eligible group. Last, differential emigration after 2010 is unlikely to be a major confounder to identify the effect on return migration, as long as we include education and cohort by year fixed effects in the regressions.

Figure D.1: Emigration rates from Italy by age and education, relative to stayers

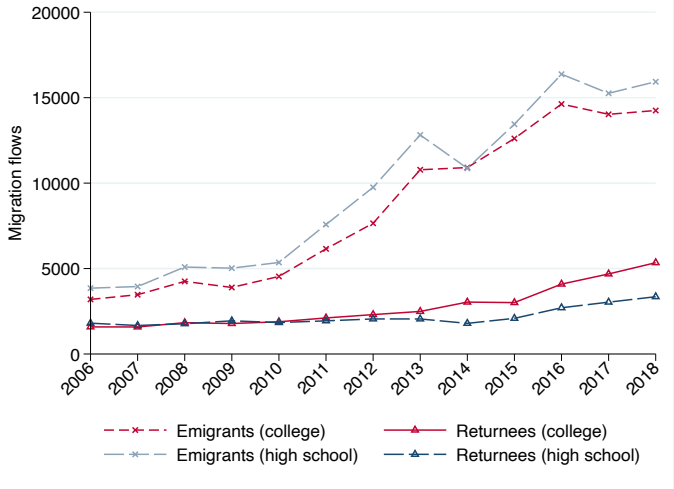


(a) by age

(b) by education

Notes: annual emigration flows of Italian citizens, as a share of the resident population in each age/education group as of 2011 Census and multiplied by 100, therefore in percentage points. Source: authors' elaboration on Istat data; replicating Anelli et al. (2023).

Figure D.2: Emigration and return migration of under-40 college and high school graduates

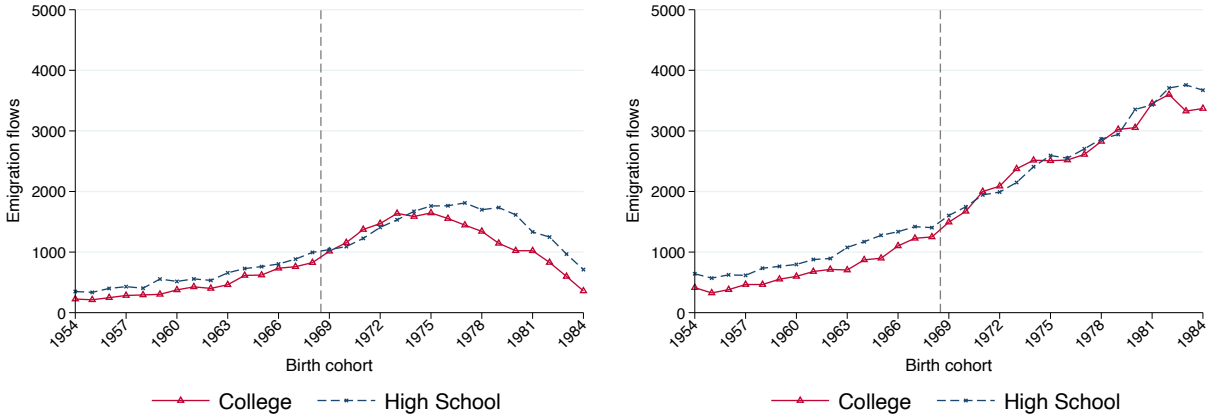


Notes: College graduates (high-skill) in red, high school graduates (mid-skill) in blue. Italian citizens born in Italy, 23-40 years old at the time of migration. *Source*: authors' elaboration on Istat data.

Figure D.3: Emigration by cohort and by age, pre- and post-2010 tax scheme

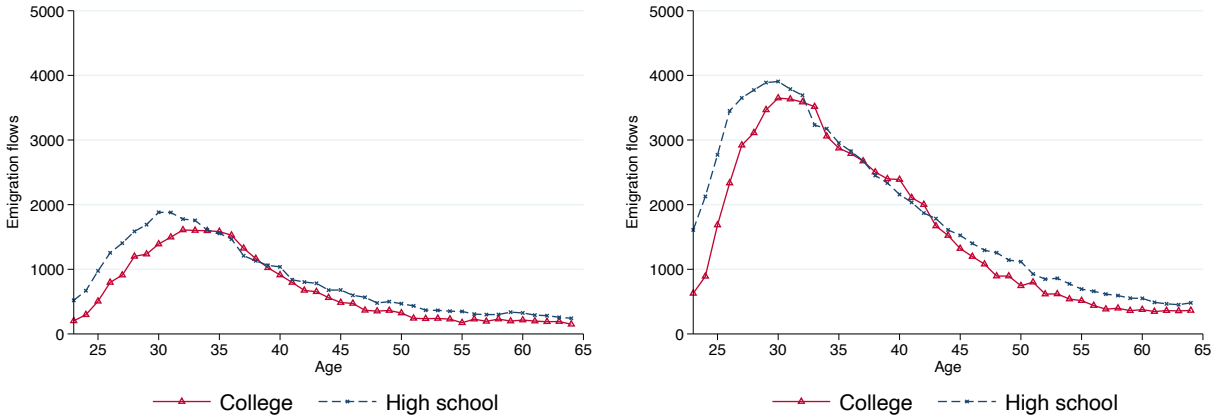
(a) by birth cohort, pre-period

(b) by birth cohort, post-period



(c) by age, pre-period

(d) by age, post-period



Notes: Figures (a)-(b) plot the total number of Italians 23-64 years old moving abroad from Italy(a) between 2006-2010 and (b) between 2011-2015, by birth cohort (x-axis) and by education level (college and high school graduates). Figures (c)-(d) plot the total number of Italians 23-64 years old moving abroad from Italy (c) between 2006-2010 and (d) between 2011-2015, by age at return emigration (x-axis) and by education level (college and high school graduates). *Source*: authors' elaboration on Istat data.

E Additional details on the revenue analysis

E.1 Cost-benefit analysis

Baseline formulation From Section 6, the fiscal break-even condition is given by:

$$\underbrace{\sum_{t=1}^{d}\beta^{t-1}\sum_{i\in M}T(sw_{it})}_{\substack{\text{Revenue from M}\\ \text{during scheme}}}+\underbrace{(1-\delta)\sum_{t=d+1}^{T}\beta^{t-1}\sum_{i\in M}T(w_{it})}_{\substack{\text{Revenue from M}\\ \text{after scheme}}}\geq\underbrace{\sum_{t=1}^{d}\beta^{t-1}\sum_{i\in I}[T(w_{it})-T(sw_{it})]}_{\text{Revenue loss from I}}$$

where M and I denote marginal and infra-marginal beneficiaries respectively, d is the duration of the tax scheme, β the discount factor, w_{it} is the gross (labor) income of individual i at time t, $T(.)$ the tax function, s the taxable share under the scheme, δ is the fraction of marginal beneficiaries who leave the country after the scheme elapses, and the total number of periods T is the difference between the retirement age (65) and the average age at return migration (a).

To obtain a tractable expression, we assume that individuals are identical within each group $\{M, I\}$, that earnings are constant over time, and that M individuals' earnings are θ-times the earnings of I individuals. Formally:

$$\begin{aligned} w_{it} &= w_I \quad \forall i \in I \\ w_{it} &= w_M \quad \forall i \in M \\ w_M &= \theta w_I \equiv \theta w \end{aligned}$$

simplifying the break-even condition to:

$$M\ T(s\theta w)\sum_{t=1}^{d}\beta^{t-1}+(1-\delta)\,M\ T(\theta w)\sum_{t=d+1}^{T}\beta^{t-1}\geq I\ [T(w)-T(sw)]\sum_{t=1}^{d}\beta^{t-1} \tag{5}$$

Break-even M/I Equation 5 can be rearranged to solve for the break-even marginal-to-inframarginal ratio:

$$\frac{M}{I} \geq \frac{[T(w) - T(sw)] \sum_{t=1}^{d} \beta^{t-1}}{T(s\theta w) \sum_{t=1}^{d} \beta^{t-1} + (1-\delta)\, T(\theta w) \sum_{t=d+1}^{T} \beta^{t-1}} \tag{6}$$

To compute the break-even threshold in the paper (the right-hand side), we use the baseline parameter values in Table A.11 and the tax schedule $T(.)$ depicted in Figure 2(a), which includes payroll taxes.

Break even m We can also solve the break-even condition for $m = M/(M+I)$, the overall share of marginal returnees. From Equation 5, we divide both sides by $M + I$ and use $(1-m) = I/(M+I)$, obtaining:

$$m \left[T(s\theta w) \sum_{t=1}^{d} \beta^{t-1} + (1-\delta)\ T(\theta w) \sum_{t=d+1}^{T} \beta^{t-1} \right] \geq (1-m) \left[[T(w) - T(sw)] \sum_{t=1}^{d} \beta^{t-1} \right]$$

which can be solved for the break-even m:

$$m \geq \frac{[T(w) - T(sw)] \sum_{t=1}^{d} \beta^{t-1}}{T(s\theta w) \sum_{t=1}^{d} \beta^{t-1} + (1-\delta)\, T(\theta w) \sum_{t=d+1}^{T} \beta^{t-1} + [T(w) - T(sw)] \sum_{t=1}^{d} \beta^{t-1}} \tag{7}$$

The difference between (6) and (7) is that the numerator of the former is added to the denominator of the latter.

Yearly tax revenue For the revenue projections of Figure 7, it is helpful to unpack Equation (3) to illustrate the cost and benefit in each year t:

$$\begin{aligned} Cost_t = &\ \beta^{t-1} \cdot [T(w) - T(sw)] \cdot I \cdot \mathbb{1}(t \leq d) \\ Benefit_t = &\ \beta^{t-1} \cdot T(s\theta w) \cdot M \cdot \mathbb{1}(t \leq d) + \ \beta^{t-1} \cdot T(\theta w) \cdot (1-\delta) \cdot M \cdot \mathbb{1}(t \geq d+1) \end{aligned}$$

To compute the values in Figure 7, we assume $N = M + I = 4,000$ total beneficiaries, a total of $T = 30$ periods, and we use the estimated share of marginal returnees m, so that $M = m \cdot N$ and $I = (1-m) \cdot N$.

E.2 Incorporating human capital externalities

Human capital externalities from *marginal* returnees matter to evaluate the net benefit of the policy, while those from infra-marginal would have materialized anyway. Hence, they will enter the benefit terms; the cost is unaffected. Formally, we can introduce a multiplier of the aggregate earnings of marginal returnees as follows:

$$\begin{aligned} Benefit_t = &\ \beta^{t-1} \cdot [\, T(s\theta w) + \eta_{ext} \cdot \theta \cdot w \,] \cdot M \cdot \mathbb{1}(t \leq d) + \\ &+ \ \beta^{t-1} \cdot [\, T(\theta w) \ + \ \eta_{ext} \cdot \theta \cdot w \,] \cdot (1-\delta) \cdot M \cdot \mathbb{1}(t \geq d+1) \end{aligned}$$

In this expression, the benefit for the receiving country stems from each of the two terms in the squared brackets. The first is the tax revenue from marginal returnees, as in the baseline cost-benefit analysis: $T(s\theta w)$ during the scheme and $T(\theta w)$ afterwards, where θ is the earnings multiplier capturing the selection of marginal returnees. The second term captures the externalities of marginal returnees to the receiving economy, and it is determined by the parameter η_{ext} (which is $\eta_{ext} = 0$ in our baseline). Notice that in the post-scheme periods, both terms are reduced by the fraction of out-migrants, δ.

E.3 Optimal tax implications

Finally, we can use our framework to derive simple implications for optimal taxation. Consider a standard optimal tax framework such as in Brewer, Saez and Shephard (2010) and Piketty and Saez (2013). We are interested in deriving the optimal tax rate in the presence of international migration, abstracting from intensive margin responses. For simplicity, we focus on the **revenue-maximizing** tax rate, thus abstracting from distributional aspects, and we assume a proportional tax rate to simplify exposition.

The key innovation in our setting is that there are multiple periods, and that we introduce a *temporary* tax scheme which lowers the tax rate for some periods only.

Static case Government maximizes income tax revenue R:

$$R = \tau \cdot N(1-\tau) \cdot \bar{w}(1-\tau)$$

where $N(.)$ is the number of individuals and $\bar{w}(.)$ their average earnings, both positive functions of the net-of-tax rate. Absent the intensive margin, $\bar{w}(1-\tau) = w$, and thus we can assume $w = 1$ without loss of generality:

$$R = \tau \cdot N(1-\tau)$$

The optimal tax rate τ^* is such that a small change in τ does not change revenue; thus, it solves the FOC:

$$\frac{dR}{d\tau} = N - \frac{dN}{d(1-\tau)}\tau = 0$$

where the first term is the mechanical effect of increasing τ (dM) and the second term is the behavioral response due to (net) emigration (dB). Let the (stock) elasticity w.r.t the net-of-tax rate be:

$$\varepsilon = \frac{dN}{d(1-\tau)}\frac{(1-\tau)}{N}$$

then we can rewrite the FOC as follows:

$$N - \tau\varepsilon\frac{N}{(1-\tau)} = 0$$

and solve for the optimal tax rate (static case):

$$\tau^* = \frac{1}{1+\varepsilon} \equiv \tau^{static}$$

Thus, if the stock elasticity is equal to $\varepsilon = 1$, the optimal tax rate is $\tau^* = 50\%$.

Multi-period case Consider now the extensive margin case with multiple periods. The government maximizes present-discounted revenue:

$$R = \sum_{t=1}^{T} \beta^{t-1} \cdot N_t \cdot \tau_t$$

where β is the government's discount factor.

Suppose that the government is considering the following policy: a reduced tax rate τ for the first $d < T$ periods, and a standard tax rate $\bar{\tau}$ for the remaining $T - d$ periods. For exposition, assume $\beta = 1$. Furthermore, assume that a fraction of individuals $\delta \in [0, 1]$ leave the country after the reduced tax period. For a given duration d, the government chooses τ to maximize:

$$R = N \cdot \tau \cdot d + (1-\delta) \cdot N \cdot \bar{\tau} \cdot (T - d)$$

If the migration response is governed by a standard elasticity (as in the static case), which is solely a function of $(1 - \tau)$, we have:

$$\frac{dR}{d\tau} = N \cdot d - \frac{dN}{d(1-\tau)} \cdot \tau \cdot d - (1-\delta) \cdot \frac{dN}{d(1-\tau)} \cdot \bar{\tau} \cdot (T - d) = 0$$

The FOC has an extra term relative to the static case, which captures the revenue loss due to the fact

that increasing the tax rate *today* (the first d periods) reduces tax revenue *tomorrow* (the remaining $T-d$ periods) as well. Rearranging, we obtain:

$$\tau^* = \frac{1}{1+\varepsilon} - (1-\delta)\frac{\varepsilon}{1+\varepsilon}\frac{T-d}{d}\,\bar{\tau}$$

If $\delta < 1$, the optimal tax rate τ^* is lower than the static Laffer rate: intuitively, if at least some individuals stay after the tax cut, the behavioral migration response would be larger than the mechanical effect at the Laffer rate, and thus a lower tax rate is optimal. Instead, if everyone leaves ($\delta = 1$), the optimal policy is to charge the Laffer rate for d periods (like in the static case).

If $\beta < 1$, the formula is identical except that the $(T-d)/d$ term is replaced by the term $\sum_{t=d+1}^{T}\beta^{t-1}/\sum_{t=1}^{d}\beta^{t-1}$, as shown in the paper:

$$\tau^* = \frac{1}{1+\varepsilon} - (1-\delta)\frac{\varepsilon}{1+\varepsilon}\frac{\sum_{t=d+1}^{T}\beta^{t-1}}{\sum_{t=1}^{d}\beta^{t-1}}\,\bar{\tau}$$

In principle, one could derive a formula for the optimal duration as well; however, this requires a generalized elasticity definition, which takes into account the present-discounted value of the tax scheme, and thus its duration in addition to its intensity.[88] We illustrate this in Figure B.3, which shows that the 2010 scheme is more generous than the 2015 scheme in a static comparison (due to the larger exemption), but that the two schemes are equally generous in present-value (due to the longer expected duration in the 2015 scheme).

[88] Such elasticity could be used to compare migration responses to temporary shocks with different durations, such as a temporary tax cut or labor demand shock. Absent migration costs, the duration of a transitory shock should not matter for migration decisions, as there is no cost of migrating again after the shock ends. However, in the presence of migration costs, which naturally limit the net utility gain of migrating in response to a temporary shock, its duration matters. Thus, such elasticity could be interpreted as a "frictionless elasticity" in the absence of adjustment costs (e.g., Chetty et al., 2011).

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