Training Vouchers and Labor Market Outcomes in Chile*

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Abstract

This paper evaluates the impact of a training voucher programme in Chile, the *Bono Trabajador Activo*, on workers' labor market outcomes. Using detailed administrative datasets of the National Employment Service and the Unemployment Insurance System, we apply difference-in-difference and IV estimators to measure these effects. Our main results indicate that the voucher programme has an overall negative impact on employment and earnings, particularly among individuals who expect to change economic sector. In contrast, we find that the programme improves females' labor outcomes, particularly for those with lower education. The voucher programme also improves employment duration and mobility across economic sectors.

JEL Codes: J24, J68, H43.

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1 Introduction

The introduction of vouchers in public policies is one of the most significant and controversial reforms undertaken in recent decades. Despite the fact that vouchers are now a commonly used instrument for increasing access to public

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services, particularly to education, their use in the context of labor training is more recent. This paper examines the impact of a labor training voucher on the labor market outcomes of workers in Chile.

The economics literature suggests different ways through which training vouchers may affect labor market outcomes. On the one hand, vouchers are expected to increase the set of consumers' (workers, in our case) choices, which might increase competition among labor-training providers. More competition between training providers might reduce inefficiencies in the delivery of training, which is expected to improve labor outcomes. Moreover, vouchers might allow workers to choose training providers according to their own preferences. This flexibility is expected to lead to better matches between workers and training providers, which might also increase the effectiveness of the training. On the other hand, it is also possible that asymmetries of information could cause workers to use vouchers for training that is not completely in accordance with their preferences or that have lower returns in the labor market.

Although school vouchers have been extensively studied in the literature (Angrist et al. 2002; Bettinger et al. 2010; Epple and R. 1998; Figlio and Page 2002; Hanushek et al. 2007; Hoxby 2003; Hsieh and Urquiola 2006; among others), labor training vouchers have received less attention (Doerr et al. 2014; Rinne et al. 2008). None of the papers on training vouchers offers evidence of the effects of labor training vouchers in developing countries. The main objective of this paper is contributing with new evidence on the impact of a recent implemented labor training voucher on labor outcomes in Chile.

Chile represents an interesting case among developing countries (OECD 2011). In the last two decades, Chile has experienced both strong economic growth and accelerated poverty reduction.[1] However, the unemployment rate is still high among the poor (17 percent among the poorest quintile compared to 8 percent at national level) and inequality is substantial (Chile has a Gini index of 0.52 compared to an average of 0.32 for the OECD countries).[2] With the aim of improving those two indicators and achieving the standard of living of developed economies, Chile has prioritised policies in recent years designed to increase investment in human capital accumulation and to improve productivity. In particular, Chile has implemented policies to improve the educational system.[3] However, policies aimed at improving the labor training system, with the goal of improving worker productivity by tailoring training programmes to the needs of the productive sector, are still in progress.

Previous analyses of the training system in Chile find low coverage among salaried workers with low productivity (SENCE 2010). Evaluations of the *Franquicia Tributaria* (FT)[4] indicate that the mechanism is almost exclusively reach-

[1] According to the CASEN 1990-2011, the poverty rate has decreased from 39 percent in 1990 to 15 percent in 2011.

[2] Income inequality in Chile is the highest among the OECD countries (OECD 2012).

[3] For instance, Chile is progressively increasing the public spending on education and has established secondary education as compulsory since 2003.

[4] FT is a subsidy for firms investing in off-the-job training programmes for their workers. This subsidy functions in a highly competitive system; in which private providers offer training courses to firms in a massive industry of courses. Courses financed by FT cover 84 percent of all public-related training courses. Trained individuals under FT represent 12 percent of all employed individuals in Chile. FT also funds internal courses of firms and training

ing workers in medium- and large-size companies (Rodriguez and Urzúa 2012) as well as high-productivity workers.[5] Furthermore, an analysis of the Chilean training system revealed the absence of public instruments allowing workers to express their preferences regarding the demand for labor training services (*Trabajo, Consejo Asesor Presidencial*, 2008).

To overcome these shortcomings, in 2011 Chile implemented a series of measures to strengthen its training system, including the introduction of a voucher scheme: the *Bono Trabajador Activo* (BTA) programme. In terms of budget, the BTA represents the second largest programme of the National Training and Employment Service (SENCE).[6] In 2011, the BTA budget was USD 32.3 million (approximately 16.2 billion Chilean Pesos (CLP)), which represented 15 percent of the total resources allocated to SENCE during that year (*Ley de Presupuesto*, 2011).[7] The BTA aims to address the training needs of workers with the ultimate objective of increasing their earnings and job mobility. The BTA consists of a public grant, allowing beneficiaries to choose the subject (from a list of predefined subjects by SENCE) and location of the labor training.

This paper uses administrative data from different sources to evaluate the impact of the BTA on individual labor outcomes. First, we use data from the Unemployment Insurance System (UI), containing employment and earning histories of formal workers from 2002 to 2014. The UI dataset contains monthly information from about 7.7 million formal workers. Second, we merge the UI dataset with administrative data from SENCE, containing information of the BTA beneficiaries (205,823 workers in 2011).[8] The rich nature of these datasets allows us to use panel data models for evaluating the impact of training on earnings and employment probability. Moreover, using administrative data of applicants to the BTA allows us to restrict our sample to individuals sharing unobservable characteristics, such as motivation. Given the non-experimental setting, we form a control group with individuals whose probabilities of undertaking training are similar to the ones of those who ended up using the BTA. Then, we compute a difference-in-difference model to measure the effects of the programme on different labor outcomes. Finally, to account for the potential selection into treatment based on unobservable characteristics, we employed an IV approach.

Overall, our results indicate a negative and small impact of the BTA on employment and earnings, particularly among individuals with expectations of changing economic sector. We also find evidence of heterogeneous effects, favoring females and lower-educated individuals. Finally, we find evidence of positive impact on employment duration and mobility across economic sectors.

instructors.

[5] The FT mainly benefits workers with higher incomes and education. The main users of the FT are administrative and high-skill workers (61.3 percent of total workers). They pay training completely or partially with the FT (SENSE, 2011).

[6] SENCE's largest programme in terms of budget is the *Subsidio al Desempleo*, which in 2011 has a budget of USD 83 million (approximately 41.5 billion CLP). It is important to note that the BTA has suffered important reduction in terms of budget allocation after its implementation.

[7] The exchange rate used along this paper is the 2011 average of USD 1 = 477 CLP (Source: Central Bank of Chile).

[8] That is, workers who: (i) applied to the programme in 2011; (ii) were awarded a voucher; and, (iii) decided to finally use it or not to engage in a training course.

The main contribution of this paper is providing evidence regarding the effect of training vouchers on labor market outcomes in a developing country. To the best of our knowledge, this is the first study in a developing country that evaluates the effects of training vouchers on labor market outcomes.

The rest of the paper is organised as follows: Section 2 describes the *Bono Trabajador Activo* programme; Section 3 presents the research strategy implemented; Section 4 describes the data used; Section 5 presents the results; and, Section 6 concludes and offers policy recommendations.

2 The *Bono Trabajador Activo*

Despite the significant economic development observed in Chile during the last decades, inequality is still persistent in the country. Chile has the most unequal distribution of income among the OECD countries (OECD 2012), and one similar to the average of the Latin-American region (López-Calva and Lustig 2010).[9] The main source of household income (80 percent) in Chile comes from labour income (CASEN, 2009), which suggests that this is an important component related to inequality in the country. Moreover, workers in Chile exhibit an important deficit of basic skills. For instance, according to Microdatos (2013), 44 percent of adults were functionally illiterate (42 percent in reading comprehension and 51 percent in basic quantitative skills). There is a consensus in Chile that investing in human capital accumulation and productivity would lead at improving the labour conditions of workers, which would contribute to reaching the living standards of developed countries (*Consejo de Equidad*, 2008).

At the beginning of 2011, Chile implemented the *Bono Trabajador Activo* (BTA) with the objective of addressing the low levels of employability of particular groups of workers and improving their access to better quality jobs. The BTA consists of a public grant allowing workers to freely choose labour training according to their preferences from a set of possible choices. The BTA is managed by SENCE and the training courses take place at Technical Training Organizations (OTECs). Moreover, applicants have to fulfill the following eligibility requirements: be employed; be at least 18 and no more than 60 years old (women) and 65 years old (men); have contributed at least 12 months (continuously or discontinuously) during their professional lives; have contributed at least 6 months (continuously or discontinuously) during the year prior to application; and, have, on average, a monthly gross wage lower than USD 1,200 (CLP 600,000).[10] Administrative data from different public institutions (Civil Registry and Identification Service; Social Welfare Institute; Unemployment Fund Administrator; among other sources) allow the verification of the above information.[11]

[9] While the average Gini index among the OECD countries is 0.32, the one of Chile is 0.52. On the other hand, the average Gini of Latin America is 0.51.

[10] Average calculated over the last 12 months previous to the application.

[11] The employment status data of the applicants is verified through administrative data from de Ministry of Labour. Although the data verification process, delays in updating administrative data might allow unemployed workers to receive the BTA even though they are unemployed.

By design, the BTA funds courses lasting between 80 and 140 hours (distributed, on average, over a 6 months period).[12] In general, the maximum BTA funding corresponds to USD 800 (approximately CLP 400,000) per beneficiary. For more expensive courses, the funding might increase up to USD 1,000 (CLP 500,000). Before the training starts, the beneficiary is asked to pay 20 percent of the total course fees. This initial copayment is designed as a guarantee, which is reimbursed to the beneficiary at the end of the course if he/she attends to at least 75 percent of the training, passes the course, and completes a satisfaction survey.[13] If these conditions are not met, the OTEC may retain the copayment.

Originally, the BTA planned on sorting eligible workers following an employability index (EI).[14] Eligible workers were expected to be sorted by this index giving priority to receive the voucher to those with lower scores, but, in practice the EI was never used. Although the EI was designed as a targeting mechanism, it was not used during the first year of the programme because the programme's administration expected a low demand for vouchers. Instead, all eligible applicants were awarded training vouchers, subject to availability of slots in each course. This assignment mechanism has a direct impact on the evaluation methods to use, as we discuss later in the paper.

3 Empirical Strategy

This section presents the empirical strategy for estimating the effect of the training voucher on the labour outcomes of workers. The non-experimental feature of the data determines the methodology used.

Despite the fact that all applicants fulfilling the eligibility requirements were offered a voucher, only 25 percent enrolled in a training course. Among those who were offered a voucher but did not use it are those who: (i) were unable to enroll in an OTEC given the existing slots for each region; (ii) decided not to enroll because the course of their choice was not offered; and (iii) did not enroll in an OTEC for some other unspecified reason. Unfortunately, we are unable to observe which of these reasons determined the lack of participation.

Therefore, given that all eligible applicants were offered a voucher, our definition includes in the treatment group only those applicants who were awarded a BTA voucher and enrolled in a training course. The control group consists of

[12] This might vary with the type and number of weekly hours of the training chosen. In practice, the average length of the courses is 58 days (see Figure 3.A in the Appendix for the distribution of length).

[13] After completing the course, students are obliged to answer a satisfaction survey. The survey is filling-in on-line on the SENCE's website. In 2012 and 2013 the surveys were not conducted, because of problems in its implementation.

[14] The employability index (EI) was defined as:

$$IE_i = \overline{S_i} \frac{Months_i}{12}$$

where $\overline{S_i}$ corresponds to the average monthly earnings in the 12 months previous to the application. This average is represented in *Unidades de Fomento* (UF), which is the account unit used in Chile. The exchange rate between the UF and the CLP is constantly adjusted to inflation so that the value of the UF remains constant on a daily basis during low inflation. $Months$ is the number of months with formal employment on the 12 months period previous to the application.

those applicants who were awarded a voucher but did not take a training course. Unfortunately, we do not have data on dropouts from training.[15] Therefore, it is possible that the treatment group includes individuals who started but did not complete the training courses. The fact that some of those included in our treatment group may not have completed the course suggests that our estimates would underestimate the true impact of the BTA.

Because individuals using and not using the voucher might be different, we first estimate the probability of using the BTA voucher on a set of observable characteristics and keep in the sample those who shared a common support (73 percent), as shown in Figure 2.A in the Appendix. Then, we exploit the longitudinal setting of the data and evaluate an individual fixed effect model to estimate the effect of the voucher on employment and earnings. The difference-in-difference approach allows us to control for time-invariant unobservable characteristics (e.g. ability, motivation) that might affect both participation in the treatment and labour outcomes. Finally, to account for the potential selection into treatment based on unobservables, we estimate an IV model.

3.1 Regression models

We start estimating the propensity score of starting vs. not starting a training course using a probit model:

$$P_i^* = \alpha + \beta X_i + \epsilon i \tag{1}$$

where P^* is a latent variable that determines the observed outcome p under the following rule:

$$p_i = \begin{cases} 0, P_i^* \leq \overline{p} \\ 1, P_i^* > \overline{p} \end{cases}$$

This procedure allows us defining an overlap region or common support where individuals, conditionally on X, have a positive probability of being both treatments and controls. We apply a Minima and Maxima approach to delete all observations whose propensity score is smaller than the minimum and larger than the maximum in the opposite group (control or treatment). The set of variables in X includes variables fixed over time as well as variables that were measured before the start of training.

Considering this restricted sample, we estimate the effect of the BTA using the following model:

$$y_{it} = \alpha + \beta D_{it} + \delta X_{it} + \tau_i + \lambda_t + \epsilon_{it} \tag{2}$$

where y_{it} is the labour market outcome of interest for individual i in month t. X_{it} is a vector of time-variant individual characteristics (age and age squared). On the other hand, τ_i is the individual fixed-effect and λ_t is the time (months) fixed-effect. D_{it} is a dummy indicator for whether individual i effectively undertakes training using the BTA. For these individuals, D takes the value of 1

[15] The data are not available for the entire sample.

when they start training and maintains a value of 1 until June 2014, which is the last month when we observe the individuals.

Assuming that (i) the control group adequately represents the trajectory of the treatment group in the absence of the programme (parallel trends assumption) and (ii) the treatment effect is homogeneous, the coefficient β in equation (2) represents the impact of the BTA on the corresponding labour market outcome.
The parameter of interest, β, in equation (2) is estimated by a Fixed-Effects (FE) model. The key identifying assumption is that, in the absence of the BTA, changes in earnings or employability would not systematically be different between workers in the treatment and control groups. Under this assumption, the parameter of interest β represents the average effect of BTA on trained workers compared to workers who did not use the voucher. We also, explore heterogeneous effects by gender and education.

To test whether the common trend assumption is likely and to analyze the treatment effects over time, we estimate the following model:

$$Y_{it} = \tau_i + \lambda_t + \sum_{j=-q}^{-1} \beta_j D_{ij} + \sum_{j=0}^{m} \beta_j D_{ij} + \delta X_{it} + \epsilon_{it} \tag{3}$$

where we include q "lags" and m "leads" of the treatment effect, so that, the treatment effect β in equation (2) might be decomposed into the treatment effect on the jth lag or lead. If the common trend assumption is valid, we expect the β_j's coefficients be close to zero for all $j < 0$.

Finally, to account for the potential selection into treatment based on unobservable characteristics, we estimate an IV model. We use as instrumental variable the number of months between the time an individual approaches the OTEC to register for a training course and the time when the BTA voucher was awarded. We expect that this time-span affects the corresponding labour market outcome only indirectly through its effect on the probability of participation (i.e. enrollment into a training course using the BTA). Given the time-invariant nature of this instrumental variable, we are not able to use panel data. Therefore, we estimate IV models for each month after the time of treatment.

4 Data and Summary Statistics

This section provides descriptive statistics on individual characteristics and the outcome variables. We use data from different sources to estimate the effect of the BTA on labour market outcomes. First, we use administrative data from SENCE containing information on BTA beneficiaries. Second, we use data from the Chilean Unemployment Insurance System (UI), which is administered by the Unemployment Fund Administrator, and contains data from all formal dependent workers since 2002.[16]

[16]The Unemployment Insurance is an individual saving account for each dependent worker. Both the worker and his employer contribute to this fund. The UI is supplement by the Solidarity Fund, which is financed by public and private (employers) contributions. The

The administrative data from SENCE contains information on BTA applicants since 2011. For every voucher received, it is possible to identify the starting and ending dates of the corresponding training. Figure 1.A, in the Appendix, shows the distribution of the starting and the ending months of training courses for individuals in our sample. Most training courses started between August 2011 and May 2012 (98 percent) and finished between October 2011 and July 2012 (95 percent). Moreover, the average length of the training courses was 58 days (Figure 3.A, in the Appendix). According the Ministry of Labour and Pensions, in 2011, there were 205,823 applicants for the BTA. As mentioned above, all applicants fulfilling the application requirements had the same probability of receiving a voucher, subject to the availability of spots on each course.

The UI system provides a detailed administrative dataset containing, as of June 2014, information on the gross monthly earnings of 7,747,624 formal workers since October 2002. It also contains information of individuals gender and age as well as the firms' economic sectors and regions. Combining the UI data and the records of beneficiaries of the BTA, we ended up with a sample of 198,187 workers.[17] Even though all applicants were supposed to fulfill the eligibility requirements described above, we find some contrasting evidence in the data. Regarding the employment status requirement, 15 percent were not actually employed at the time of the application. Moreover, 8 percent of the applicants had contributed fewer than 6 months in the 12 month period before applying; and, 4 percent had contributed fewer than 12 times along their career. Regarding earnings, 7 percent of applicants have average earnings greater than USD 1,200 (CLP 600,000) in the last 12 months before applying to the BTA. Finally, in very few cases (0.1 percent) the applicants were not in the age range established by the programme. We limited the sample to the 137,657 individuals who meet the eligibility criteria and were at least 18 years old in May 2006 and 65 or less in May 2011. Furthermore, as mentioned above, we restricted the sample to individuals sharing a common support (i.e. under the same range of propensity scores of being in the treatment group on the characteristics presented in Table 1), ending up with a sample of 99,955 individuals.[18] Out of these observations, 30 percent (29,917 workers) enrolled in a training course in 2011 and therefore form the treatment group. The remaining 70 percent (70,038 workers), forming our control group, are those who were awarded a voucher but did not initiate a training course.

Table 1 shows descriptive statistics for the whole population of applicants, and for those in the control and treatment groups. The applicants are mostly Chilean (99 percent). Male participation is larger than female participation (54 vs. 46 percent, respectively). On average, applicants are 34 years old. Applicants have, on average, 11.9 years of education, which corresponds to almost

Unemployment Fund Administrator of Chile (AFC) is the private manager of the mandatory unemployment insurance.

[17] When merging these datasets 7,636 applicants of BTA were not found in the UI database. This may be due to the fact that the UI only captures labour histories of individuals with new contracts starting in October 2002. Thus, individuals whose contracts started before October 2002 are not in the UI.

[18] Figure 2.A in the Appendix shows the distribution of predicted probabilities for treatment and control groups. Table 1.A in the Appendix shows the results of the estimation of equation (1).

finishing secondary education.[19] The most demanded areas of interest correspond to skilled white-collar jobs, as Administration (23 percent) and Computer Science (15 percent). In contrast, courses related to primary activities are less demanded (Agriculture, Construction, Mining).

[Tabla 1 here]

Finally, Figure 1 shows the evolution of average (log) monthly earnings and employment for individuals in the treatment and control groups relative to the month of application. To explore whether there are pre-exiting differences in trends between the treatment and the control groups, Figure 1 presents the trends in monthly earnings and employment before the time of application to the BTA for a period up to 50 months. Figure 1 shows that both groups follow similar trends in employment and (log) monthly earnings before the application of the BTA (and small differences after it), which reflects that our results can be attributable to the impact of the BTA and not to pre-existing trends.

[Figure 1 here]

5 Results

This section reports the estimated impacts of the BTA on the probability of being employed, individual's monthly earnings, employment duration and probability of changing economic sector. It also explores whether the BTA has heterogeneous impacts by gender, level of education and for those who had expectations of changing economic sector at the time of application. At the end of this section, we present two sets of robustness checks: (i) a placebo test testing for pre-treatment differential trends; and, (ii) an IV estimation accounting for the potential selection into treatment based on unobservable characteristics.

Table 2 presents the FE estimation of equation (2) of the overall impact of the BTA on the probability of being employed and individual's (log) monthly earnings.[20] As mentioned above, our primary interest lies in the estimation of the coefficient β, which represents the impact of the BTA in equation (2). Table 2 shows that the impacts of the BTA on employment and monthly earnings are negative and small in magnitude, particularly for the first variable. Overall, two and a half years after having applied to the BTA, enrolling in a training course using the BTA reduces by 0.6 percentage points (pp) the probability of being employed and reduces monthly earnings by 12 percent. These results are consistent with those of Doerr et al. (2014), who only find positive impacts in employment after four years the voucher award and no positive effects on earnings during the same period.

[Table 2 here]

[19] The 2003 constitutional reform in Chile established that primary (8 grades) and secondary (4 grades) education is mandatory for all the inhabitants in Chile up to 18 years old. Before 2003, compulsory education only covered the 8 years of primary education, and before 1965 and 1929, the minimum mandatory education was 6 and 4 years, respectively.

[20] We also estimated RE model for equations in Tables 2, 3 and 4 and rejected the Hausman test's null hypothesis in all cases. Results are available upon request.

We also explore heterogeneous impacts of the BTA voucher by gender and education level in Table 3. We define lower education (LE) as a dummy variable taking the value of 1 when the individual has not completed secondary education and 0 when the individual has completed secondary education or more. We find evidence that the BTA has differential effects by gender and level of education (as shown by the interaction terms in models 1 and 2 for employment and 7 and 8 for earnings). In particular, the BTA has a larger (and positive) effect on female employment and earnings, relative to male, and it has a more negative effect on lower-educated than on higher-educated individuals.

In addition to being statistically different from the effect for males (as shown by the interaction terms in models 1 and 7 in Table 3), the effect of the BTA on both females employment and earnings is positive and statistically significant. The BTA increases by 2 pp the probability of women of being employed and increases their earnings by 24 percent.[21] Interestingly, we find that the positive effect of the BTA on female labour outcomes is concentrated among those with lower education. Relative to more educated women, those with lower education benefit more from using the BTA (as shown by the interaction terms in models 3 and 9 in Table 3). Moreover, the BTA increases by 1 pp the probability of lower-educated women of being employed and increases their earnings by 9 percent.[22] It is interesting to highlight that the BTA has a different effect on the sample of males. The BTA has a differential effect on those with lower and higher education but, in this case, it affects the lower-educated more. Finally, among the samples of lower-educated and higher-educated individuals, the impact of the BTA on employment and earnings is larger (and in fact positive) for females than for males (as shown by the interaction terms in models 5 and 6 for employment and 11 and 12 for earnings). Once again, the effects seem to be larger for lower-educated females.

[Table 3 here]

To further explore the heterogeneous impacts of the BTA, Table 4 presents whether the effects vary among individual who had expectations of changing economic sector at the time of application to the programme and those who did not. In general, using the complete sample as well as the subsamples of lower- and higher educated females and males, the BTA has a differential effect according to individuals' expectations of changing economic sector. Those who did not expect to change economic sector show a positive and significant effect of the BTA on both employment and earnings (coefficient on BTA in Table 4). In contrast, the BTA seems to negatively affect the employment probability and earnings of individuals expecting to change economic sector (sum of coefficients on $BTA+$ *BTA*Expect changing sector* in Table 4). The BTA positive effects for those who did expect changes seem to be larger among the lower-educated (females and males), relative to comparable higher-educated individuals, and among females (lower- and higher-educated), relative to comparable males. The negative effects of the BTA are also larger in magnitude on earnings than on employment probability.

[21] These effects correspond to the sum of coefficients $BTA+(BTA*Female)$ in models 1 and 7, which are both significant at the 99% level.

[22] These effects correspond to the sum of coefficients $BTA+(BTA*Female)$ in models 3 and 9, significant at the 99% and 90% level, respectively.

[Table 4 here]

In summary, we find evidence that the BTA negatively affects both individuals' employment probability and earnings. Even though, at a first glance, these results seem to be counterintuitive for a voucher programme for labour training, they are likely to be linked to a long-term lock-in period that has been found in other studies (e.g. Doerr et al. (2014) in Germany) and to certain individual characteristics. We find that the BTA's negative effects are more pronounced for individuals (females and males) who expected to change economic sector at the time of application to the BTA. Finally, we also find an interesting result from a policy point of view; the BTA positively affects females' employment probability and earnings, particularly among those with lower education.

5.1 Robustness checks

First, this section explores whether the assumption of common trends between individuals in the treatment and control groups is plausible. Second, it tests whether there is selection into treatment in terms of individual unobservable characteristics.

Figure 2 plots the estimated "lags" and "leads" coefficients β corresponding to the effects of the BTA on employment probability and earnings from equation (3). As mentioned above, to hold the common trend assumption, we should observe that the estimated βs are close to 0. This would suggest that the BTA did not affect either employment or earnings before the time of application (month 0). Figure 2 shows that, particularly for earnings, the effect of BTA on pre-treatment outcomes is close to 0, which would support the use of a difference-in-difference model. Furthermore, Figure 2 shows evidence of a lock-in period in both employment and earnings. Only after 22 months (i.e. corresponding to June 2014, last time when we observe individuals) the negative effect of the BTA on earnings, but particularly on employment, approaches zero.

[Figure 2 here]

The second set of results shown in this section corresponds to the estimation of an IV model, where initiating training is instrumented by the time between the application to and the awarding of the voucher. As mentioned above, given that this IV variable is time-invariant we are only able to estimate the impact of the BTA using cross-sectional data. However, the use of cross-sectional data allows us to estimate the effect of the BTA on two additional labour outcomes; employment duration and changes in economic sector. The first variable corresponds to the number of months worked since application to the BTA and the second variable is an indicator for whether the individual changed economic sector after applying to the BTA. Table 5 shows the 2SLS IV estimation corresponding to June 2014, Table 4.A in the Appendix shows the IV estimations from December 2012 until June 2014.

[Table 5 here]

The first column in Table 5 shows the first stage estimation of starting a training using the BTA as function of the time-lapse between application and awarding of the voucher and the other covariates includes in the second stage.

The Durbin-Wu-Hausman test at the bottom of Table 5 leads to rejection of the null hypothesis that using the BTA is exogenous. In addition, the F-test (16.8) at the bottom of Table 5 is considerably larger than the rule of thumb of 10, which confirms the relevance of our instrument. The next two columns show that the IV estimation of the BTA on employment and earnings is negative but statistically insignificant. In contrast, the effect of the BTA on employment duration and the probability of changing economic sector after applying to the BTA are positive and significant. These two last results would suggest that the BTA is increasing the chances of employability of workers but also helping them to change sectors, which might be associated to the lower earnings.

This section shows evidence that supports the use of a difference-in-difference model for estimating the impact of the BTA on labour outcomes. First, evidence from a placebo test shows that the BTA has no differential pre-treatment impact on treatment and control groups. Second, we show that the use of the BTA for starting training increases employment duration and the probability of changing economic sector.

6 Concluding Remarks and Discussion

By increasing workers' choices, vouchers are argued to create healthy competition between training providers. This competition might help to reducing inefficiencies in the delivery of training and improving labour market outcomes. However, publicly-funded vouchers might not lead to these improvements and/or to the maximization of social well-being in cases when individuals are poorly informed or when the training level maximizing individuals' well-being does not maximise well-being of the society as a whole. Unfortunately, the existing empirical evidence on the effect of labour training funded of vouchers is not conclusive regarding whether the implementation of such a policy is more efficient than alternative policies (e.g. programmes where assignments to training are made by the government or its agents).

In addition to contributing to the scarce empirical evidence on the effects of training vouchers, particularly in developing countries, this paper is motivated by the fact that the *Bono Trabajador Activo* (BTA) has the second largest budget among the public training services offered in Chile.

Overall, our results indicate that, at least during the first two and a half years after applying to the BTA, the programme negatively affect individuals' employment probability and earnings. In contrast, the BTA positively affect females' labour outcomes, particularly of those with lower education. This result suggests that training programmes might help to improve the low rate of female labour participation and the gender wage gap in Chile. The counterintuitive negative effects found for the BTA are likely to be linked to a long-term lock-in period that has been found in other studies (e.g. Doerr et al. (2014) in Germany) and to certain individual characteristics. In particular, we find that the BTA exhibits more negative effects for individuals (females and males) who expected to change economic sector at the time of application to the BTA. Further results show that the BTA increases the employment duration and the probability of

changing economic sector. This last result might be associated to a decrease in earnings after changing to a new economic sector.

The negative effects on employment and earnings are similar to previous findings in the literature that individuals receiving training vouchers have worse labour outcomes than those who did not take training (Corson et al. 1993; Dickinson and West 1983; McConnell et al. 2006). It is however important to highlight that our results correspond to short- and medium-term estimates. In addition, they correspond to employment and earnings occurring only in the formal sector, which are the ones observed in administrative data. Nevertheless, based on the findings of by Doerr et al. 2014, we would not expect the longer-run coefficients to show positive and large effects on employment or earnings. The authors observed participants for four years after the beneficiaries received the voucher, and found no significant effect in this time period.

According to Doerr et al. (2014), the negative effect of the voucher could be the result of a lock-in period for participation in the programme (i.e. individuals reduce the intensity of job searching or accepting job offers). Another explanation suggested by our results, however, is that the negative results in earnings are associated to individuals changing between economic sectors and that this sector mobility implies a cost, possible due to the loss of sector-specific human capital.

From a public policy perspective, what is important to evaluate for Chile is why the BTA did not had the expected impact on workers' outcomes and how could be it improved to become a cost-effective programme addressing employability and productivity problems. Given that the programme is not estimated to have, on average, a positive effect on earnings or employment, a cost-benefit analysis is not necessary at this point. It is worth remembering however that the programme is not small—with a cost of US$32 million in 2011, being the second largest programme in SENCE's budget.

We therefore argue that before continuing with the programme as it is currently designed, it is worthwhile to explore in more detail the factors that limit the programme's effectiveness. In this process it is necessary to distinguish between design failures and implementation failures of the BTA. For instance, among the main implementation failures we would highlight: limited training menu for individuals; lack of mechanisms to incentivize competition between OTECs; and a lack of vocational feedback and transmission of information to help individuals to take an informed decision about training.

Our main recommendations would be along the following lines: (i) provide information to individuals regarding costs and labor market returns of the training options, as well as the quality and placement rate of each OTEC; (ii) offer vocational support to individuals, particularly to those with larger economic disadvantage; (iii) verify the quality and relevance of the training being offered by the OTECs; (iv) incentivize competition among OTECs for public resources, awarding contracts based on their previous results; (v) regulate the market of training providers to assure quality and relevance of the training courses offered; and, (vi) test and evaluate any change to the current programme before scaling it up.

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Table 1: Descriptive Statistics

	Control	Treatment	All	Difference C-T [b]	
N	70,038	29,917	99,955		
Male	0.54	0.55	0.54	-0.02	***
Age [a]	34.36	33.69	34.16	0.66	***
Immigrant	0.01	0.02	0.01	-0.01	***
Years of education	11.92	11.93	11.92	-0.01	
Change sector expectancy	0.43	0.46	0.44	-0.03	***
Area of interest					
Administration	26.06	17.13	23.38	8.93	***
Farming	2.36	1.66	2.15	0.70	***
Trade and services	7.62	7.52	7.59	0.10	
Computer Science	13.85	16.48	14.64	-2.63	***
Construction	5.56	6.41	5.81	-0.85	***
Mechanics	4.29	9.06	5.71	-4.77	***
Mining	5.98	1.54	4.65	4.44	***
Prevention	6.62	10.28	7.71	-3.66	***
Services	9.64	3.89	7.92	5.75	***
Transport	9.42	8.60	9.18	0.82	***
Tourism and languages	8.60	17.44	11.25	-8.84	***
Occupation					
Operator	13.53	14.41	13.80	-0.88	***
Craftsman	0.15	0.14	0.15	0.01	
Driver	4.58	4.38	4.52	0.20	
Office worker	20.69	20.14	20.53	0.55	**
Manager and supervisors	2.79	2.37	2.67	0.42	***
Construction workers	4.53	5.46	4.81	-0.93	***
Teachers	3.89	3.70	3.83	0.19	
Professionals	13.92	12.51	13.50	1.41	***
Service workers	3.00	3.34	3.10	-0.34	***
Sellers	10.45	10.13	10.35	0.32	
Other	22.47	23.43	22.75	-0.96	***
Country Zone					
Center	18.44	24.92	20.38	-6.48	***
Metropolitan	48.91	32.32	43.95	16.59	***
North	15.39	11.61	14.26	3.78	***
South	17.25	31.16	21.41	-13.91	***
Month in which applied for the voucher					
11-May	11.59	14.16	12.36	-2.57	***
11-Jun	11.82	12.39	11.99	-0.57	**
11-Jul	8.90	9.89	9.20	-0.99	***
11-Aug	14.11	13.46	13.92	0.65	***
11-Sep	17.90	16.65	17.53	1.25	***
11-Oct	13.68	12.87	13.44	0.81	***
11-Nov	11.42	9.72	10.91	1.70	***
11-Dec	10.57	10.85	10.66	-0.28	
Days between requesting the BTA and awarding it	23.01	24.96	23.59	-1.95	***
Wage (pesos) [a]	346946	340354	344973	6592	***
Employed (%) [a]	100.00	100.00	100.00	0.00	
Contribution (months) year prior application	11.46	11.47	11.47	-0.01	
Contribution (month) (Since January 2006 to application)	51.00	51.05	51.01	-0.05	

NOTES: [a] At the time (month) when individual applied to the BTA. [b] t-test for difference of means. ***p<0.01, **p<0.05, *p<0.1. Source: Administrative data from SENCE and Unemployment Insurance System.

Table 2: Impact of the BTA on employment and (log) monthly earnings, all workers

	(1)	(2)
Variables	Employment	Earnings[a]
BTA	-0.006***	-0.122***
	(0.000)	(0.009)
Age	0.076	1.473
	(1.599)	(28.209)
Age2 (/100)	-0.020***	-0.425***
	(0.000)	(0.005)
Constant	-1.505	-41.166
	(45.619)	(804.916)
Individual FE	Yes	Yes
Time FE	Yes	Yes
Observations	10,195,410	10,195,410
R-squared	0.124	0.142
Number of individuals	99,955	99,955

Note: [a]Earnings correspond to the log of nominal monthly earnings in US$. Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Table 3: Impact of the BTA on employment and (log) monthly earnings, by gender and education level

	Dependent variable: Employment						Dependent variable: Earnings[a]					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Variables	All	All	Female	Male	LE[b]	HE[c]	All	All	Female	Male	LE[b]	HE[c]
BTA	-0.024***	-0.006***	-0.003***	-0.008***	-0.012***	-0.025***	-0.411***	-0.112***	-0.062***	-0.150***	-0.201***	-0.425***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.011)	(0.009)	(0.014)	(0.012)	(0.038)	(0.012)
BTA*Female	0.039***	-	-	-	0.059***	0.038***	0.646***	-	-	-	0.952***	0.620***
	(0.001)	-	-	-	(0.003)	(0.001)	(0.015)	-	-	-	(0.059)	(0.016)
BTA*(Lower Education)	-	-0.004***	0.014***	-0.007***	-	-	-	-0.147***	0.148***	-0.181***	-	-
	-	(0.002)	(0.003)	(0.002)	-	-	-	(0.028)	(0.050)	(0.035)	-	-
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,195,410	10,195,410	4,659,666	5,535,744	800,496	9,394,914	10,195,410	10,195,410	4,659,666	5,535,744	800,496	9,394,914
R-squared	0.124	0.124	0.161	0.096	0.105	0.126	0.142	0.142	0.178	0.113	0.119	0.144
Number of individuals	99,955	99,955	45,683	54,272	7,848	92,107	99,955	99,955	45,683	54,272	7,848	92,107

Notes: [a]Earnings correspond to the log of nominal monthly earnings in US$. [b]LE = Lower Education takes the value of 1 when the individual has not completed secondary education and 0 otherwise. [c]HE = Higher Education takes the value of 1 when the individual has at least completed secondary education and 0 otherwise. All models also control for age and age squared. Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1. Table 2.A in the Appendix shows the completed regression.

Table 4: Impact of the BTA on employment and (log) monthly earnings, by expectation of changing economic sector when applying to the BTA

Dependent variable: Employment	(1)	(2)	(3)	(4)	(5)
Variables	All	Female LE[b]	Male LE[b]	Female HE[c]	Male HE[c]
BTA	0.008***	0.050***	0.022***	0.012***	0.001
	(0.001)	(0.004)	(0.003)	(0.001)	(0.001)
BTA*(Expect changing sector)	-0.031***	-0.074***	-0.036***	-0.037***	-0.021***
	(0.001)	(0.006)	(0.004)	(0.001)	(0.001)
Individual FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Observations	9,595,242	258,876	486,030	4,131,918	4,718,418
R-squared	0.124	0.167	0.077	0.16	0.098
Number of individuals	94,071	2,538	4,765	40,509	46,259

Dependent variable: Earnings[a]	(6)	(7)	(8)	(9)	(10)
Variables	All	Female LE[b]	Male LE[b]	Female HE[c]	Male HE[c]
BTA	0.147***	0.847***	0.379***	0.229***	0.017
	(0.012)	(0.075)	(0.052)	(0.018)	(0.016)
BTA*(Expect changing sector)	-0.585***	-1.281***	-0.675***	-0.690***	-0.424***
	(0.015)	(0.101)	(0.070)	(0.024)	(0.021)
Individual FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Observations	9,595,242	258,876	486,030	4,131,918	4,718,418
R-squared	0.142	0.181	0.09	0.178	0.116
Number of individuals	94,071	2,538	4,765	40,509	46,259

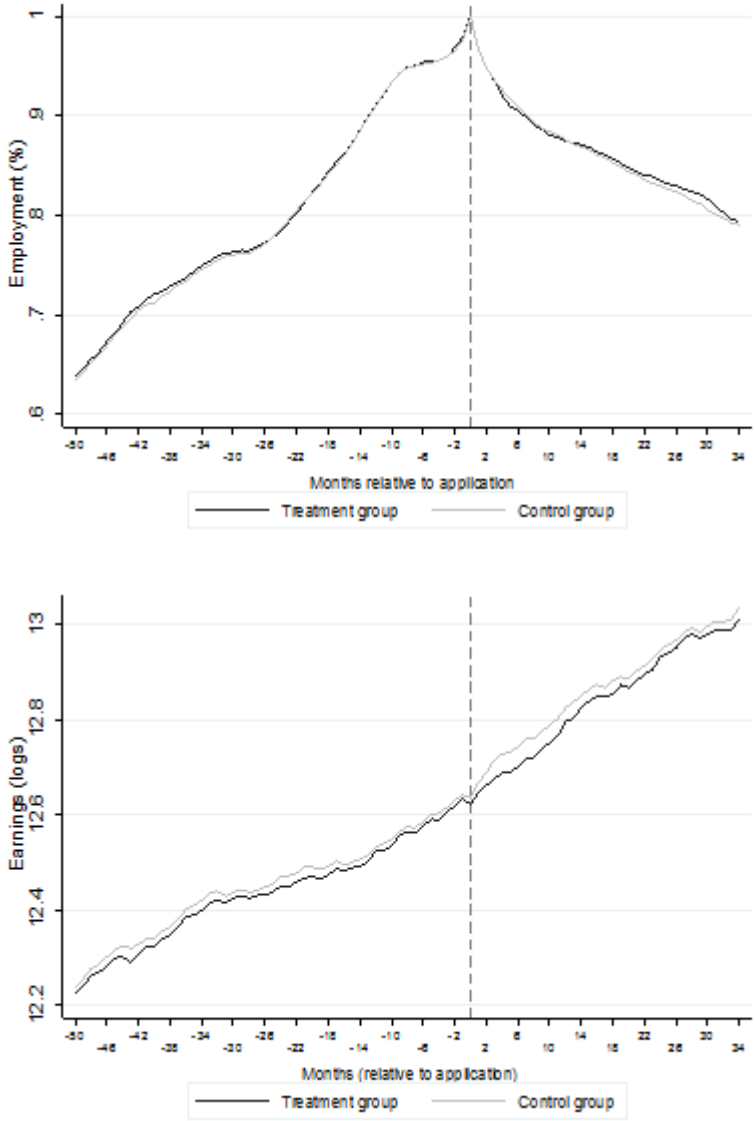
Notes: [a]Earnings correspond to the log of nominal monthly earnings in US$. [b]LE = Lower Education takes the value of 1 when the individual has not completed secondary education and 0 otherwise. [c]HE = Higher Education takes the value of 1 when the individual has at least completed secondary education and 0 otherwise. All models also control for age and age squared. Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1. Table 3.A in the Appendix shows the completed regression.

Table 5: IV estimates of the impact of the BTA

	1st Stage	2nd Stage (June 2014)			
		Employment	Earnings[a]	Months worked since BTA	Change sector after BTA
BTA	-	-0.335	-3.405	222.187***	1.790***
	-	(0.225)	(3.907)	(54.364)	(0.487)
Age	0.012***	0.019***	0.331***	-2.316***	-0.039***
	(0.002)	(0.003)	(0.054)	(0.748)	(0.007)
Age2 (/100)	-0.013***	-0.022***	-0.394***	2.512***	0.037***
	(0.002)	(0.004)	(0.061)	(0.852)	(0.008)
Male	0.032***	0.057***	1.056***	-5.953***	-0.008
	(0.004)	(0.008)	(0.137)	(1.904)	(0.017)
Years of education	-0.004***	0.001	0.052**	1.004***	0.002
	(0.001)	(0.001)	(0.020)	(0.284)	(0.003)
Inmigrant	0.108***	-0.009	-0.469	-24.981***	-0.202***
	(0.016)	(0.028)	(0.494)	(6.878)	(0.062)
Metropolitan	-0.174***	-0.032	0.01	38.953***	0.351***
	(0.005)	(0.040)	(0.687)	(9.565)	(0.086)
North	-0.125***	-0.062**	-0.648	27.291***	0.297***
	(0.006)	(0.028)	(0.493)	(6.863)	(0.061)
South	-0.073***	-0.023	-0.216	16.259***	0.122***
	(0.005)	(0.017)	(0.295)	(4.103)	(0.037)
IV: Months between application and access to BTA	0.009***	-	-	-	-
	(0.002)	-	-	-	-
Constant	0.285***	0.520***	-3.599***	-43.277**	0.646***
	(0.037)	(0.075)	(1.304)	(18.148)	(0.163)
F-test	16.783	-	-	-	-
Durbin-Wu-Hausman test (p-value)	0.000	-	-	-	-
Observations	74,250	74,250	74,250	74,250	74,250

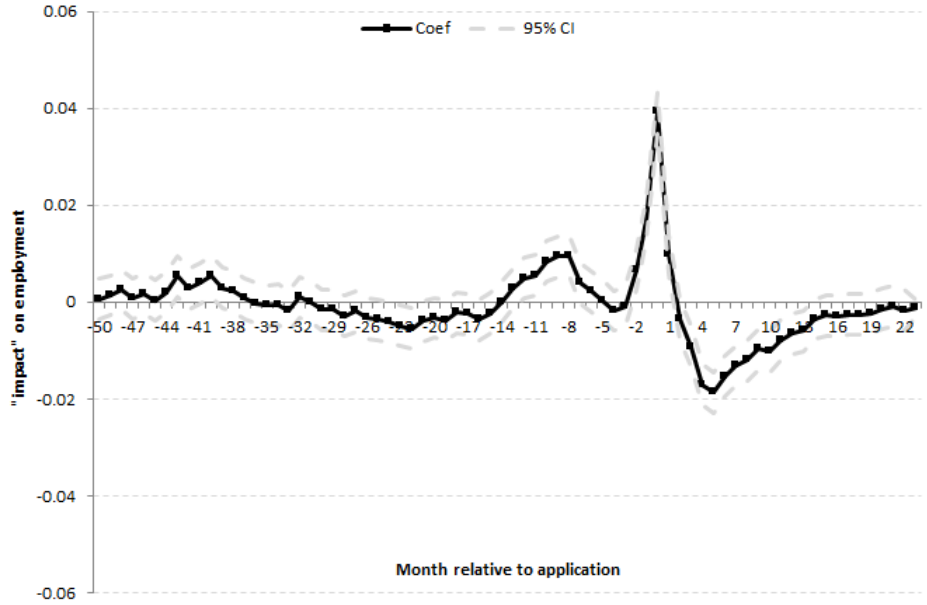
Notes: [a]Earnings correspond to the log of nominal monthly earnings in US$. Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

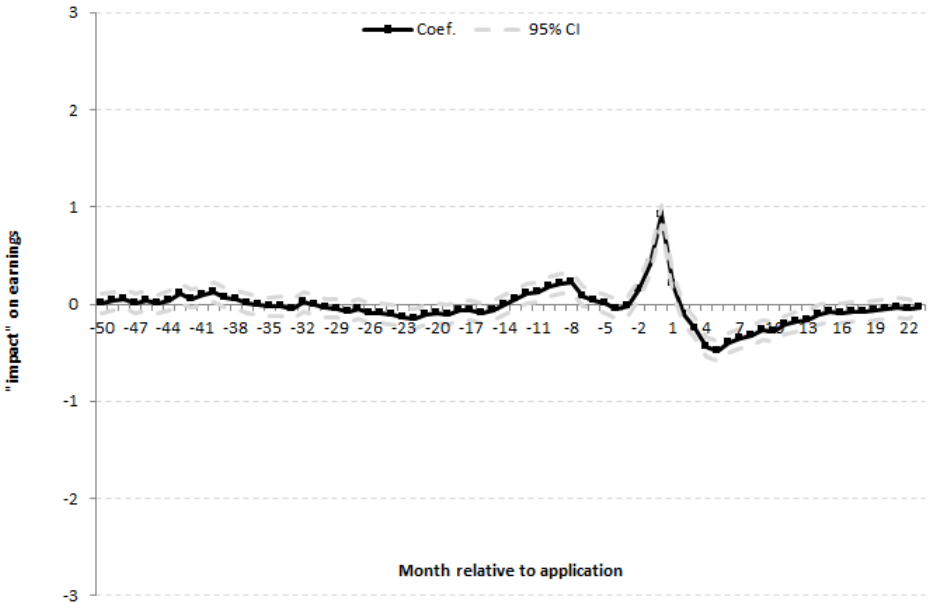
Figure 1: Trends in employment and (log) monthly earnings



Notes: Vertical lines in the graphs represent the start of the courses at month 0.
Source: Authors' estimates bases on administrative data from the Unemployment Insurance System.

Figure 2: "Lags" and "leads" impacts of the BTA on employment and (log) monthly earnings





Appendix

Figure 1A: Start and finishing date of courses

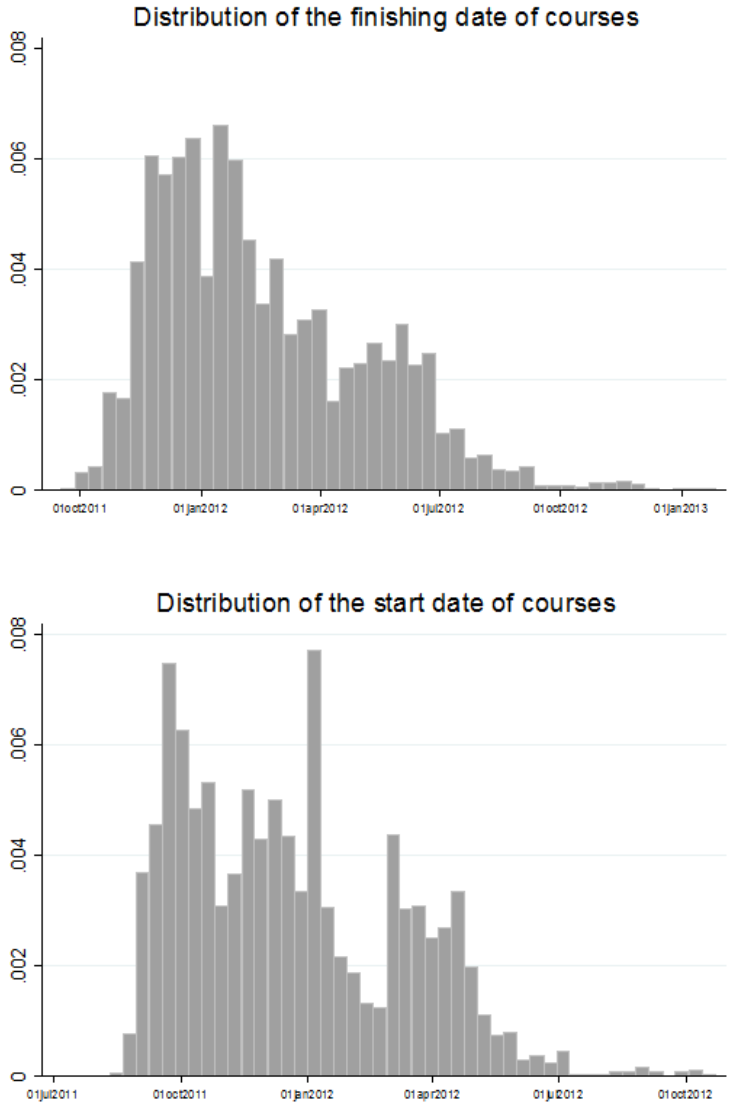


Figure 2.A: Probability of using the BTA, for treatment and control groups

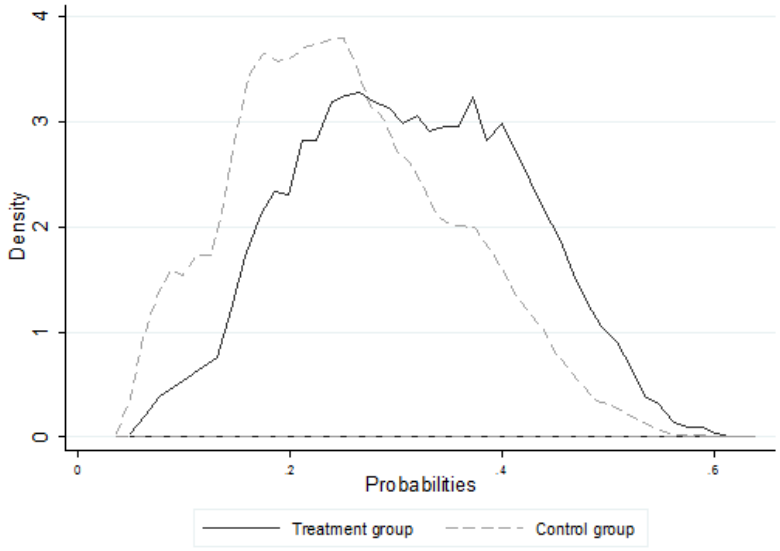


Figure 3.A: Length of courses (in days), Kernel density estimate

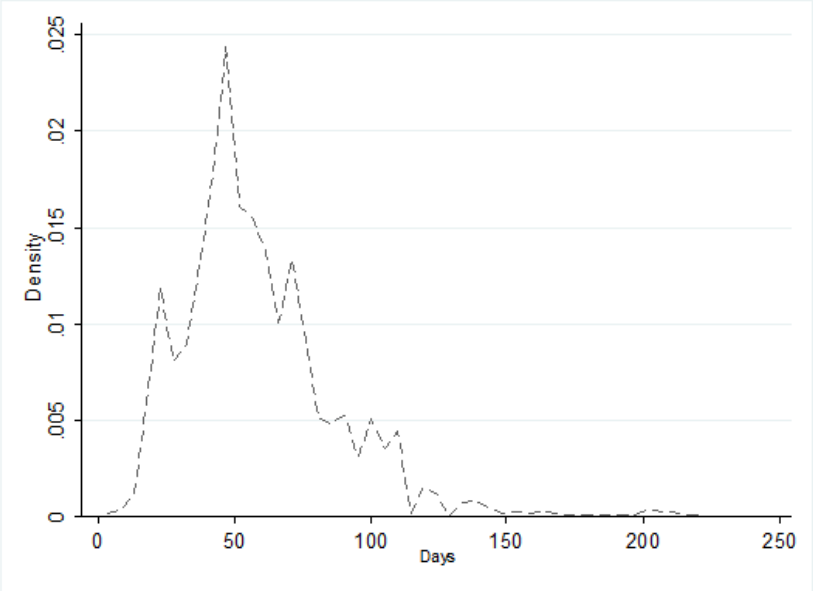


Table 1.A: Probability of using the BTA (Marginal Effects)

	Variables	Coef.	sd
	Sex	0.000	(0.020)
	Years of education	0.001	(0.004)
	Age	-0.030	(0.083)
	Age2	0.000	(0.001)
	Mean Wage (year before application)	0.000	(0.000)
	Migrant	0.528***	(0.172)
	Months worked year before application	-0.001	(0.006)
Month of application (base category: May)	June	-0.179***	(0.048)
	July	-0.189**	(0.087)
	August	-0.297***	(0.110)
	September	-0.358***	(0.100)
	October	-0.356***	(0.109)
	November	-0.379***	(0.123)
	December	-0.263**	(0.119)
Area of interest (base category: Administration)	Farming	-0.026	(0.173)
	Trade and services	0.236***	(0.042)
	Computer Science	0.363***	(0.041)
	Construction	0.264***	(0.097)
	Mechanics	0.642***	(0.221)
	Mining	-0.491**	(0.208)
	Prevention	0.491***	(0.066)
	Services	-0.288***	(0.050)
	Transport	0.142**	(0.071)
	Tourism and languages	0.670***	(0.085)
Occupations (base category: Operator)	Craftsman	-0.026	(0.096)
	Driver	-0.015	(0.051)
	Office worker	-0.046	(0.051)
	Manager and supervisors	-0.112**	(0.044)
	Construction workers	0.063	(0.106)
	Teachers	-0.115***	(0.037)
	Professionals	-0.159***	(0.050)
	Service workers	0.113	(0.089)
	Sellers	-0.109***	(0.041)
	Other	-0.020	(0.037)
Country Zone (base category: Center)	Metropolitan	-0.469**	(0.200)
	North	-0.404**	(0.204)
	South	0.094	(0.379)
	Days between applying to and awarding the BTA	-0.003**	(0.001)
Observations			99,979

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

Table 2.A: Impact of the BTA on employment and (log) monthly earnings, by gender and education level. Full model.

Dependent variable: Employment	(1)	(2)	(3)	(4)	(5)	(6)
Variables	All	All	Female	Male	LE[b]	HE[c]
BTA	-0.024***	-0.006***	-0.003***	-0.008***	-0.012***	-0.025***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
BTA*Female	0.039***	-	-	-	0.059***	0.038***
	(0.0019	-	-	-	(0.003)	(0.001)
BTA*(Lower Education)	-	-0.004***	0.014***	-0.007***	-	-
	-	(0.002)	(0.003)	(0.002)	-	-
Age	0.076	0.076	0.051***	0.042***	0.034***	0.08
	(1.599)	(1.599)	(0.000)	(0.000)	(0.001)	(1.864)
Age2 (/100)	-0.020***	-0.020***	-0.017***	-0.022***	-0.009***	-0.020***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Constant	-1.507	-1.505	-0.879***	-0.439***	-0.511***	-1.59
	(45.614)	(45.619)	(0.010)	(0.009)	(0.027)	(52.481)
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,195,410	10,195,410	4,659,666	5,535,744	800,496	9,394,914
R-squared	0.124	0.124	0.161	0.096	0.105	0.126
Number of individuals	99,955	99,955	45,683	54,272	7,848	92,107

Dependent variable: Earnings[a]	(7)	(8)	(9)	(10)	(11)	(12)
Variables	All	All	Female	Male	LE[b]	HE[c]
BTA	-0.411***	-0.112***	-0.062***	-0.150***	-0.201***	-0.425***
	(0.011)	(0.009)	(0.014)	(0.012)	(0.038)	(0.012)
BTA*Female	0.646***	-	-	-	0.952***	0.620***
	(0.015)	-	-	-	(0.059)	(0.016)
BTA*(Lower Education)	-	-0.147***	0.148***	-0.181***	-	-
	-	(0.028)	(0.050)	(0.035)	-	-
Age	1.475	1.472	1.003***	0.868***	0.697***	1.547
	(28.207)	(28.209)	(0.007)	(0.006)	(0.016)	(32.908)
Age2 (/100)	-0.428***	-0.424***	-0.366***	-0.467***	-0.216***	-0.431***
	(0.005)	(0.005)	(0.007)	(0.006)	(0.015)	(0.005)
Constant	-41.201	-41.152	-29.658***	-22.331***	-23.137***	-42.753
	(804.842)	(804.915)	(0.177)	(0.157)	(0.479)	(926.698)
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,195,410	10,195,410	4,659,666	5,535,744	800,496	9,394,914
R-squared	0.142	0.142	0.178	0.113	0.119	0.144
Number of individuals	99,955	99,955	45,683	54,272	7,848	92,107

Notes: [a]Earnings correspond to the log of nominal monthly earnings in US$. [b]LE = Lower Education takes the value of 1 when the individual has not completed secondary education and 0 otherwise. [c]HE = Higher Education takes the value of 1 when the individual has at least completed secondary education and 0 otherwise. All models also control for age and age squared. Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Table 3.A: Impact of the BTA on employment and (log) monthly earnings, by expectation of changing economic sector when applying to the BTA. Full model.

Dependent variable: Employment	(1)	(2)	(3)	(4)	(5)
Variables	All	Female LE[b]	Male LE[b]	Female HE[c]	Male HE[c]
BTA	0.008***	0.050***	0.022***	0.012***	0.001
	(0.001)	(0.004)	(0.003)	(0.001)	(0.001)
BTA*(Expect changing sector)	-0.031***	-0.074***	-0.036***	-0.037***	-0.021***
	(0.001)	(0.006)	(0.004)	(0.001)	(0.001)
Age	0.078	0.056***	0.026***	0.052***	0.043***
	(1.788)	(0.002)	(0.001)	(0.000)	(0.000)
Age2 (/100)	-0.021***	-0.023***	-0.006***	-0.019***	-0.023***
	(0.000)	(0.002)	(0.001)	(0.000)	(0.000)
Constant	-1.551	-1.225***	-0.201***	-0.878***	-0.453***
	(50.985)	(0.051)	(0.034)	(0.011)	(0.009)
Individual FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Observations	9,595,242	258,876	486,030	4,131,918	4,718,418
R-squared	0.124	0.167	0.077	0.16	0.098
Number of individuals	94,071	2,538	4,765	40,509	46,259

Dependent variable: Earnings[a]	(6)	(7)	(8)	(9)	(10)
Variables	All	Female LE[b]	Male LE[b]	Female HE[c]	Male HE[c]
BTA	0.147***	0.847***	0.379***	0.229***	0.017
	(0.012)	(0.0759	(0.052)	(0.018)	(0.016)
BTA*(Expect changing sector)	-0.585***	-1.281***	-0.675***	-0.690***	-0.424***
	(0.015)	(0.101)	(0.070)	(0.024)	(0.021)
Age	1.511	1.055***	0.557***	1.025***	0.891***
	(31.542)	(0.030)	(0.020)	(0.007)	(0.007)
Age2 (/100)	-0.445***	-0.440***	-0.155***	-0.404***	-0.489***
	(0.005)	(0.027)	(0.018)	(0.008)	(0.007)
Constant	-42.06	-35.225***	-17.937***	-29.635***	-22.581***
	(899.651)	(0.877)	(0.601)	(0.186)	(0.168)
Individual FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Observations	9,595,242	258,876	486,030	4,131,918	4,718,418
R-squared	0.142	0.181	0.09	0.178	0.116
Number of individuals	94,071	2,538	4,765	40,509	46,259

Notes: [a]Earnings correspond to the log of nominal monthly earnings in US$. [b]LE = Lower Education takes the value of 1 when the individual has not completed secondary education and 0 otherwise. [c]HE = Higher Education takes the value of 1 when the individual has at least completed secondary education and 0 otherwise. All models also control for age and age squared. Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Table 4.A: IV estimates of the impact of the BTA

Variables	1st Stage	2nd Stage				
		Month	Employment	Earnings[a]	Months worked since BTA	Change sector
BTA	-	12-Dec	-0.343*	-5.535	226.600***	-0.066
	-		(0.189)	(4.361)	(55.352)	(0.109)
Age	0.012***	13-Jan	-0.379*	-6.563	226.221***	-0.214*
	(0.002)		(0.197)	(4.540)	(55.262)	(0.122)
Age2 (/100)	-0.013***	13-Feb	-0.193	-2.061	226.028***	-0.094
	(0.002)		(0.183)	(4.356)	(55.218)	(0.106)
Male	0.032***	13-Mar	-0.063	1.155	225.966***	-0.141
	(0.004)		(0.177)	(4.326)	(55.206)	(0.117)
Years of education	-0.004***	13-Apr	-0.212	-2.765	225.754***	-0.331**
	(0.001)		(0.186)	(4.412)	(55.157)	(0.143)
Inmigrant	0.108***	13-May	-0.086	0.649	225.668***	-0.051
	(0.016)		(0.184)	(4.465)	(55.140)	(0.111)
Metropolitan	-0.174***	13-Jun	-0.163	-1.196	225.505***	-0.301**
	(0.005)		(0.189)	(4.525)	(55.105)	(0.130)
North	-0.125***	13-Jul	-0.071	0.895	225.434***	-0.011
	(0.006)		(0.187)	(4.553)	(55.091)	(0.104)
South	-0.073***	13-Aug	-0.168	-1.665	225.265***	-0.048
	(0.005)		(0.192)	(4.602)	(55.055)	(0.103)
IV: Months between application and access to BTA	0.009***	13-Sep	-0.278	-4.152	224.987***	-0.027
	(0.002)		(0.202)	(4.779)	(54.993)	(0.097)
Constant	0.285***	13-Oct	-0.327	-5.285	224.659***	-0.262**
	(0.037)		(0.205)	(4.794)	(54.918)	(0.125)
		13-Nov	-0.069	0.838	224.591***	0.071
			(0.190)	(4.639)	(54.906)	(0.103)
		13-Dec	-0.148	-1.262	224.443***	0.016
			(0.194)	(4.704)	(54.876)	(0.100)
		14-Jan	-0.211	-2.786	224.231***	-0.273**
			(0.201)	(4.816)	(54.829)	(0.129)
		14-Feb	-0.353	-6.51	223.878***	-0.138
			(0.215)	(5.082)	(54.749)	(0.108)
		14-Mar	-0.545**	-10.864**	223.333***	-0.240*
			(0.238)	(5.506)	(54.622)	(0.126)
		14-Apr	-0.461**	-8.935*	222.872***	-0.042
			(0.229)	(5.360)	(54.516)	(0.111)
		14-May	-0.35	-6.076	222.522***	-0.185
			(0.221)	(5.220)	(54.438)	(0.115)
		14-Jun	-0.334	-5.518	222.187***	0.115
			(0.225)	(5.312)	(54.364)	(0.135)
F-test	16.783		-	-	-	-
Durbin-Wu-Hausman test (p-value)	0.000		-	-	-	-
Observations	74,250		74,250	74,250	74,250	74,250

Notes: [a]Earnings correspond to the log of nominal monthly earnings in US$. Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1.