Trained for Success? The Impact of Vocational Education Training on Labor Market Outcomes and Family formation

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Abstract

This paper evaluates the impact of the reform of the short vocational education training in Italy implemented in early 2000 on labor market outcomes and marital choice. The reform increased years of short vocational training from two years to one more additional year, increasing hours of subjects providing general skills. Using a staggered events study, we find a positive, permanent impact on employment, a temporary effect on wages. Labor market effects are larger for women. Improvement in labor market conditions has further consequences on marriage among men, but not women. Our paper shows that this kind of education reforms may have significant effects also beyond the labor market.

Keywords: Vocational Education; Employment; Earnings; Marriage.
JEL codes: I26; J12; J24.

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1. Introduction

The Italian labor market has been characterized by a high level of early school leavers and soaring youth unemployment rates. This has led to an urgent need for effective solutions to bridge the gap between education and employment opportunities for young people, prompting the country to undergo a series of reforms to address these challenges (EU Commission, 2014).

Obstacles in the school-to-work transition and skill mismatches are often cited as the main contributors to the 'youth problem' in the labor market (Ryan, 2001). For these reasons, the European Union guidelines have encouraged Italy to prioritize effective Vocational Education and Training (VET) and dual VET systems. These systems play a crucial role in facilitating smoother transitions from school to work, addressing skill mismatches, and enhancing the returns to education (Caliendo & Schmidl, 2016). Furthermore, differently from other tracks of education, VET systems may respond rapidly to changes in labor demand in terms of skill contents, while strengthening those skills that allow individuals to act as levers and enablers of the innovation process.

Since the beginning of the century, Italy profoundly changed its VET system, embedding it in formal education (CEDEFOP, 2018) and introducing for the first time a dual system combining work-based and in-class learning, as recommended by the European Commission (EC Bruges Communiqué, 2010; EC Riga Conclusions, 2015; EC European Alliance for Apprenticeship EAfA, 2013).

The first step in this direction consisted of a reform that completely transformed the short Vocational Track (short VET, or *Istruzione e Formazione Professionale*, IeFP). Until the end of the Nineties, short VET programs lasted two years, focusing primarily on professional skills, and were administered at the provincial or regional level. In the early 2000s, a national reform was adopted, which extended the duration of short VET programs to three years and incorporated additional general competencies. In order to be implemented, the national law had to be adopted by each individual region. Regions varied in the timing of adoption, and we leverage this staggered implementation to infer the effect of the reform.

In this paper, we examine the impact of this reform on labor market outcomes and marriage using microdata from the Italian Labor Force Survey and applying the event study method. First, we show that the reform increases the probability of being employed by 9.2% and wages by 14.3%. Both men and women enjoy these labor market returns, with women experiencing the largest gains.

Furthermore, the reform makes males more marketable in the marriage market. The reform increases IeFP men graduates probability to get married by 11.1%. We find no effect on women.

Our research contributes to the literature in several ways. First, this study enters the debate about the role of VET in enhancing the return to education for its graduates. One strand of the literature shows that there is a positive impact of VET on the labor market (Barrera-Osorio et al., 2023; Guo & Wang, 2020; Newhouse & Suryadarma, 2011), while another strand of literature does not find any significant effect of VET (Bratti et al., 2022; Hirshleifer et al., 2016; Kemper & Renold, 2024; Krafft, 2018). Other scholars provide alternative explanations for this mixed evidence. One of the explanations is that VET graduates enjoy short-term benefits because they are equipped with better technical skills, but experience worse outcomes in the long run because of a lack of general skills that are not taught in VET. This argument has been well supported by evidence from several countries, showing the trade-off between short-term and long-term benefits of attending vocational education (Brunello & Rocco, 2017; Choi et al., 2019; Forster et al., 2016; Golsteyn & Stenberg, 2017; Hanushek et al., 2017; Heinesen & Stenholt Lange, 2022). However, this argument is challenged by recent evidence from Finland, showing that VET has a permanent wage increase at least until the mid-thirties, and there is no evidence that there is a negative impact through retirement (Silliman & Virtanen, 2022). Brunetti & Corsini (2019) point out that VET has a positive impact in the short term and long term only in the countries that implemented dual systems, while there are only several positive impacts in the countries that implemented school-based vocational training. Our study fills the gap in this debate by showing that vocational education has the potential to increase labor market outcomes when professional and vocational skills are complemented with more general skills, as implemented in IeFP reform in Italy.

Expanding the general curriculum in VET has been discussed in several papers. Thus, the next contribution of our paper to the existing literature is about the optimal mix of professional and general skills to be learned in VETs. There is a debate about the benefit of general education when combined with VET. Experimental evidence in the Dominican Republic shows that combining vocational and life skills increases short-term labor market outcomes for females but not for males (Acevedo et al., 2020). Two similar reforms in Spain and Finland that delay vocational entry support the positive impact of general education. In Spain, the reform increases labor market outcomes for highly skilled individuals (Bellés-Obrero & Duchini, 2021). In Finland, the reform decreases employment in the early period after graduation, but in the end, the reform

increases wages (Ollikainen, 2021). A contrasting result was found in Croatia, which implemented a similar reform to Spain and Finland. In this country, increasing the length of VET by providing general skills does not have any impact on labor market outcomes (Zilic, 2018). Similar findings are found in Romania, where a shift from vocational education to general education did not make any difference compared to the previous system (Malamud & Pop-Eleches, 2010).

The IeFP reform in Italy shares many features with previous reforms implemented in other European countries, such as the Netherlands in 1975. This reform added an additional year to the 3 years VET transforming it into 4 years vocational training by increasing the general curriculum. This reform did not increase long-term wages for post-reform vocational training graduates (Oosterbeek & Webbink, 2007). Another similar reform was implemented in Sweden in 1988-1993 as a national pilot project. In this country, the prolonged vocational education from 2 to 3 years, with an additional general curriculum, failed to decrease the likelihood of being unemployed. For worse, the program increased the likelihood of unemployment among students with low academic achievement (Hall, 2016). This Swedish reform was not able to give earnings premiums for its graduates either (Hall, 2012). In the case of Italy, Comi et al. (2022)investigate the impact of the IeFP reform on school to work transition, finding that such reform accelerated school to work transition for short vocational training graduates. However, they do not consider the long-term impact on employment and earnings. Our study fills this gap by providing additional evidence on the benefits of the reform in terms of employment and earnings premium.

Our last contribution to the literature is related to the impact of improved labour market outcomes for VET graduates on marriage opportunities. A piece of evidence demonstrates that education expansion reform increases the probability of being employed in the formal sector and increases marriage outcomes both for men and women (Akresh et al., 2023). However, there is a debate about the impact of better employment conditions and resources on marriage. On one side, better labor market conditions, either at the worker level (Dew & Price, 2011; Schneider et al., 2019; Sieg & Wang, 2018) or at the macroeconomic one (Autor et al., 2019; Maclean et al., 2016; Wachter, 2020) increase marital transitions thanks to the availability of more resources. On the other side, better labour market conditions may create a trade-off between job career and family formation, especially in the case of women. Previous research proves that fertility has a negative impact on women's earnings (Lundborg et al., 2017). Bertrand (2013) provides more details about personal women's preferences, investigating the choices of college-educated women. The study

reveals that the greatest life satisfaction comes from having a family. A career also provides life satisfaction. However, women find it hard to accumulate life satisfaction from both sources. Bertrand et al. (2021) show that skilled women are in general less likely to get married, but a crucial role is played by social norms. On the contrary, men work more when they have family (Knowles, 2013). Given this mixed evidence about the effect of better labor market conditions on marriage, we contribute to the debate by showing that, in the context of better labor market conditions because of the IeFP reform, better employment and earnings increase men's probability of being married. The reform failed to increase the marriage of women, which shows that the marriage market premium from an increase in women's labor conditions vanished because of women's preference choice to strengthen their early careers rather than having a family.

The rest of the paper is organized as follows. The next section will discuss the institutional setting of IeFP reform. Then, we present the data used in the analysis and our estimation strategy to get the causal effect. Our estimation results will be discussed in the following section. In the final section, we deliver our conclusions and discuss the main policy implications.

2. The Italian Short Vocational Education Reform

Since the early 2000s, the Italian education system has lived through an intense period of radical changes.

In 2003, the enactment of Law 53/03, also known as the Moratti Reform, marked a significant shift by extending compulsory education until the age of 18. This initiative aimed to ensure that every citizen had access to education and training for at least 12 years or until the acquisition of a qualification. Prior to this reform, the Italian schooling system consisted of two cycles: the initial cycle included primary (5 years) and lower-secondary (3 years) education, while the subsequent cycle offered options like general high school (liceo), technical and professional high schools (istituti tecnici e istituti professionali), with the possibility to enroll in post-secondary non-tertiary and tertiary education. Table 1 summaries the second cycle of Italian education system before and after the Moratti Reform (See Figure A1 in the appendix for visualization).

Before 2003, vocational education in Italy operated independently of the state system, it was exclusively the competence of the regions through regional vocational training agencies. Its focus was primarily on imparting vocational skills. The Moratti Law introduced a completely new vocational track called Istruzione e Formazione Professionale (IeFP), integrated into the secondary

education cycle under regional supervision. This new track held equal status to other state schools and granted a nationally and European recognized professional certificate (Qualifica Professionale). Additionally, the reform introduced a fourth year leading to a diploma, although by 2010/2011, only four regions offered this extension, with enrolment representing a small fraction (2.5%) of total IeFP students. Notably, the revised vocational track placed greater emphasis on general education, alongside the continued provision of vocational and technical skills, without neglecting essential competencies like literacy and numeracy (hard skills), and problem-solving and critical thinking (soft skills).

Thus, the reform effectively bridged the traditional gap between education and training, presenting a new short vocational track distinct from its predecessor in Italy.

[TABLE 1 ABOUT HERE]

The implementation of the short vocational track following the reform underwent a long transitory phase, varying in timing and management across regions. In terms of timing, some regions like Lazio, Lombardia, Veneto, Piemonte, and Puglia introduced the third year in 2002/2003, while others like Liguria, Molise, and Friuli Venezia Giulia, Emilia Romagna, Toscana, Umbria, Abruzzo, Campania, Basilicata, Sicilia and Sardegna adopted it in 2003/2004 and Valle d'Aosta, Marche, Calabria in 2004/2005. Notably, the autonomous provinces of Bolzano and Trento, in Trentino-Alto Adige region, initiated the third year several years prior to the reform (Zagardo, 2012).

Regarding management and funding, the reform was implemented in different ways. In one model, regional authority managed the organization of this track. The government established the overall regulations controlling vocational education and training and provided resources for the regions to implement these programs. It was the responsibility of the regions to plan and administer the short vocational track. Additionally, training institutions had to obtain formal authorization from the regions, complying with the criteria established at the national level. Regions such as Piemonte, Lombardia, Liguria, Veneto, Lazio, Abruzzo, Molise, Puglia, Basilicata, Sicilia, and Sardegna predominantly adopted this organizational structure. In an alternative model, state-run professional public high schools were also granted the opportunity to offer the short vocational track through regional laws. In this case, the existing public professional 5-year high schools

(istituti professionali) could activate IeFP programmes in a subsidiary regime operating under the Ministry of Education's jurisdiction. Friuli Venezia Giulia, Emilia Romagna, Toscana, Umbria, and Campania leaned towards implementing state-run programs. Interestingly, despite the reform's full implementation in 2011/2012, both organizational models continued to coexist in certain regions. The significant increase in student enrolment in three-year IeFP programs since 2003/2004 highlights the reform's impact. The number of students tripled from 2003/2004 to 2004/2005, with another rise after full implementation in 2013/2014, surpassing 300 thousand students, constituting 11.4% of all secondary school enrolments (CNOS-FAP, 2014). Characteristics of students enrolled in vocational tracks at the end of the last century included an average age of 15-16, with 13% being migrants and 50% coming from single-income households. Additionally, most of the parents had only completed compulsory schooling. Around 70% of boys and 80% of girls completed lower-secondary school on time, while 41% were repeaters, having experienced grade retention in state-run public schools.

3. Data and Estimation Strategy

3.1. Data

The empirical analysis in this study utilizes data from the Italian Labour Force Survey (LFS) from 2014 to 2019. This dataset includes detailed information on individuals' current and past labor-market experiences, sociodemographic characteristics, educational attainment, and specific tracks achieved. The suitability of the LFS data for this analysis stems from two primary reasons. Firstly, the dataset's ample sample size enables the selection of a sufficiently representative sample, even for relatively rare occurrences such as obtaining a three-year qualification in the short vocational track in Italy. This is made possible by leveraging multiple waves of data through pooled cross-section analysis. Secondly, the LFS data provide valuable insights into school-to-work transitions. Participants with employment during any survey year are queried about the initiation of their first job. Additionally, in 2014, the Istituto Nazionale di Statistica (ISTAT) introduced a new question regarding the timing of the respondent's highest level of education attainment. By combining these responses, researchers could retrospectively determine the employment status in the early years. This variable serves as a key outcome measure in our analysis. Furthermore, through graduation year, we can assign individuals to the old or new regime of short VETs. However, a limitation of

this dataset is the absence of information on parental background for non-cohabiting individuals and final grades. Moreover, due to the introduction of the question on graduation year in 2014 post-reform, researchers had to rely on retrospective data rather than contemporaneous information.

[TABLE 2 AROUND HERE]

Our analysis is focused on IeFP graduates and individuals with an high school vocational or technical diploma. The final sample consists of 83,488 observations, of which around 13,800 are IEFP graduates and the remaining 70,000 are either from technical or professional schools. Table 2 reports the summary statistics of the sample. The sample is dominated by men, while only 41.3% are females. On average, our sample has 7 years of experience and already graduated from school almost 12 years before the survey. Around 69% of the observations have a job. They have an average net monthly income of around 1000 euros. Furthermore, only 29% of the individuals are married, and 2.7% married but then divorced, while the majority is still single (68.1% of total observations).

Overall, IeFP graduates experience a slightly lower probability of having a job than graduates from technical or vocational schools. However, the difference is only statistically significant at a 10% level and small in size. IeFP graduates also register significantly lower wages (-4.2%). IeFP graduates are also characterized by fewer years of experience, a higher share of males, and a higher share of foreigners compared to professional and technical school graduates. Among IeFP graduates, the ones who graduated after the reform were less likely to have a job, more likely to be single, and less likely to get married. They have less work experience, probably also because they graduated in more recent years (See Table A1 in the appendix). This simple comparison between IeFP graduates before and after the reform reveals worsening labor market outcomes. However, the pre-post comparison may be biased by the impact of the Great Recession on the labor market. We provide a more reliable identification strategy in the next subsection.

3.2. Estimation Strategy

This research applies an event study approach to study the impact of IeFP reform on labor market outcomes and marital choice. In general, we try to estimate the following event study estimation model:

$$Y_{irc} = \beta_0 + \sum_{g=-9}^{8} \beta_g Treatment_{g,irc} + \gamma X_{irc} + A_r + A_c + \varepsilon_{irt} \quad (1)$$

Where Y_{irc} denotes outcomes of person i who lives in region r and graduated from their highest education degree at time c. As outcome variables we consider $Employment_{irc}$, $Log\ Salary_{irc}$, $Single_{irc}$, $Married_{irc}$, and $Divorced_{irc}$. In particular, $Employment_{irc}$ is a dummy variable equal to 1 if person i have a job. $Log\ Salary_{irc}$ is natural logarithm transformed monthly salary. $Single_{irc}$ is dummy variable equal to 1 if the person is still single during the time of the interview. $Married_{irc}$ indicates a dummy variable equal to 1 if the person is married and still married or currently living as a widower. $Divorced_{irc}$ has the value of 1 if the individual is divorced at the time of the interview. $Treatment$ is a dummy variable indicating whether a person i graduated from IeFP or graduated from technical or professional schools, in which case it is equal to 0. X is a vector of control variables. We control for the number of years spent working (i.e. actual experience). This variable is to be preferred to age , since age cannot capture different timing for school entrance and graduation. We then control for tenure in a the current job. Other control variables include a foreigner dummy and survey years dummies to account for labor market dynamics during the interview. A_r represents region fixed effects and A_c denotes graduation year fixed effects. We calculate cluster standard error at region interacted with survey year to account for within-cluster correlation (Cameron & Miller, 2015).

Since the reform was implemented in different years across regions, we apply Callaway & Sant'Anna (2021) estimator to estimate equation (1). Using two-way fixed effects (TWFE) when the reform is staggered is not appropriate. In our case, the effect of the treatment is not constant over time, as has been discussed in previous literature (for example Brunello & Rocco, 2017; Forster et al., 2016). In this case, applying TWFE will lead to bias estimates (Athey & Imbens, 2022; Callaway & Sant'Anna, 2021; de Chaisemartin & D'Haultfœuille, 2020; Goodman-Bacon, 2021; Sun & Abraham, 2021). There are several methods to estimate staggered events study with dynamic effect. However, in our case where the selection into treatment or choosing IeFP over technical and professional schools is not random, the conditional parallel trend assumption is more

suitable than the unconditional parallel trend assumption proposed by de Chaisemartin & D'Haultfœuille (2020) and Sun & Abraham (2021) or even the randomized design proposed by Athey & Imbens (2022). In addition, there is a substantial difference between IeFP graduates and technical and professional school graduates before the reform is implemented (See table A2 in the appendix). Since there is a substantial pre-period difference, using an unconditional parallel trend is not suitable. Thus, the conditional parallel trend proposed by Callaway & Sant'Anna (2021) seems more appropriate in our setting.

Our estimation strategy using event study relies on the parallel trend assumption. We provide several tests that can be an indication that the assumption is satisfied.

Firstly, we check if the pre-treatment trends of the IeFP graduates' outcomes are similar to those of technical and professional schools' graduates. Specifically, we conduct a joint test for the pre-treatment period using Callaway & Sant'Anna (2021) estimator for all outcomes in this study. We summarize our result in Table A3 in the appendix. Our exercise shows that, during the pre-treatment period, there is no significant difference between IeFP graduates and technical and professional school graduates. We further check if there are any anticipation effects close to the implementation of the reform in the next section. We are not able to find the anticipation for the reform. However, a more detailed discussion will be presented in the next section.

Secondly, we want to make sure that our findings are driven by the change in outcomes from treatment groups that are affected by the reform rather than by the outcomes change of the control group. In principle, the positive effect of the reform can be caused by two contrasting factors: (1) an increase in outcomes for the treatment group and no change for control groups, and (2) a decrease in outcomes of the control groups and no change of outcomes for the treatment group. Our estimation strategy is valid if our results are consistent with the first case rather than the second case. In order to check that, we conduct a test using a placebo or fake treatment. General high school graduates are used as a fake treatment since the reform only affects the short vocational track rather than general high school. With the same specification, we found that there is no effect of the IeFP reform on high school graduates. Table A4 in the appendix presents our results. However, there is a significant effect on two outcomes: the probability of being single and the probability of being married. This significant impact is not surprising since marriage is different from labor market outcomes. For labor market outcomes, it is the single individual that is affected by the reform. In contrast with the marriage case, high school graduates if they want to get married,

they have to form a couple with someone that can be graduated from another track. Thus, we look into more details and compare the result with our main result for marital choice. For a brief, our main results on marriage which will be discussed in the next section, show that the reform has an impact only on male graduates from IeFP. Male IefP graduates are more likely to get married and less likely to be single after the reform. We can say our placebo test is valid when there is no impact of the reform on male general high school graduates and still allow if there is an impact on female general high school graduates in case IeFP male graduates marry female general high school graduates. We present our results in Table A5 in the appendix. Consistent with our argument, we find that there is no impact of the reform on male general high school graduates on marital choice, while we found that female general high school graduates are more likely to get married and less likely to be single. Based on this placebo test, the effect found in our study is not driven by the outcomes decrease for control groups but by the direct impact of the reform on the outcomes of the treated groups.

Lastly, there is one potential threat to our estimation validity, which is the change of the composition, especially for the labor market in the region. If there is a compositional labor market difference between IeFP graduates and technical and professional school graduates, our estimation cannot be trusted. Since the IeFP reform affects the short vocational track that was previously outside the school system, we evaluate if there are any changes in the number of foreigners enrolling in IeFP in order to get a better education and increase their likelihood of getting employment. Thus, we evaluate the impact of the reform on the probability that the graduates are born outside Italy. We argue that immigrants who are mostly low-skilled in order to settle in Italy, should integrate with society and find a way to afford financially to stay, especially when they bring children to Italy. Thus, a short vocational track after the reform could be one of the best choices for their children to get vocational training and be ready for employment earlier but also get general skills. It is shorter than technical and professional school, but IeFP provides both technical and general knowledge. If there is a change in foreigner composition, our estimation can provide an upward bias for employment since the foreigner could accept low-quality jobs to survive and a downward bias for salary since they just take the job offered to them. However, this concern cannot be justified with our test. We prove the reform does not have any impact on foreigner composition in the short vocational track. The effect is small and not statistically significant (See Table A6 in the appendix). Compared to the mean of foreigners who graduated

from technical and professional schools before the reform, 1.8 percentage points is far from the 13.4 percent mean. Thus, we can argue that our estimation result is valid.

Apart from the parallel trend assumption, region identification in our estimation is based on the current residence of the person, not the region in which the person graduated from their degree because the data do not provide this information. In Italy, inter-regional migration is not very common, especially for attending VET or high school. But, to check that our estimation strategy is robust to migration effects, we assess the same specification using the region where they lived before. It is our best proxy to check if there are any effects of migration since a person can move several times even after graduation. A person can move to another region that provides a better job offer rather than staying in the region where they finish their school. Or, when they finish school and have a job, the new job with better benefits could induce them to move to another region. If the job offer is correlated with the reform, our estimation will be biased. Our estimation using the previous region where people lived before their current residence, shows that there is no substantial difference (see Table A7 in the appendix). We find the magnitude is almost the same. Our exercise proves that our estimation strategy using current region residence is robust with migration effect.

4. Results and Discussion

4.1. The Effect of The Reform on Labor Market Outcomes

We begin our analysis with event studies without control variables. First, we estimate the effect of the reform on employment. Estimates with no controls show that the reform increases the probability of being employed by 9.4 percentage points. The effect is statistically significant at 1% level. However, someone might challenge that our estimate is not robust due to several confounding factors like individual characteristics and labor market dynamics in that region. Thus, we rerun our regression and add controls. We summarize our results in Table 3.

[TABLE 3 AROUND HERE]

Adding individual characteristics does not change our estimates. The same case happens when we add the survey year fixed effect. We find that students who graduated after the reform, experience

a higher likelihood to be employed by 9.2 percentage points. The effect is not only statistically significant at the 1% level but also economically significant. The average unemployment rate for the control group before the reform is 23.55. Thus, an increase by 9.2 percentage points in employment is a meaningful effect.

[FIGURE 1 AROUND HERE]

To verify our results, we conduct a pre-treatment analysis. One of the main features of parallel trend assumption in Callaway & Sant'Anna (2021) estimation is there is no anticipation effect. Near the cutoff, there should not be a positive effect of IeFP reform on employment. We have shown the pre-treatment results in previous section. In this part, we want to verify the pre-treatment more closely. Therefore, we plot our events study results' coefficients. We present our result in Figure 1. We found that near the time of intervention, there is no anticipation effect. We find only positive effect on 5 years before the treatment began. However, one period before, there is a negative effect. We can conclude that this is a temporary fluctuation. IeFP who were graduated 4 years before the treatment until the most recent cohort before the treatment evolve the same way with person graduated from technical and professional schools. Our exercise shows that even after looking closely to specific period during pre-reform, our result is still valid.

[TABLE 4 AROUND HERE]

After showing that our estimation is valid, we conduct a heterogeneity analysis. Previous studies shows that the effect of education reform differs between men and women. Thus, we conduct sub-group regression based on gender to check the specific effect for each gender. Table 4 summarizes our results. Women graduated from IeFP enjoys larger benefit than men. The reform increase women probability to be employed by 15.9 percentage points. While the reform increases men probability to be employed by 4.5 percentage points. The size of the effect for women is three times than that of men. Our results show that women enjoy larger benefits from additional years of IeFP education. Our finding is in line with previous findings that women enjoy larger benefit from additional general curriculum in a VET program (Acevedo et al., 2020). Next, we try to observe how the impact distributed across cohorts. We plot the event study results presented by

Figure A2 in the appendix. We cannot find a clear pattern for men. There are several cohorts that experiences positive improvement, but most cohorts experience no improvement. In contrast, for women, we find very clear pattern. The effect is positive for all cohorts and decreasing for younger cohorts. In other words, earlier cohort experience high employment premium compared to technical and professional schools' graduates, but the effect is decreasing over time even though the effect still exists for earlier cohort that close to the year of reform.

[TABLE 5 AROUND HERE]

After observing the impact of IeFP reform on employment, we move forward to the effect on wages. Using the same approach, first we evaluate the effect of IeFP reform using a parsimonious events study specification. Table 5 shows the results of our exercises. Without control variables, we cannot find any significant impact of the reform. One of the explanations is this estimation is downward bias. Students who graduated after the IeFP reform are relatively younger than the one who graduated before the reform. Thus, without controlling for experience and seniority, we found very little correlation. Then, we add individual controls in our specification. After adding control variables including seniority and experience, we found a positive significant results. The reform increases IeFP graduates' wages by 11.7%; the effect is statistically significant at 5% level. We find even larger effects when using our preferred specification by adding survey year fixed effects to account for specific macroeconomic conditions in different survey years. We find that the reform increases IeFP graduates monthly wage by 14.3%, corresponding to 155-euros a month[5].

In addition of point estimates, we also perform the events study plot. Firstly, we check if our result satisfies pre-trend assumption for each period before the reform. We observe several significant differences for two cohorts. Short vocational track students who were graduated 6 years before the reform has higher salary already. However, the distance is relatively long with the reform. In addition, this positive effect is only observed for this cohort. Younger cohorts who were graduated nearly the reform does not have any significant difference that implies our pre-trend assumption is valid. Secondly, we check if the post period effect is experienced by all cohorts or only several recent cohorts. Our estimation shows that the positive impact is driven by the positive

[5] With constant prices referred to 2010 value

impact of the three youngest cohort. For older cohorts, the impact is not significantly different from zero. Our finding confirms previous research that the earning benefits from the reform is disappearing over time (Brunello & Rocco, 2017; Stenberg & Westerlund, 2015). We summarize our findings using Figure 3.

[FIGURE 2 AROUND HERE]

We further explore the impact by gender. Table 6 shows our results. We find significant wage effects for both men and women. However, the impact of the reform for women is greater than that for men. The reform increases IeFP graduates monthly salary by 21.2 percentage points in the case of women, 10.6% for men (or half of the effect for women). Both effects are statistically significant at 1% level. Before the reform, the mean of control group is 1,217 euro for men and 920 euro for women. There exists the gender gap before the reform. Women have 24.4% earnings discount compared to men. The reform is success to decrease this gender gap. The estimated wage after the reform is 1,346 euros for men, 1,115 euros for women, implying a gender wage gap of 17.2%, more than 7 percentage points lower than before the reform. We also check if this large effect on women is long-lasting. We plot the events study result. The results are presented by Figure A3 in the appendix. Our result suggests that a high improvement in women salary is driven by the youngest cohort. However, from the oldest cohort of the reform until third youngest cohort, we cannot find a substantial effect. Our finding implies that the effect is not long lasting. The high salary premium is decreasing overtime. Similar pattern is found for men. The gain is relatively smaller than women. However, the wage premium for men is more sustainable. This result shows that the reform is beneficial for women in terms of salary for women only in short time while more long-lasting for men.

[TABLE 6 AROUND HERE]

4.2. Effects on Marriage

After getting the impact on IeFP reform on labor market outcomes, we further observe the impact on marriage. We categorize marriage into three categories: single, married, and divorced. In general, we cannot find any effect of the reform on marriage. Our finding is robust with several

model specifications. We summarize our result in Table 7. This finding indicates that in general, the reform even though increase labor market condition, is not able to induce marriage among its graduates.

[TABLE 7 AROUND HERE]

However, the null effect can be driven by several factors including diverse impact based on gender. As stated in previous literature that men and women react differently between career and family (Knowles, 2013; Lundborg et al., 2017), our results can be driven by the positive effect for men and negative effect for women that lead to null results when combining these two groups. We run sub-group analysis based on gender to test for heterogeneous effects. The results are presented by Table 8. In line with previous literature, we find a positive impact of the IeFP reform on the likelihood of men to marry. Men who graduated from IeFP after the reform are 11.1 percentage points more likely to get married than those who graduated from technical and professional schools. Almost symmetrically, the probability for men to be single declines by 12.7 percentage points because of the reform. These effects on the probability to be married and probability to be single are statistically significant at 1% level. We do not find any evidence on the impact of the reform on divorce for men. We also check the events study plot to check the effect of each men cohort. We do not find any effect for the first four cohorts that graduated after the reform on the likelihood of being single and married (See Figure 3). The effect is much larger for the youngest cohort. It is reasonable since the economic condition of younger men has a positive correlation with marriage (Maclean et al., 2016).

[FIGURE 3 AROUND HERE]
[FIGURE 4 AROUND HERE]

For women, we find a negative effect of the reform on marriage. The IeFP reform decreases the probability of marrying by 6.8 percentage points. However, the effect is weakly statistically significant only at 10% level (See Table 8 column 4). We also do not find significant effects on the probability to be single. To make sure about the existence of the effect, we explore the events study (See Figure 4). We find a consistent null result for women. We only find one cohort that has a

higher probability of being single and a lower probability of being married. Thus, we can conclude that the effect is very limited, and no strong evidence that the reform affects women's marital choices. We also explore the effect on those who already have salaries to check if the reform affects marriage for those who have careers. Using women who have a career already gives consistent null results for marriage and single. We present these results in Table A8 in the appendix. However, there is an interesting result for divorce. For women who already have careers, the IeFP reform increases the probability of being married and then divorced by 1.7 percentage points. This finding supports previous arguments about career vs family for women (Lundborg et al., 2017).

[TABLE 8 AROUND HERE]

Since the marital choice effect cannot stand alone for the IeFP graduates, we assess the interaction with other graduates. Our previous findings show that men's probability of being married is increasing because of the reform. Based on this finding, we want to assess if men are more competitive in the labor market. Our hypothesis is based on the improvement of men's labor market conditions relative to the others. We compare the effect of attending IeFP (affected by the treatment) with the effect of attending high school (not affected by the treatment). We find that there is no effect for men attending general high school after the reform, while for men attending IeFP, the effect is positive. Then, we conduct the same test but for female high school graduates. The magnitude of the effect is in the same direction with men IeFP graduates. After the IeFP reform, women who graduated from general high school are more likely to get married and less likely to be single. These results are summarized in Table 9. These results imply that the reform increases IeFP graduates to be married and also has a positive impact also to women high school graduates. Thus, men are more competitive in the marriage market because of the reform.

[TABLE 9 AROUND HERE]

5. Conclusions

In this study, we carried out the analysis of the effects of the reform of the short-track Vet on labor market outcomes by adopting the event study procedure proposed by Callaway and Sant'Anna. We found that the reform increases the probability of employment by 9.4 percentage points, which

is statistically significant at the 1% level. After adding controls, including individual characteristics and survey year fixed effects, the estimate remains robust, with an employment increase of 9.2 percentage points. Sub-group regression based on gender reveals that women benefit more from the reform, with a 15.9 percentage point increase in employment compared to 4.5 percentage points for men. Regarding wages, the reform increases IeFP graduates' wages by 11.7% without controls, and by 14.3% with survey year fixed effects, with larger effects observed for women. However, there is no significant effect of the reform on marriage overall, although it increases the likelihood of marriage for men and decreases it for women, with further analysis suggesting that men are more competitive in the marriage market due to the reform.

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Table 1. The Italian education system before and after the reform.

Second cycle of education		Duration	Access to Post-Secondary non-tertiary	Access to Tertiary education
Before the reform				
- Upper secondary school education:	general (*liceo*), technical (*istituto tecnico*) and vocational (*istituto professionale*) schools	5 years	Yes	Yes
- Regional vocational training system:	IeFP	2 years	No	No
After the reform				
- Upper secondary school education:	general (*liceo*), technical (*istituto tecnico*) and vocational (*istituto professionale*) schools	5 years	Yes	Yes
- Regional vocational training system:	IeFP	3 +1 year	Yes	under certain conditions

Table 2. Summary Statistics Based on School Type

	All Sample		Non-VET Graduates		VET Graduates		Difference	
	mean	sd	mean	sd	mean	sd	b	t
1 if Employed	0.691	0.462	0.693	0.461	0.683	0.465	0.009*	(2.192)
log Monthly Salary	6.931	0.405	6.938	0.402	6.896	0.417	0.042***	(8.464)
1 if Single	0.681	0.466	0.681	0.466	0.681	0.466	-0.000	(-0.107)
1 if Married	0.292	0.455	0.293	0.455	0.287	0.452	0.006	(1.386)
1 if Divorced	0.027	0.163	0.026	0.160	0.032	0.175	-0.005***	(-3.570)
Years of Experience	6.896	6.832	6.929	6.841	6.731	6.786	0.198**	(3.112)
Total Years After Graduation	11.808	5.391	11.819	5.386	11.749	5.413	0.070	(1.402)
1 if Female	0.413	0.492	0.417	0.493	0.393	0.489	0.023***	(5.044)
1 if Foreigner	0.106	0.308	0.075	0.263	0.265	0.441	-0.190***	(-68.255)
Observations	83488		69637		13851		83488	

Source: Authors' calculations.
Note: * p<0.1, ** p<0.05, *** p<0.001.

Table 3. The effect of vocational education reform on employment

	(1)	(2)	(3)
VET x Post	0.094***	0.093***	0.092***
	(0.026)	(0.024)	(0.018)
VET x Pre	-0.009	0.002	0.001
	(0.014)	(0.010)	(0.008)
Pre-control-mean	0.765	0.765	0.765
Pre-reform-sd	0.424	0.424	0.424
Observations	81,314	81,314	81,314
Individual Controls	No	Yes	Yes
Survey Year FE	No	No	Yes

Source: Authors' calculations.

Note: * p<0.1, ** p<0.05, *** p<0.01. Control variables included nut not reported including sex dummy, foreigner dummy, years of experience, and years after graduation. Standard errors in parenthesis. Standard errors are clustered using region and survey year interaction level.

Table 4. The effect of vocational education reform on employment based on gender

	(1) All	(2) Male	(3) Female
VET x Post	0.092***	0.049**	0.159***
	(0.018)	(0.021)	(0.030)
VET x Pre	0.001	0.002	0.025
	(0.008)	(0.014)	(0.018)
Pre-control-mean	0.765	0.852	0.653
Pre-reform-sd	0.424	0.355	0.476
Observations	81,314	47,656	33,658
Individual Controls	Yes	Yes	Yes
Survey Year FE	Yes	Yes	Yes

Source: Authors' calculations.

Note: * p<0.1, ** p<0.05, *** p<0.01. Control variables included nut not reported including sex dummy, foreigner dummy, years of experience, and years after graduation. Standard errors in parenthesis. Standard errors are clustered using region and survey year interaction level.

Table 5. The effect of vocational education reform on earnings

	(1)	(2)	(3)
VET x Post	0.004	0.117**	0.143***
	(0.033)	(0.052)	(0.037)
VET x Pre	-0.005	-0.014	0.001
	(0.016)	(0.018)	(0.014)
Pre-control-mean	6.992	6.992	6.992
Pre-reform-sd	0.387	0.387	0.387
Observations	46,444	46,444	46,444
Individual Controls	No	Yes	Yes
Survey Year FE	No	No	Yes

Source: Authors' calculations.

Note: * p<0.1, ** p<0.05, *** p<0.01. Control variables included nut not reported including sex dummy, foreigner dummy, years of experience, and years after graduation. Standard errors in parenthesis. Standard errors are clustered using region and survey year interaction level.

Table 6. The effect of vocational education reform on earnings based on gender

	(1) All	(2) Male	(3) Female
VET x Post	0.143***	0.106***	0.212***
	(0.037)	(0.015)	(0.074)
VET x Pre	0.001	-0.002	-0.001
	(0.014)	(0.036)	(0.029)
Pre-control-mean	6.992	7.104	6.824
Pre-reform-sd	0.387	0.320	0.417
Observations	46,444	29,076	17,368
Individual Controls	Yes	Yes	Yes
Survey Year FE	Yes	Yes	Yes

Source: Authors' calculations.

Note: * p<0.1, ** p<0.05, *** p<0.01. Control variables included nut not reported including sex dummy, foreigner dummy, years of experience, and years after graduation. Standard errors in parenthesis. Standard errors are clustered using region and survey year interaction level.

Table 7. The Effect of VET on Marital Status

	Single			Married			Divorced		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VET x Post	0.041	0.008	-0.038	-0.044	-0.015	0.034	0.003	0.007	0.005
	(0.029)	(0.054)	(0.030)	(0.029)	(0.056)	(0.029)	(0.007)	(0.013)	(0.009)
VET x Pre	-0.009	-0.012	-0.004	0.009	0.012	0.006	0.001	-0.000	-0.001
	(0.011)	(0.015)	(0.013)	(0.012)	(0.017)	(0.014)	(0.004)	(0.006)	(0.005)
Observations	81,314	81,314	81,314	81,314	81,314	81,314	81,314	81,314	81,314
Individual Controls	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Survey Year FE	No	No	Yes	No	No	Yes	No	No	Yes

Source: Authors' calculations.

Note: * p<0.1, ** p<0.05, *** p<0.01. Control variables included nut not reported including sex dummy, foreigner dummy, years of experience, and years after graduation. Standard errors in parenthesis. Standard errors are clustered using region and survey year interaction level.

Table 8. Heterogeneity Effect on Marriage Based on Gender

	Single		Married		Divorced	
	(1)	(2)	(3)	(4)	(5)	(6)
	Male	Female	Male	Female	Male	Female
VET x Post	-0.127***	0.061	0.111***	-0.068*	0.016	0.007
	(0.043)	(0.040)	(0.040)	(0.040)	(0.013)	(0.012)
VET x Pre	-0.002	0.031*	-0.001	-0.029	0.003	-0.002
	(0.023)	(0.017)	(0.024)	(0.018)	(0.009)	(0.006)
Observations	47,656	33,658	47,656	33,658	47,656	33,658
Individual Controls	Yes	Yes	Yes	Yes	Yes	Yes
Survey Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Source: Authors' calculations.

Note: * p<0.1, ** p<0.05, *** p<0.01. Control variables included nut not reported including sex dummy, foreigner dummy, years of experience, and years after graduation. Standard errors in parenthesis. Standard errors are clustered using region and survey year interaction level.

Table 9. Male IeFP Graduates' Competitiveness

	Single			Married		
	(1)	(2)	(3)	(4)	(5)	(6)
	Male	Female	Male	Male	Female	Male
VET x Post	-0.127***	-	-	0.111***	-	-
	(0.043)	-	-	(0.040)	-	-
High School x Post	-	-0.052**	-0.019	-	0.062***	0.002
	-	(0.022)	(0.021)	-	(0.023)	(0.021)
Observations	47,656	53,012	53,038	47,656	53,012	53,038
Individual Controls	Yes	Yes	Yes	Yes	Yes	Yes
Survey Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Source: Authors' calculations.

Note: * p<0.1, ** p<0.05, *** p<0.01. Control variables included nut not reported including sex dummy, foreigner dummy, years of experience, and years after graduation. Standard errors in parenthesis. Standard errors are clustered using region and survey year interaction level.

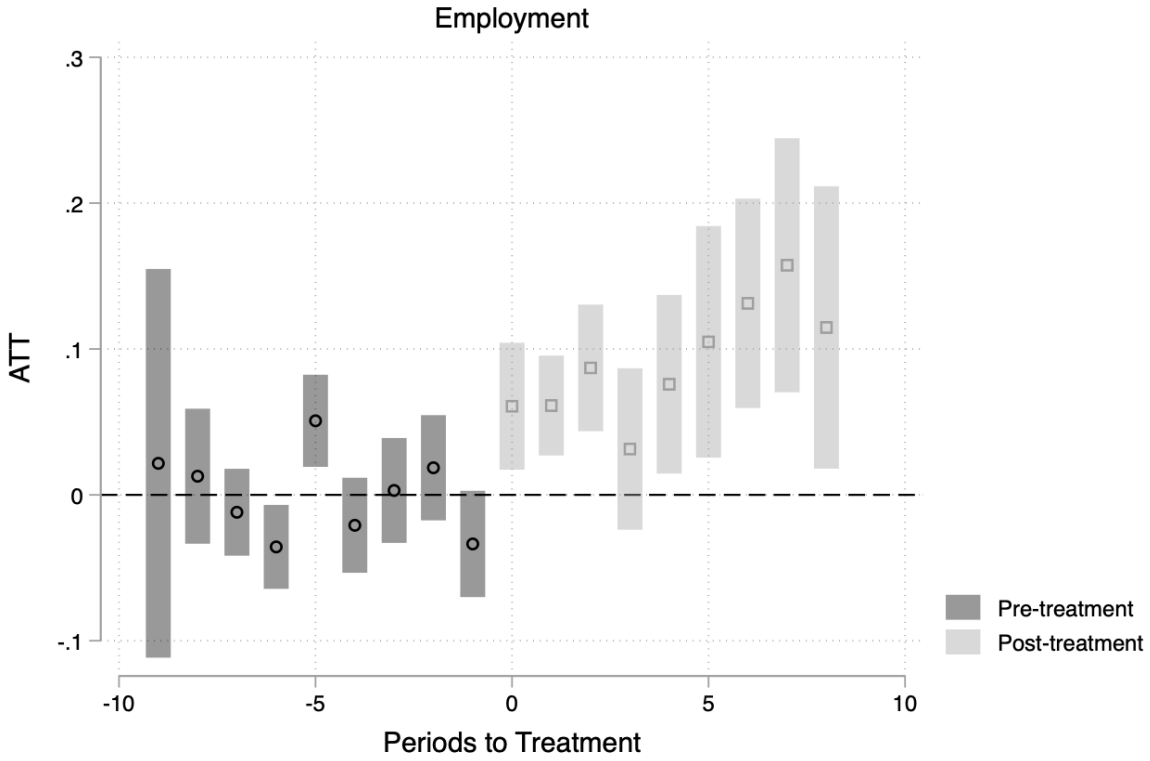

Figure 1. Event Study – The Impact of IeFP Reform on Employment

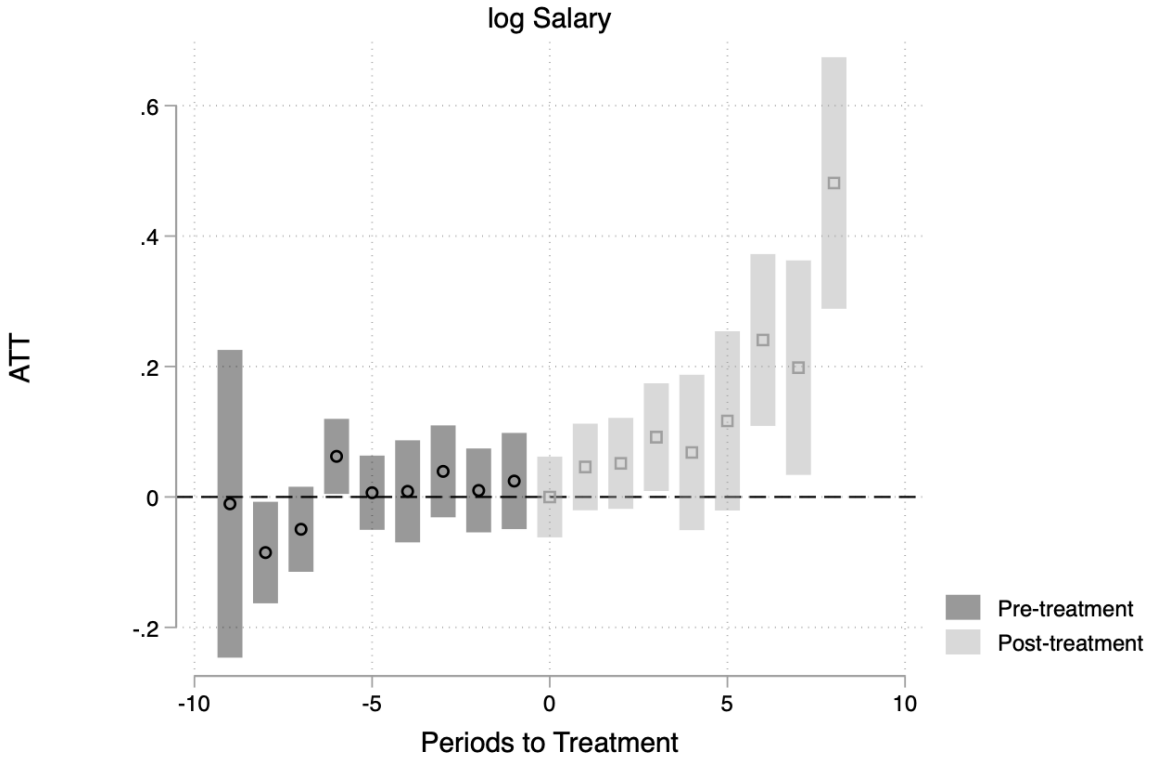

Figure 2. Event Study – The Impact of IeFP Reform on Salary

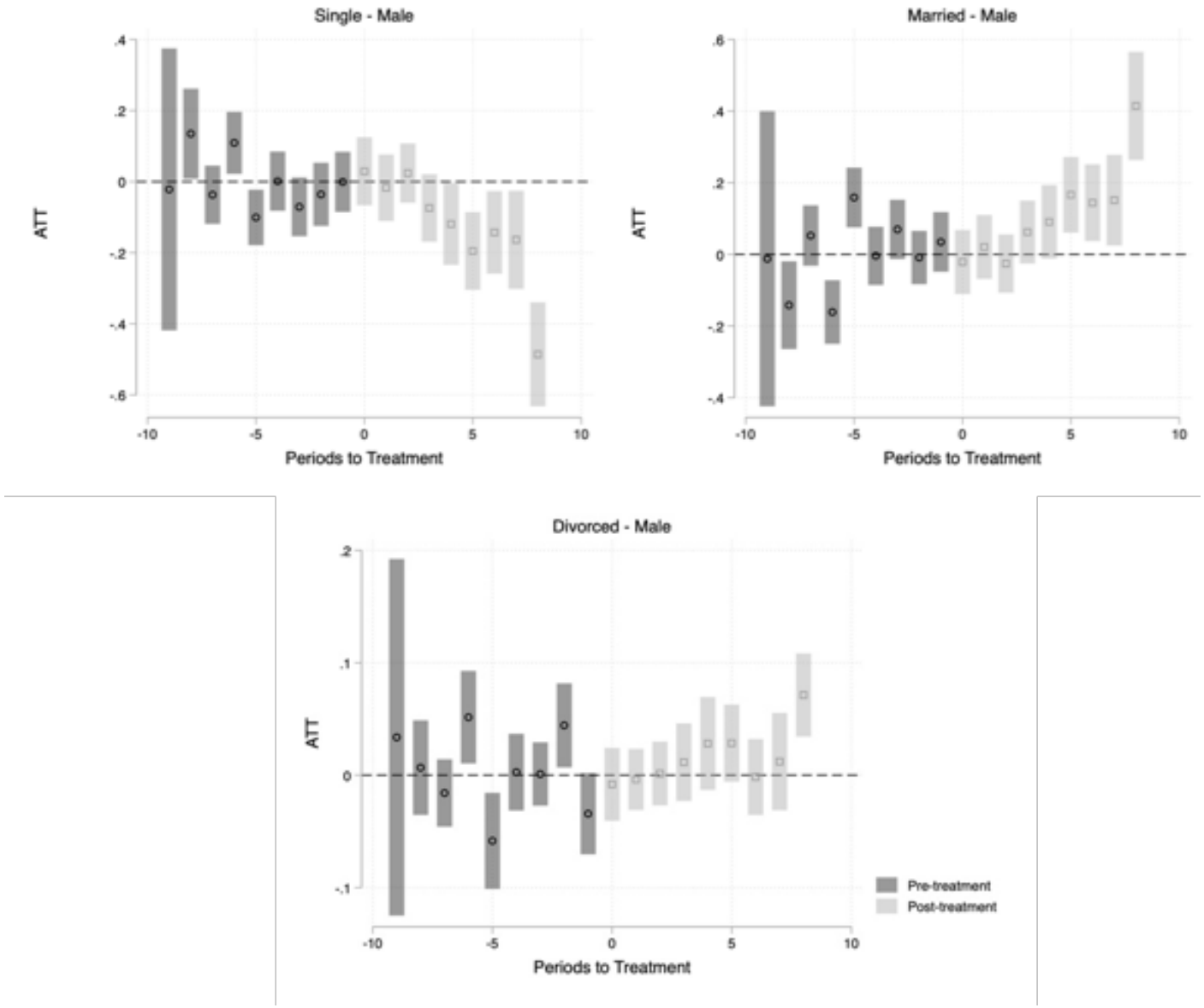

Figure 3. Event Study – The Impact of IeFP Reform on Male Marital Choice

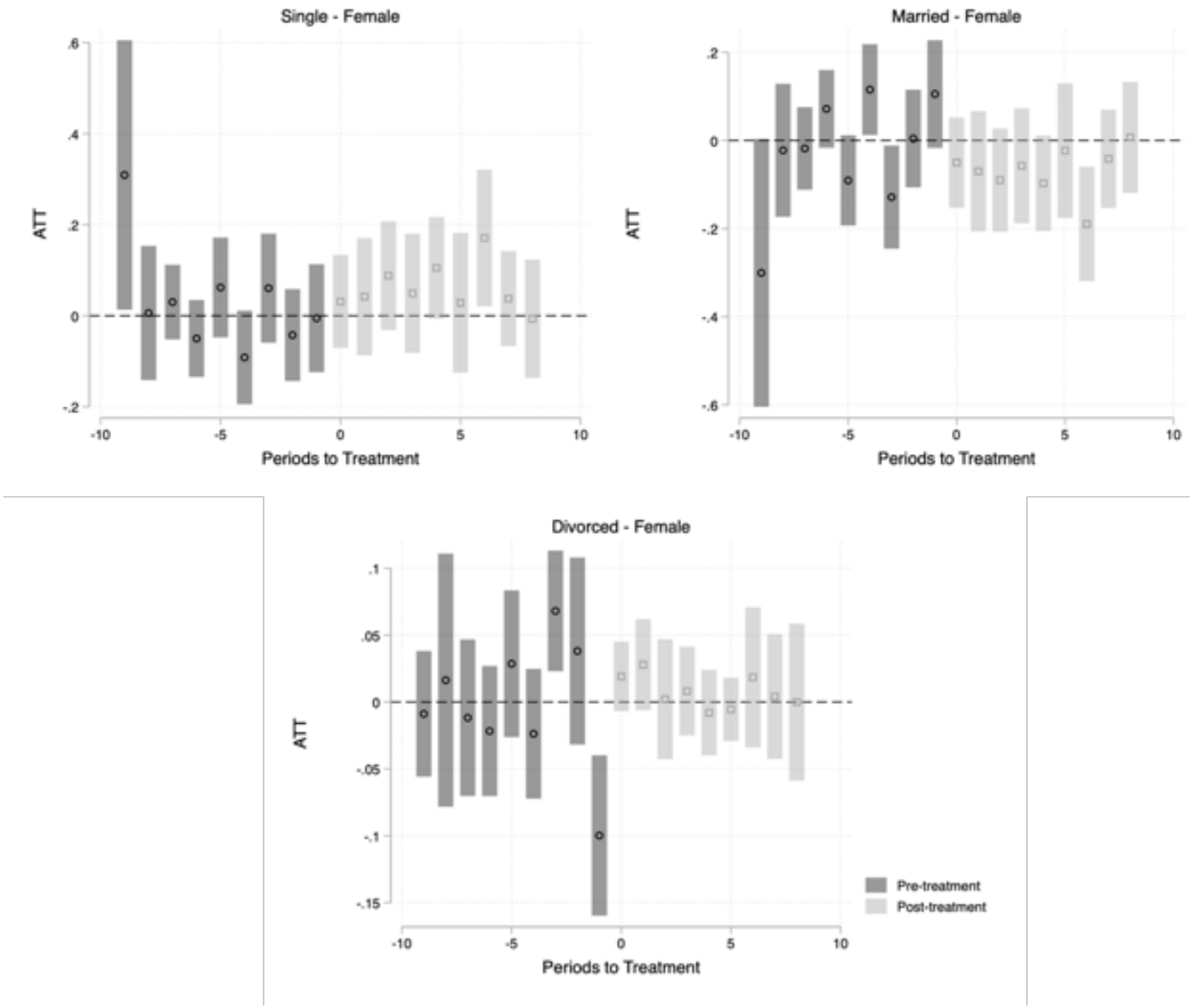

Figure 4. Event Study – The Impact of IeFP Reform on Female Marital Choice

Appendix A

Table A1. Summary Statistics Pre-Post for VET Graduates

	Pre		Post		Difference	
	mean	sd	mean	sd	b	t
1 if Employed	0.715	0.452	0.661	0.473	0.054***	(6.727)
log Monthly Salary	6.906	0.433	6.889	0.403	0.017	(1.829)
1 if Single	0.490	0.500	0.821	0.383	-0.332***	(-44.172)
1 if Married	0.454	0.498	0.165	0.371	0.289***	(39.094)
1 if Divorced	0.056	0.231	0.014	0.116	0.043***	(14.301)
Years of Experience	9.384	7.543	4.791	5.406	4.593***	(41.743)
Total Years After Graduation	16.149	3.011	8.532	4.426	7.618***	(113.794)
1 if Female	0.410	0.492	0.381	0.486	0.029***	(3.509)
1 if Foreigner	0.325	0.469	0.221	0.415	0.104***	(13.856)
Observations	5850		8001		13851	

Source: Authors' calculations.

Note: * p<0.1, ** p<0.05, *** p<0.001.

Table A2. Summary Statistics Based on School Type at Pre-Period

	Non-VET Graduates		VET Graduates		Difference	
	mean	sd	mean	sd	b	t
1 if Employed	0.765	0.424	0.715	0.452	0.050***	(8.285)
log Monthly Salary	6.992	0.387	6.906	0.433	0.086***	(12.147)
1 if Single	0.489	0.500	0.490	0.500	-0.001	(-0.091)
1 if Married	0.467	0.499	0.454	0.498	0.013	(1.870)
1 if Divorced	0.044	0.205	0.056	0.231	-0.013***	(-4.251)
Years of Experience	9.962	7.340	9.384	7.543	0.578***	(5.551)
Total Years After Graduation	16.035	3.004	16.149	3.011	-0.114**	(-2.691)
1 if Female	0.439	0.496	0.410	0.492	0.029***	(4.116)
1 if Foreigner	0.079	0.270	0.325	0.469	-0.246***	(-56.947)
Observations	35095		5850		40945	

Source: Authors' calculations.
Note: * p<0.1, ** p<0.05, *** p<0.001.

Table A3. The Effect of Pre-VET Treatment

	(1) Employment	(2) Salary	(3) Single	(4) Married	(5) Divorced
VET x Pre	0.001	-0.005	-0.004	0.006	-0.001
	(0.008)	(0.016)	(0.013)	(0.014)	(0.005)
Observations	81,314	46,444	81,314	81,314	81,314
Individual Controls	Yes	Yes	Yes	Yes	Yes
Survey Year FE	Yes	Yes	Yes	Yes	Yes

Source: Authors' calculations.

Note: * p<0.1, ** p<0.05, *** p<0.01. Control variables included nut not reported including sex dummy, foreigner dummy, years of experience, and years after graduation. Standard errors in parenthesis. Standard errors are clustered using region and survey year interaction level.

Table A4. High School Graduate as Placebo

	(1) Employment	(2) Salary	(3) Single	(4) Married	(5) Divorced
High School x Post	-0.010	-0.023	-0.061***	0.056***	0.004
	(0.015)	(0.036)	(0.019)	(0.020)	(0.006)
High School x Pre	0.005	-0.002	-0.011*	0.007	0.004
	(0.005)	(0.007)	(0.006)	(0.007)	(0.003)
Observations	106,050	52,160	106,050	106,050	106,050
Individual Controls	Yes	Yes	Yes	Yes	Yes
Survey Year FE	Yes	Yes	Yes	Yes	Yes

Source: Authors' calculations.

Note: * p<0.1, ** p<0.05, *** p<0.01. Control variables included nut not reported including sex dummy, foreigner dummy, years of experience, and years after graduation. Standard errors in parenthesis. Standard errors are clustered using region and survey year interaction level.

Table A5. Heterogeneity of Marriage for High School Graduates

	Single		Married		Divorced	
	(1)	(2)	(3)	(4)	(5)	(6)
	Male	Female	Male	Female	Male	Female
High School x Post	-0.019	-0.052**	0.002	0.062***	0.018***	-0.009
	(0.021)	(0.022)	(0.021)	(0.023)	(0.005)	(0.007)
Observations	53,038	53,012	53,038	53,012	53,038	53,012
Individual Controls	Yes	Yes	Yes	Yes	Yes	Yes
Survey Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Source: Authors' calculations.

Note: * p<0.1, ** p<0.05, *** p<0.01. Control variables included nut not reported including sex dummy, foreigner dummy, years of experience, and years after graduation. Standard errors in parenthesis. Standard errors are clustered using region and survey year interaction level.

Table A6. Falsification on the effect of VET reform on being born outside Italy

	(1)
VET x Post	0.018
	(0.016)
Pre-control-mean	0.134
Pre-reform-sd	0.340
Observations	81,314
Individual Controls	Yes
Survey Year FE	Yes

Source: Authors' calculations.

Note: * p<0.1, ** p<0.05, *** p<0.01. Control variables included nut not reported including sex dummy, foreigner dummy, years of experience, and years after graduation. Standard errors in parenthesis. Standard errors are clustered using region and survey year interaction level.

Table A7. Results Comparison Using Previous Region Residence

	(1) Employment	(2) Salary	(3) Single	(4) Married	(5) Divorced
Panel A: Using Current Region Residence					
VET x Post	0.092***	0.143***	-0.038	0.034	0.005
	(0.018)	(0.037)	(0.030)	(0.029)	(0.009)
VET x Pre	0.001	0.001	-0.004	0.006	-0.001
	(0.008)	(0.014)	(0.013)	(0.014)	(0.005)
Observations	81,314	46,444	81,314	81,314	81,314
Panel B: Using Previous Region Residence					
VET x Post	0.091***	0.143***	-0.039	0.034	0.005
	(0.017)	(0.037)	(0.030	(0.029)	(0.009)
VET x Pre	-0.002	0.008	0.003	-0.002	-0.001
	(0.008)	(0.014)	(0.013)	(0.014)	(0.005)
Observations	81,319	46,447	81,319	81,319	81,319
Individual Controls	Yes	Yes	Yes	Yes	Yes
Survey Year FE	Yes	Yes	Yes	Yes	Yes

Source: Authors' calculations.

Note: * p<0.1, ** p<0.05, *** p<0.01. Control variables included nut not reported including sex dummy, foreigner dummy, years of experience, and years after graduation. Standard errors in parenthesis. Standard errors are clustered using region and survey year interaction level.

Table A8. The Effect of the Reform on Marriage for Women with Career

	(1) Single	(2) Married	(3) Divorced
VET x Post	0.061	-0.078	0.017**
	(0.064)	(0.065)	(0.008)
VET x Pre	0.012	-0.011	-0.000
	(0.020)	(0.021)	(0.012)
Observations	17,368	17,368	17,368
Individual Controls	Yes	Yes	Yes
Survey Year FE	Yes	Yes	Yes

Source: Authors' calculations.

Note: * p<0.1, ** p<0.05, *** p<0.01. Control variables included nut not reported including sex dummy, foreigner dummy, years of experience, and years after graduation. Standard errors in parenthesis. Standard errors are clustered using region and survey year interaction level.

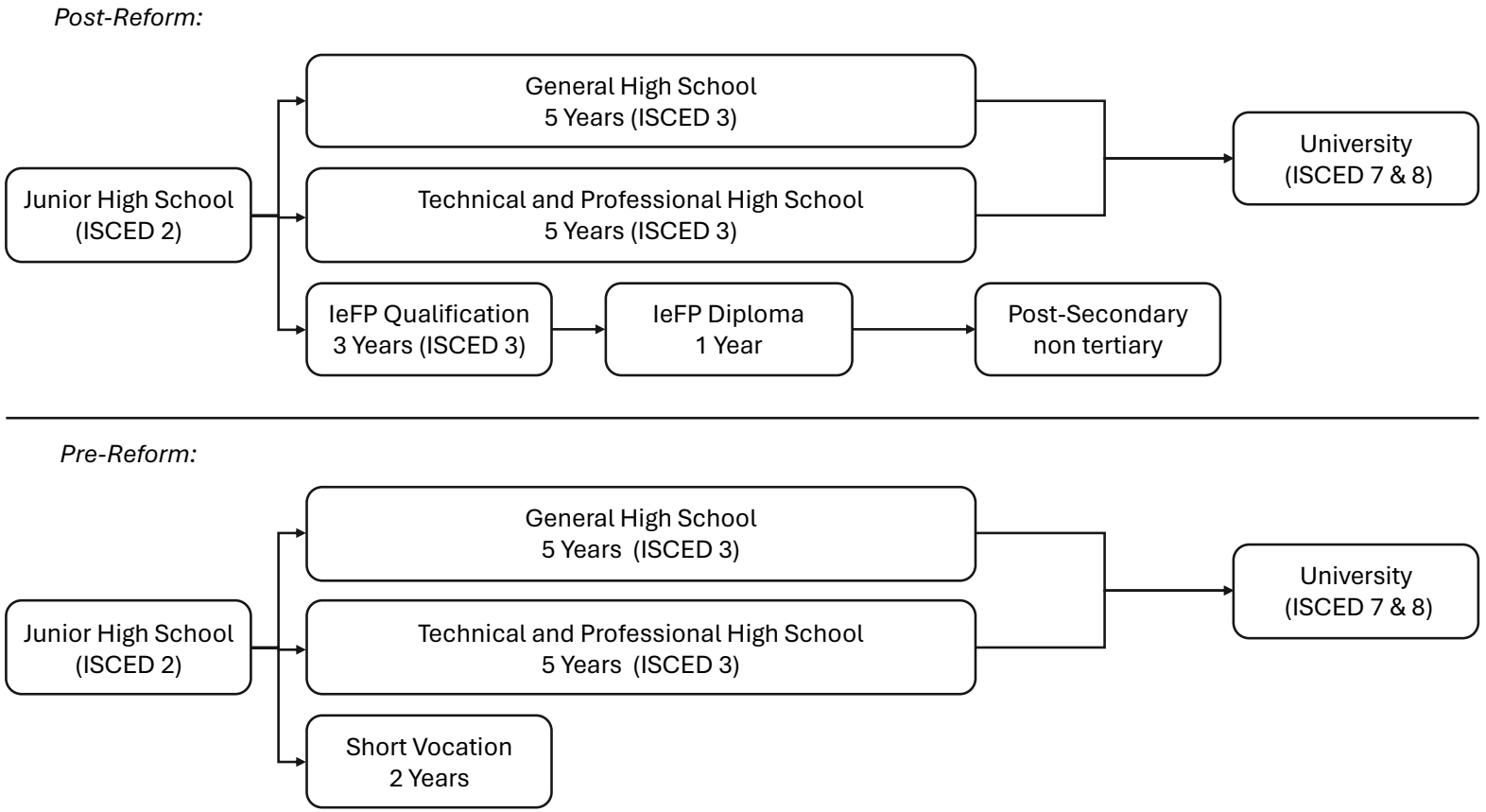

Figure A1. The Italian IeFP Reform

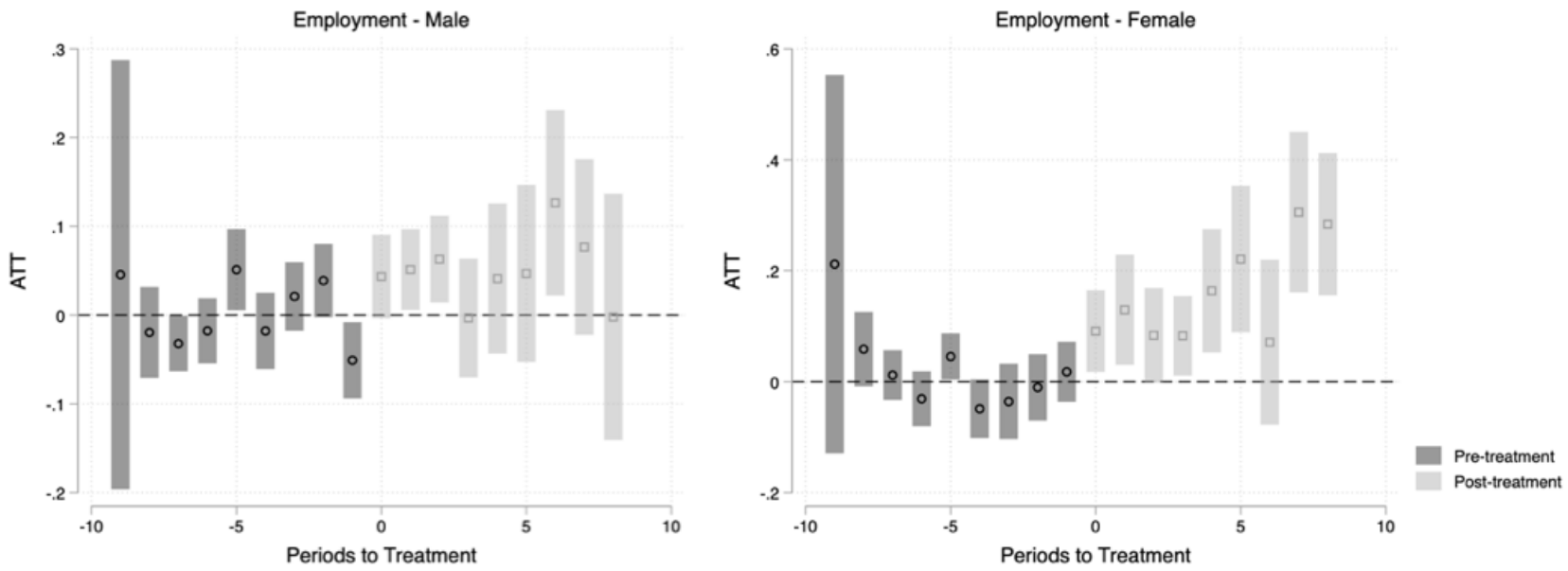

Figure A2. The effect of IeFP reform on employment based on gender

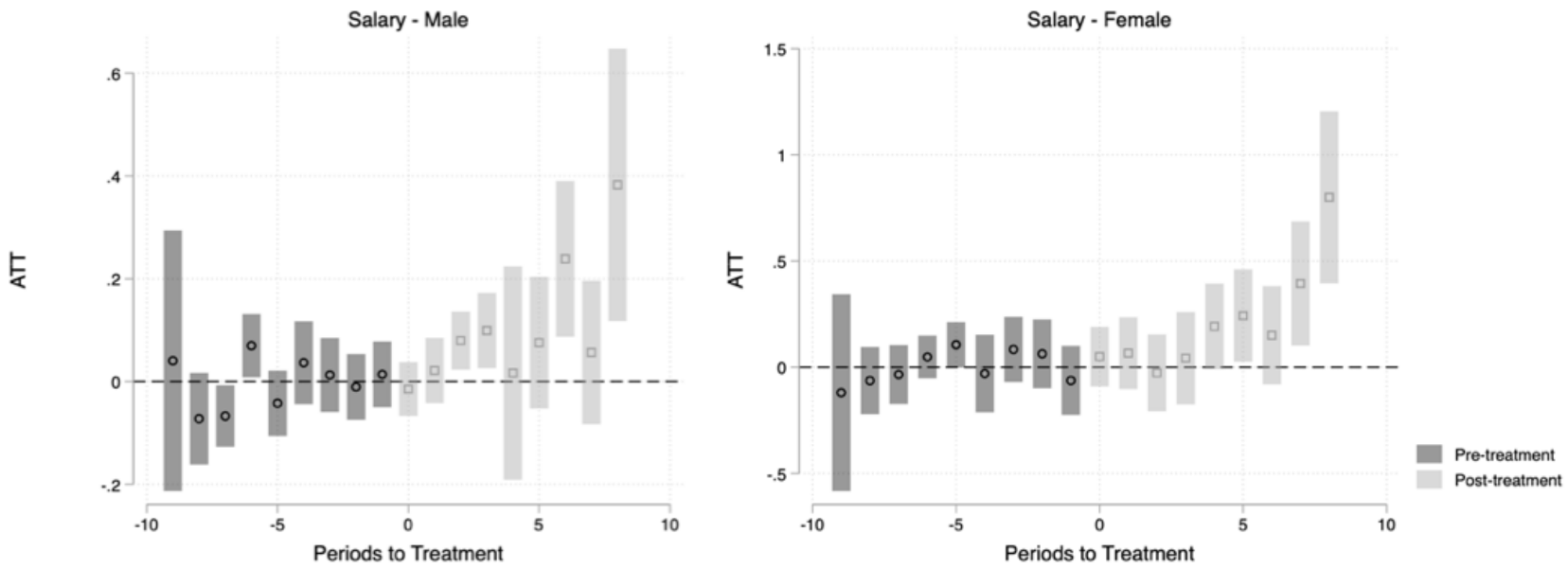

Figure A3. The effect of IeFP reform on salary based on gender