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**Working Paper Series**

**#2015-026**

**The impact of unemployment insurance savings accounts  
on subsequent employment quality**

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**UNU-MERIT Working Papers**

**ISSN 1871-9872**

**Maastricht Economic and social Research Institute on Innovation and Technology,  
UNU-MERIT**

**Maastricht Graduate School of Governance  
MGSOG**

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# The Impact of Unemployment Insurance Savings Accounts on Subsequent Employment Quality

Paula Nagler\*

August 10, 2015

## Abstract

The introduction of unemployment insurance savings accounts (UISA) in Chile in October 2002 led to more comprehensive unemployment protection while decreasing the opportunity cost of job change. Using a difference-in-differences approach this paper examines whether the introduction of UISA had an impact on the differences in subsequent wages and contract types of (i) workers changing into a new employment, and (ii) workers experiencing a period of unemployment before re-entering the labour market. The analysis uses longitudinal social protection data and is the first to empirically investigate the effect of UISA on subsequent employment quality. The findings suggest that the introduction of the UISA scheme had a small negative effect on the wage difference of formal private sector workers, but no effect on contract types. Using informal private sector workers as a control group, only workers of the treatment group experiencing a period of unemployment show statistically different and positive results in wage growth. The robustness analysis, using an alternative “as if” introductory date and a different control group, largely supports these findings. The paper therefore concludes that the effect of UISA affiliation on wage growth is slightly negative, but positive compared to a control group for workers experiencing a period of unemployment, leading to a marginally higher employment quality for this latter group.

*JEL classifications:* C21, C31, E24, J64, J65, J68, O54

*Keywords:* Chile, Contract Type, Employment Quality,  
Unemployment Insurance Savings Accounts, Wages

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# 1 Introduction

Chile introduced a new unemployment protection scheme for formal private sector workers in October 2002. Before, unemployment protection was limited to severance pay in case of job termination due to economic necessities of the firm, complemented by low unemployment insurance (UI) benefits. The new law introduced individual unemployment insurance savings accounts (UISA) in addition to severance pay and abolished the low unemployment insurance. Access to accumulated savings was extended to workers losing employment due to just cause or voluntarily leaving the current employment.<sup>1</sup> Furthermore opportunity costs of workers were reduced in case of job change, as accumulated benefits are kept in the individual savings account. Employers can similarly benefit from the new policy introduction by reduced *ad-hoc* obligations in case of severance payments.

Due to the extension in unemployment protection and the reduction in opportunity costs, this paper examines if the policy introduction had an effect on the subsequent employment quality of two groups of workers who leave their initial employment by analysing the differences in wages and contract types. The first group changes directly into a new job, the second group retakes a job after experiencing a period of unemployment.<sup>2</sup> Workers who terminate their initial employment relation face reduced opportunity costs in case of a job change, or increased financial leeway to search for a better job in case of unemployment, if they are affiliated to UISA. To my knowledge this paper is the first to empirically investigate if the Chilean UISA scheme had an impact on subsequent employment characteristics, measured by the differences in wages and contract types between the initial and subsequent employment relation, and by a difference-in-differences analysis using a control group. Different to unemployment insurance schemes, where numerous studies have analysed the impact on subsequent employment characteristics, this scheme presents an alternative kind of unemployment protection. It is not based on risk-pooling as in an insurance type of scheme, but presents a forced savings scheme that is financed by both the employer and the employee in case of permanent contracts, or by the employer only in case of temporary contracts, and entails a solidarity fund as a minor component that is accessible when certain conditions are fulfilled.

I use longitudinal data from the Chilean Social Protection Survey and expect the following results. First, workers who directly change into a new employment relation and who are affiliated to UISA have reduced opportunity costs, as accumulated savings remain in the worker's individual unemployment account, although they still lose their right to severance pay. I expect that workers are more willing to change employment for other (better) work opportunities, even if wages of the new employment are not higher,<sup>3</sup>

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<sup>1</sup> Just cause includes: expiration of contract or misconduct.

<sup>2</sup> In the remainder of the paper I use the expressions “post-employment” and “post-unemployment” for these two groups. Post-employment refers to workers who directly start a new job after terminating their initial work relation, and post-employment wages (contract types) refer to wages earned (or contract types signed) in this subsequent job. Post-unemployment refers to workers who terminate their initial work relation, experience a period of unemployment, and then re-enter the labour market. Post-unemployment wages (contract types) refer to wages earned (or contract types signed) in this subsequent job, after experiencing a period of unemployment.

<sup>3</sup> “Better” work opportunities could entail a wide range of more preferable characteristics to the employee

since they forgo less unemployment protection loss when changing jobs. With regard to contract types I expect that workers with a permanent contract only change to a new employment if receiving the same contract type, while workers with a temporary contract are willing to accept an employment with the same (temporary) or permanent contract type.<sup>4</sup> However, workers affiliated to UISA might put less emphasis to permanent contracts due to extended unemployment protection. These expected outcomes are not substantially different compared to a situation without the UISA scheme, but the willingness to change for a new employment is higher due to reduced opportunity costs and could therefore have an impact on the differences in wages and contract types.<sup>5</sup>

Second, workers who are unemployed before re-entering the labour market and who are affiliated to UISA, face reduced pressure to find a new employment. Therefore they have more time to find a job that offers adequate payment and contract type. This is expected to have a positive impact on the wage difference, compared to a situation without unemployment protection. I also expect the impact on the following contract type to be similar or superior, as workers can spend more time to search for a permanent contract. However, the outcome also depends on whether the worker experiences a short- or medium length of unemployment, or if the worker is a long-term unemployed. During long-term unemployment skills decline, with a negative effect on the subsequent employment characteristics.

Using a difference-in-differences approach, I find significant and negative effects on the wage difference between workers who started before or after the UISA introduction, but no effect on the difference in contract types for workers of both groups. Using informal private sector workers as a control group, only the wage difference for the post-unemployment group is statistically different and positive for the treatment group, while the overall effect continues to be negative. I therefore conclude that UISA had a small negative effect on the wage difference, with a magnitude of 5 to 7 percent less compared to workers who are not affiliated, but had no effect on contract types. In comparison with the control group, the difference in wage growth is statistically significant and slightly positive. The subsequent employment quality is therefore only partially affected (wages), and as expected: the wage difference is overall negative for UISA affiliates compared to workers not affiliated, but the difference in wage growth is positive when compared to the control group.

The paper is organised as follows. Section 2 reviews the theoretical and empirical literature of the impact of unemployment protection on subsequent employment quality, followed by a description of the UISA scheme in section 3. Section 4 describes the database used and provides descriptive statistics. Section 5 explains the method used for the analysis and section 6 presents and discusses the results. The final section concludes with a summary of the findings, policy recommendations and suggestions for further research.

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that exclude a higher wage, for example more adequate job requirements for the worker's qualifications, distance to travel to the work location, or opportunities to develop within the company, among others.

<sup>4</sup> I make the assumption that workers consider a permanent contract superior to a temporary contract.

<sup>5</sup> See also Nagler (2013) on the impact of UISA accounts on employment duration.

## 2 Literature Review

The literature on unemployment protection suggests that unemployment benefits lead to ambiguous labour market outcomes. First, they improve the overall labour market efficiency, as risk-averse workers would seek low-risk, but also lower-paid employment, leading to an equilibrium with low unemployment, but also lower capital and labour ratios, and a worse job quality. Unemployment protection therefore encourages workers to seek higher-paid and higher-quality jobs that also include higher unemployment risk (Acemoglu and Shimer, 1999). The composition of the labour market changes, and consequently total output and welfare increase (Acemoglu and Shimer, 2000). Second, it shields households from a sharp fall in income during unemployment by providing unemployed workers a financial cushion while searching for reemployment. And third, it leads to longer unemployment duration and overall higher unemployment as shown by a large body of literature, among others van Ours and Vodopivec (2008), Tatsiramos (2009) and Caliendo et al. (2013).<sup>6</sup> Longer unemployment duration arises due to two reasons. Unemployed workers can be more selective with regard to incoming job offers compared to a situation where they would have to accept the first employment irrespective of wage and quality, and due to lower search effort (Katz and Meyer, 1990; Acemoglu and Shimer, 2000).

While unemployment benefits lead to prolonged unemployment duration, as workers can be more selective when searching for a job, they might simultaneously lead to favourable outcomes in terms of subsequent job quality. In standard job search theory, unemployment benefits have been interpreted as a search subsidy, allowing job seekers to spend more time searching for adequate jobs that match their abilities and satisfy certain conditions. The potentially favourable outcomes are based on Burdett (1979) who argues that job seekers searching for employment do not have perfect information about all job positions that are currently available. Therefore, they need time to search for new positions that match their qualifications and offer adequate conditions. Consequently generous unemployment protection is expected to increase the job match quality for the subsequent employment, for example through better employment stability and higher wages. Positive outcomes are expected to apply primarily to short- and medium-term unemployed workers, but to a more limited extent to long-term unemployed workers due to a decline in skills and other negative effects of long unemployment spells.

Unemployment protection can assume various forms and designs, depending on a country's context and preferences, for instance unemployment insurance based on risk-pooling, severance pay or individualised savings accounts. Most studies that evaluated unemployment protection have focused on unemployment insurance due to its prevalence in advanced economies. Severance pay, in particular, is widespread in developing countries, which is often restrictive and can lead to a situation of rigid labour markets (Vodopivec, 2013). Unemployment accounts are a relatively new design of unemployment protection and have gained increased attention over the past decade, although they have already been implemented in the 1970s and 1980s in various Latin American countries alongside unemployment insurance, or for specific subgroups of

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<sup>6</sup> Other empirical studies include Card and Levine (2000), Lalive and Zweimüller (2004) and Addison and Portugal (2008).

workers (Ferrer and Riddell, 2011). Unemployment accounts are not only discussed as a form of unemployment protection to replace restrictive severance pay, but to also improve the efficiency of unemployment insurance schemes in advanced economies due to problems of moral hazard.

In the literature the theoretical and empirical effects of unemployment protection on subsequent employment quality have been analysed in their large majority for unemployment insurance schemes. For unemployment accounts a number of theoretical studies have been conducted to analyse the expected outcomes if unemployment insurance was replaced by individualised savings schemes, among others Orszag and Snower (2002), Brunner and Colarelli (2004), Feldstein and Altman (2007) and Brown et al. (2008). Orszag and Snower (2002) argue that unemployed workers who receive benefits from unemployment accounts internalise the social costs of their unemployment to a greater extent compared to unemployment insurance and have a higher incentive to actively search for employment. Unemployment accounts are therefore expected to lead to higher employment, lower unemployment and higher productivity. Brunner and Colarelli (2004) point out that unemployment accounts give the unemployed more financial security compared to unemployment insurance, and furthermore allows them to take the time to retrain and to find employment if necessary. Feldstein and Altman (2007) also argue that it would facilitate a substantial improvement in the incentives of unemployed workers. Brown et al. (2008) analyse the incentive effects of unemployment accounts and simulate a model using data from high-unemployment countries in Europe, and find that they change people's incentives and could achieve significant reductions in the unemployment level without reducing the overall benefit level for the unemployed.

The studies compare primarily the theoretical model to unemployment insurance schemes, but do not take the effect on subsequent unemployment quality into account. However, if the theoretical argumentation of the papers also holds in practice, both better and worse outcomes for subsequent employment quality can be expected. Better outcomes due to a higher effort to find employment, financial leeway to retrain and higher labour productivity, while keeping the unemployment protection at a similar level compared to unemployment insurance schemes. Worse outcomes due to a higher pressure to find quick reemployment before depleting the individual account, even if the new job does not offer adequate conditions. The outcome is also expected to depend largely on the design of the scheme, for example on the generosity of benefits or on additional governmental support.

Empirical evidence of the impact of unemployment benefits on subsequent job characteristics only exists for unemployment insurance schemes and results have so far been mixed. Most research has been conducted using data from the United States, Canada and, more recently, European countries. Positive effects, defined as higher wages, employment stability and better access to permanent contracts, are found by Gangl (2002) and Tatsiramos (2009), weak positive effects by Belzil (2001) and Centeno and Novo (2009), and positive effects for certain subgroups of workers by Ehrenberg and Oaxaca (1976) and Caliendo et al. (2013). Wulfgramm and Fervers (2013) equally find positive effects, but include and study labour market support programmes. Card et al. (2007), Lalive (2007), van Ours and Vodopivec (2008) and Schmieder et al. (2010) do not find significant outcomes.

A number of studies establish positive, weak positive or partly positive effects with regard to subsequent employment stability and wages. [Gangl \(2002\)](#) studies unemployment duration and post-unemployment wages using US and German data. In the United States the negative effect on unemployment duration slightly outweighs the wage increase, while in Germany the positive effect on post-unemployment wages is more pronounced. Stronger UI effects are furthermore found in the lower tails of the wage distribution. Using data from the European Community Household Panel [Tatsiramos \(2009\)](#) provides evidence for increased duration of subsequent employment, suggesting a positive matching effect of unemployment benefits. [Belzil \(2001\)](#) finds a weak matching effect between benefit duration and subsequent job duration using Canadian labour force data. Increasing the maximum benefit duration by one week increases unemployment duration by 1 to 1.5 days, but increases the expected subsequent job duration by 0.5 to 0.8 days only. [Centeno and Novo \(2009\)](#) analyse the liquidity effect of unemployment insurance and find a large impact on employment duration, but only a small impact on subsequent wages. Wage gains are concentrated among workers at the bottom of the pre-unemployment income distribution. [Ehrenberg and Oaxaca \(1976\)](#) find that an increase in unemployment benefits results in productive job search for a subsample of older workers, with positive outcomes on both wages and the duration of subsequent employment. In contrast, the authors do not find any wage difference for the younger cohort of workers, while it still increases the unemployment spell. [Caliendo et al. \(2013\)](#) provide evidence that unemployed workers who find a job close to benefit exhaustion (or shortly after) experience less stability in their subsequent employment and receive lower wages compared to other unemployed workers with extended benefits who exit employment at the same time. However, this result is only significant for men. [Wulfgramm and Fervers \(2013\)](#) take furthermore active labour market policies into account and find that unemployment benefits function as a search subsidy, and that training programmes and counseling services lead to higher reemployment stability.

In contrast, [Card et al. \(2007\)](#), [Lalive \(2007\)](#), [van Ours and Vodopivec \(2008\)](#) and [Schmieder et al. \(2010\)](#) do not find significant outcomes. [Card et al. \(2007\)](#) estimate job search behaviour to cash-on-hands using Austrian data, and make use of sharp discontinuities in the eligibility for severance pay and extended UI benefits. They find that an increase in severance pay and an extension of UI benefit duration lead to reduced job finding rates, but that an increase in search duration has little or no effect on subsequent job match quality. [Lalive \(2007\)](#) equally uses Austrian data and concludes, using a regression discontinuity design, that changes in benefit duration do not affect the subsequent employment quality measured by wages. In their paper [van Ours and Vodopivec \(2008\)](#) analyse how job quality is affected after a change in Slovenia's unemployment insurance law, but do not find significant effects on subsequent wages, the probability to secure a permanent contract or employment duration. Finally, [Schmieder et al. \(2010\)](#) analyse the impact of different unemployment insurance lengths on labour supply and search outcomes using data from Germany, and equally do not find any effect of increased UI duration on employment quality, expressed as subsequent wages.

While extensive research has been conducted analysing the effect of unemployment insurance on subsequent job quality, there is still a general lack of research with regard to a possible impact of unemployment insurance savings accounts. However, the outcomes

can widely differ, as unemployment accounts primarily present a forced savings scheme compared to unemployment insurance based on risk-pooling. The only research in this area so far conducted has analysed the impact of savings on search intensity in a job search model with unemployment insurance (Lentz, 2009; Vejlin, 2011). Both articles find, using Danish data, that wealthy individuals experience longer unemployment duration which is explained by lower search intensity. While the case of Denmark analyses the impact of wealth in a context of unemployment insurance provision, the case of Chile is described as a forced savings scheme with monthly contributions into an individual savings account, complemented by a solidarity pillar. Reyes et al. (2011) analyse the Chilean UISA scheme and provide evidence that individuals internalise the cost of unemployment by reduced moral hazard. Therefore, the impact of UISA introduction on subsequent wages, contract types or employment stability continues to be unclear.

Finally, it is important to remark that labour market evaluations using emerging and developing country data are still limited, as the bulk of research has so far been conducted with advanced country data with a focus on North America and Europe. However, the labour market functions differently in developing economies, for example due to a large informal labour market, where unemployed workers could potentially find employment during “official” unemployment spells.

### 3 The Chilean UISA Scheme

This section provides an overview of the Chilean UISA scheme, consisting of a description of how unemployment protection was organised before the new policy introduction and the historical and economic context of the new legislation. Furthermore it entails a detailed description of the scheme and a summary of the changes affecting workers and employers.

#### 3.1 Context

Before the introduction of UISA, severance pay was the principal form of unemployment protection in Chile for workers dismissed according to labour Code 161,<sup>7</sup> complemented by benefits financed by social security and additional minor support programmes.<sup>8</sup> Severance pay led to labour market rigidities, but offered limited protection to unemployed workers, as only workers dismissed due to economic necessities or bankruptcy of the firm received benefits during unemployment spells, often without the guarantee of payout.<sup>9</sup> The complementary unemployment benefits by the Social Security were minimal

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<sup>7</sup> Article 161 of the labour code. Dismissal due to company needs (economic reason or downsizing).

<sup>8</sup> For each completed year of employment, workers were entitled to one month severance pay with a maximum of eleven years.

<sup>9</sup> Limited protection can result through restricted access to severance pay, as workers often face strict regulations of severance pay eligibility, and may involve long judicial processes if firms try to evade their payment obligations. Furthermore firms which are in financial distress or go bankrupt may be unable to transfer the required amount to their previous employees (Acevedo et al., 2006).

and independent of previous salaries. Further support was provided through workfare programmes for low-income workers, hiring subsidies for firms, unemployment insurance for domestic helpers and job search assistance (Acevedo et al., 2006).<sup>10</sup>

The political and economic context of UISA introduction was based on two major events: (i) the political change in 1990, when democracy was restored in Chile, and center and left-wing parties formed a coalition giving priority to improving workers' position, leading to an extension in severance pay and (ii) the sharp increase in the unemployment rate end of the 1990s due to a deterioration in terms of trade and external demand and the negative impact of the Asian crisis, leaving many workers unemployed and without means to smooth consumption (Acevedo et al., 2006).

The development and design of the new scheme involved various parties with different concerns and interests. While the government intended to limit moral hazard, employers were worried about labour market flexibility, and workers, represented by labour unions, did not want to forfeit "hard won rights" as they considered the extension of severance pay after the political change in Chile (Sehnbruch, 2004). With the expansion in unemployment protection in terms of access and amount of benefits transferred, while limiting moral hazard through individualised accounts (Reyes et al., 2011) and moderately relaxing the severance pay *ad-hoc* obligations, the new unemployment policy was approved 2001 in Congress with a high political consensus and implemented in October 2002 (Acevedo et al., 2006).

### 3.2 Detailed Description

The new unemployment protection consists of two components: (i) individual savings accounts for each worker as a form of self-insurance, backed up by (ii) a solidarity fund (SF) that functions similarly to an unemployment insurance based on risk-pooling. The scheme covers all private sector workers over 18 years, with either a temporary or permanent contract. Enrollment into the new scheme is mandatory for all workers starting a new employment contract after October 2002, avoiding adverse selection. Workers who started a new employment before the introduction date can voluntarily switch to the new system, but only very few decided to do so.<sup>11</sup>

The financing of UISA is regulated differently by contract type. For employees with a permanent contract UISA contributions are financed by both employer and employee (2.4 percent and 0.6 percent, respectively), and are split between the individual account to

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<sup>10</sup> These additional support programmes were often uncoordinated and ineffective. For the workfare programmes only minimum wages were paid, the discretionary design presented problems, and the rushed implementation in times of crisis led to suboptimal programme design. The hiring subsidies in times of high unemployment, in turn, were expensive (about USD 60 million), and abuse of the programme was widely reported. Unemployment insurance for domestic helpers only covered this small sector of domestic employees, and job search assistance was performed at the local level leading to limited geographical coverage (Acevedo et al., 2006).

<sup>11</sup> In my sample only 8 out of 3,384 workers who started a new employment during the two years before UISA introduction are voluntarily affiliated to the new scheme, presenting below 0.5 percent of the sample. Huneus et al. (2012) report 2 percent voluntary affiliation by December 2010.

save up for possible unemployment spells (2.2 percent) and the common SF (0.8 percent). The latter is also co-financed by the government with approximately USD 16 million per year (Huneus et al., 2012).<sup>12</sup> For employees with a temporary contract only the employer contributes to the savings account with 3.0 percent and workers do not have access to the SF.<sup>13</sup>

Benefits were considerably extended in terms of eligibility and total amount transferred. Although the previously existing unemployment subsidy lasting for twelve months was replaced by transfers lasting for a maximum of five months, the current support system is more generous, translating into overall higher transfers. The accumulated benefits in the individual accounts are transferred to workers terminating their employment for any cause,<sup>14</sup> conditional that they have worked for a certain minimum period of time: six months for workers with temporary contracts, and twelve months for workers with permanent contracts, continuous or discontinuous, since they became affiliated to the scheme or since the last time they requested and were granted benefits (Huneus et al., 2012). Workers with permanent contracts who lose their employment according to Labour Code 161 are equally better protected, as they have, apart from the severance pay and their accumulated savings, access to the SF in case of low individual savings. In this case access to the SF is optional, and if workers decide to receive these benefits they have to accept additional conditions: (i) they have to pay monthly visits to the municipal employment office, (ii) they must be willing to participate in training programmes and (iii) they must accept job offers paying at least 50 percent of their pre-unemployment wage (Reyes et al., 2011). Finally, workers who do not become unemployed during their working life receive their accumulated account balance when retiring (Sehnbruch, 2004).

**Table 1:** Benefit Changes Before and After UISA Introduction

EVENT	Before UISA	After UISA
Job change	Loss of accumulated rights to severance pay	Loss of severance pay (as before), keeps accumulated savings in UISA account
Unemployment	Severance pay if job loss occurred due to labour Code 161 All other cases: nothing	Severance pay (as before), transfer of accumulated savings (maximum five months), solidarity fund if applicable
Inactivity	Severance pay if job loss occurred due to labour Code 161 All other cases: nothing	Severance pay (as before), transfer of accumulated savings (maximum five months)
Retirement	Nothing	Transfer of accumulated savings given account balance is positive
Death	Nothing	Transfer of accumulated savings given account balance is positive to surviving dependents

*Note(s):* By author based on Acevedo et al. (2006).

Table 1 summarises the changes in unemployment benefits before and after UISA

<sup>12</sup> See also Figures 3 and 4 in Appendix A.

<sup>13</sup> Since a reform in May 2009 workers with temporary contracts are also eligible to receive unemployment benefits through the solidarity pillar. Huneus et al. (2012) describe the 2009 reform in more detail.

<sup>14</sup> Also in case of just cause, including the following events: expiration of contract, voluntary resignation or misconduct.

introduction. For all events (job change, unemployment, inactivity, retirement and death of the worker) the current situation with UISA is more beneficial for the worker or his/her dependents: for a change in employment, opportunity costs decreased, while in all other cases accumulated savings are directly transferred to the worker or the dependents.

Since the UISA reform, severance pay continues to be paid out in case of dismissal due to economic necessities of the firm with the possibility of deducting accumulated savings from the severance pay liabilities. While it does not directly improve the situation of employers, it alleviates the *ad-hoc* obligation of the firm when the severance pay is due.

## 4 Data and Descriptive Statistics

The database used in this paper is the Chilean EPS database,<sup>15</sup> a longitudinal survey with questions on the individual and household level about the Chilean labour market and social protection system.<sup>16</sup> The survey was conducted in 2002, 2004, 2006 and 2009 and contains retrospective data since January 1980. When the first round was conducted in 2002, the sample was drawn from a frame of 8.1 million current and former affiliates of the Chilean pension system included for at least one month in the time frame 1980 to 2001 containing 17,246 individuals, 937 of them reported by surviving relatives. The survey was extended in 2004 with non-affiliated individuals, completing the base sample, and has since then been representative on the regional and national level for the entire Chilean population. Since 2004 the data is linked to the administrative records of the pension scheme, health insurance, the cash transfer programme “Chile Solidario” and other welfare programmes. In 2004 new health and wealth questions were added to the questionnaire. In 2006 and 2009 the sample was kept, and includes approximately 16,000 individuals (15 years and older) of all regions.<sup>17</sup> The EPS is the first panel survey conducted in Chile with four rounds of data collection covering this range of thematic areas. The questionnaires contain sections on labour history and social security, education, health, social protection, labour training, property and patrimony, family history and housing.<sup>18</sup>

For the analysis I select as the dependent variables the difference in average net wage and contract type between the initial and subsequent employment relation, as the main independent variable UISA affiliation, and as further covariates changes in labour characteristics of private sector workers. Average net wage is expressed in 2002 prices<sup>19</sup> and contract type is coded as permanent contract. Affiliation to the UISA scheme is expressed as a binary variable, where I allocate UISA=1 to all workers who started a new

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<sup>15</sup> The acronym EPS stands for Encuesta de Protección Social in Spanish, or Social Protection Survey in English ([Subsecretaría de Previsión Social Chile, 2009](#)).

<sup>16</sup> The survey is conducted by the Centre for Microdata, Department of Economics, of the University of Chile (Centro Microdatos, Universidad de Chile) with the support of the University of Pennsylvania.

<sup>17</sup> In each survey round three different types of questionnaires account for repeated, new and deceased participants.

<sup>18</sup> See also [Nagler \(2013\)](#).

<sup>19</sup> Data from the International Monetary Fund: inflation of average consumer prices for Chile 2000-2010 (index and percentage change). Data last updated 03/2013.

Exchange rate on 28 July 2015: 663 CLP = 1 USD [[www.xe.com](#)].

employment after the UISA introduction in October 2002 and UISA=0 to all workers who started their employment before.<sup>20</sup>

Table 2 shows the initial and subsequent average net wage and contract type of formal private sector workers who started a new employment during the two years before or after the policy introduction. I take the subgroup of workers who directly changed into a new employment after terminating this initial employment relation. The wage difference is higher among the workers who started their initial employment before UISA introduction compared to those who started during the two years after. The change in the differences is negative for both men and women, and larger for men than for women. A possible explanation could present the fact that a change of employment included large opportunity costs before the policy introduction, motivating workers to only change employment if new job conditions clearly improved. The wage outcome in terms of gender is contradictory. Before UISA introduction the difference for women is smaller compared to men, but larger afterwards. The differences in contract type are minor, namely -2 percentage points for women before and 1 percentage point after, and -4 percentage points for men before and 0 percentage point difference after UISA introduction. The change in the differences is positive for both men and women, and larger for men than for women.

**Table 2:** Descriptive Statistics - Post-Employment

<b>Wage</b>	Obs	<b>Before UISA</b>			Diff	Obs	<b>After UISA</b>			Change
		Initial	Subs	Diff			Initial	Subs	Diff	
Female	206	143.60 (110.74)	160.19 (126.83)	<b>16.59</b>	164	152.04 (90.48)	166.59 (129.54)	<b>14.55</b>	-2.04	
Male	581	178.80 (145.48)	202.32 (167.19)	<b>23.52</b>	472	200.08 (140.80)	214.44 (169.78)	<b>14.36</b>	-9.16	
<b>Contract</b>	Obs	Initial	Subs	Diff	Obs	Initial	Subs	Diff	Change	
Female	241	0.62 (0.49)	0.60 (0.49)	-0.02	174	0.53 (0.50)	0.52 (0.50)	-0.01	0.01	
Male	661	0.58 (0.49)	0.54 (0.50)	-0.04	486	0.49 (0.50)	0.49 (0.50)	0.00	0.04	

*Note(s):* Standard deviation in parenthesis. Differences in bold if difference is statistically significant at the 5 percent level. Wage: average monthly net wage in 1,000's of CLP (in 2002 prices). Contract: binary variable; the variable takes the value 1 if the contract is permanent. Subs = subsequent wage or contract type.

Further I tabulate the subsequent type of employment of workers who directly change into a new employment before or after UISA introduction. For wages I have a sample of 766 before UISA and 647 after UISA. From the 766 workers before UISA introduction 81 percent remain in the private sector, 10 percent become self-employed, 3 percent change into the public sector and the remaining observations can be found among employers and domestic workers. 43 percent of the subsequent contracts are temporary and 57 percent permanent. After UISA introduction the shares are similar. From the 647 workers 84

<sup>20</sup> This binary variable is not a self-reported variable, nor does it include any information on benefit collection. See also Nagler (2013).

percent remain in the private sector, 11 percent become self-employed and 3 percent change into the public sector. The difference in contract types is a bit larger, with 50 percent of the contracts being temporary and 50 percent permanent. Finally, I assert that 30 percent of the observations are censored, identifying the workers who started a new employment in the time period observed and continue to be in the same employment at the time of the last survey.

Table 3 shows the initial and subsequent average net wage and contract type of private sector workers who started a new employment during the two years before or after the policy introduction. I take the subgroup of workers who experienced a period of unemployment after terminating the initial employment relation, before re-entering the labour market.<sup>21</sup> While there is a positive difference in subsequent wages among the workers who started their initial employment before UISA, it is slightly negative for women afterwards. For men the wage level practically remains unchanged. In terms of gender the difference for women is smaller compared to men before UISA introduction, and negative afterwards. The differences in contract type are again minor, namely -1 percentage point for women before and 4 percentage points after, and 1 percentage point for men before and 3 percentage points difference after UISA introduction.

**Table 3:** Descriptive Statistics - Post-Unemployment

<b>Wage</b>	Obs	<b>Before UISA</b>			Diff	Obs	<b>After UISA</b>			Change
		Initial	Subs	Diff			Initial	Subs	Diff	
Female	143	124.32 (68.26)	126.06 (74.90)	1.74	249	123.66 (65.83)	118.37 (57.11)	-5.29	-7.03	
Male	310	159.93 (100.93)	167.46 (105.42)	7.53	341	168.03 (116.08)	167.21 (112.75)	-0.82	-8.35	
<b>Contract</b>	Obs	Initial	Subs	Diff	Obs	Initial	Subs	Diff	Change	
Female	226	0.38 (0.49)	0.33 (0.47)	-0.05	255	0.20 (0.40)	0.23 (0.42)	0.03	0.08	
Male	456	0.42 (0.49)	0.40 (0.49)	-0.02	344	0.28 (0.45)	0.28 (0.45)	0.00	0.02	

*Note(s):* Standard errors in parenthesis. Differences in bold if difference is statistically significant at the 5 percent level. Wage: average monthly net wage in 1,000's of CLP (in 2002 prices). Contract: binary variable, the variable takes the value 1 if the contract is permanent. Subs = subsequent wage or contract type.

Further I tabulate the subsequent type of employment of workers who experienced a period of unemployment before re-entering the labour market before or after UISA introduction. For wages I have a sample of 434 before UISA and 594 after UISA. From the 434 workers before UISA introduction 87 percent remain in the private sector, 5 percent become self-employed, 5 percent change into the public sector and the remaining observations can be found among employers and domestic workers. 59 percent of the contracts are temporary and 41 percent are permanent. After UISA introduction the shares of employment type are similar. From the 594 workers 89 percent remain in the

<sup>21</sup> The period of unemployment is of different length and can include short-, medium- and longer-term unemployment.

private sector, 5 percent become self-employed and 2 percent change into the public sector. The share of contract types, however, differs considerably. 74 percent of the contracts are temporary and only 26 percent are permanent. Finally, I assert that 4 percent of the observations are censored, identifying the workers that became unemployed and continue to be unemployed at the time of the last survey.

The descriptive statistics report the average differences of the initial and subsequent wages and contract types of workers who started their initial employment in the two years before or after UISA introduction. They give a first indication of differences explained by UISA affiliation in the two subgroups of workers that I study. Next, I conduct an empirical analysis using econometric techniques to further analyse a possible impact of UISA introduction on subsequent job quality.

## 5 Methodology

For the analysis I use a difference-in-differences approach and proceed in two steps. First I estimate regressions with a sample of formal private sector workers only, where I use the differences in wages and contract types from the initial and subsequent employment relation as the dependent variables. As main explanatory variable I take UISA affiliation, and as further explanatory variables changes in the workers' characteristics. In these regressions I therefore compare workers who started before with workers who started after UISA introduction, analysing the differences in wages and contract types. Second, I use an untreated comparison group. The difference-in-differences is then defined as a comparison of two sample results studied before and after the introduction of a policy scheme or a policy intervention, but where only one of the groups was exposed to treatment. In other words, I analyse potentially significant differences in wages and contract types for two different groups and for two different periods in time.

A simple example of a difference-in-differences approach would be,

$$y_{it} = \alpha + \beta D_t + \varepsilon_{it}, \quad i = 1, \dots, N, \quad t = 0, 1 \quad (1)$$

where  $D_t = 1$  after the policy was introduced and  $D_t = 0$  before, and where  $y_{it}$  measures the outcome studied. The regression result, estimated using the sample data, yields  $\beta$  as the measure of the policy impact.

However, this approach makes the assumption that the sample remains comparable over the time period observed, assuming no other changes or time trends, that could actually falsify  $\beta$ . One solution to improve the estimation is to include data from an untreated comparison group. The regression then is,

$$y_{it} = \alpha + \alpha_1 D_t + \alpha^1 D_j + \beta D_t^j + \varepsilon_{it}^t, \quad i = 1, \dots, N, \quad t = 0, 1 \quad (2)$$

where  $j$  is the group subscript, where  $D^j = 1$  if  $j = 1$  and  $D^j = 0$  if  $j = 0$ , and where  $D_t^j = 1$  if both  $j$  and  $t$  are equal to 1, and  $D_t^j = 0$  otherwise.

For the treated sample the equation before the policy intervention is,

$$y_{i0}^1 = \alpha + \alpha^1 D^1 + \varepsilon_{i0}^1 \quad (3)$$

and the equation after the policy intervention is,

$$y_{i1}^1 = \alpha + \alpha_1 + \alpha^1 D^1 + \beta + \varepsilon_{i1}^1 \quad (4)$$

The impact can then be calculated as,

$$y_{i1}^1 - y_{i0}^1 = \alpha_1 + \beta + \varepsilon_{i1}^1 - \varepsilon_{i0}^1 \quad (5)$$

The corresponding equations for the untreated sample are,

$$y_{i0}^0 = \alpha + \varepsilon_{i0}^0 \quad (6)$$

$$y_{i1}^0 = \alpha + \alpha_1 + \varepsilon_{i1}^0 \quad (7)$$

And where the difference can then be calculated as,

$$y_{i1}^0 - y_{i0}^0 = \alpha_1 + \varepsilon_{i1}^0 - \varepsilon_{i0}^0 \quad (8)$$

The post-intervention specific effect  $\alpha_1$  can be eliminated using the control sample by taking the difference of the equations (5) and (8).

$$(y_{i1}^1 - y_{i0}^1) - (y_{i1}^0 - y_{i0}^0) = \beta + (\varepsilon_{i1}^1 - \varepsilon_{i0}^1) - (\varepsilon_{i1}^0 - \varepsilon_{i0}^0) \quad (9)$$

The difference of the error terms is assumed to equal 0, and therefore it is possible to estimate  $\beta$  by taking the sample average of  $(y_{i1}^1 - y_{i0}^1) - (y_{i1}^0 - y_{i0}^0)$ , leading to the results in a difference-in-differences estimate (Cameron and Trivedi, 2009).

In the first part of the analysis the two groups are represented by workers who started their employment before or after the policy introduction, and are therefore distinguished by UISA affiliation. In the second part, I take informal private sector workers as the control group, defined as workers without a contract, who are not exposed to the new unemployment protection scheme. The two different time periods are the month of the initial employment and the month of the subsequent employment. In each point in time I take the wage (log transformed) or contract type, and calculate the difference.

## 6 Results

The results are organised in three sections. In section 6.1 I analyse the data graphically to identify a possible discontinuity in the differences of wages and contract types of workers who started a new employment relation before or after UISA introduction. In section 6.2 I conduct an econometric analysis, where I use the methodology previously described. Finally, I conduct a set of robustness tests in section 6.3.

## 6.1 Graphical Analysis

The graphical analysis is the first step in the empirical analysis. The value of the outcome is computed on both sides of the cutoff point, the UISA introduction date, to visually analyse a possible difference in the differences of wages and contract types before and after the policy was introduced. Assessing the graph gives a first evidence of a possible jump in the mean of the differences. If the graphs do not show a jump at the cutoff point, there is already a reduced chance that further analysis will lead to robust estimates with a statistically significant and substantial differences for both groups of workers.

Figure 1 shows the differences in wages (log transformed) and contract types of the initial compared to the subsequent employment relation of workers who started their initial employment in the two years before or two years after UISA introduction, and who directly changed into a new employment.<sup>22</sup> The dots on the X-axis therefore show the month of the initial employment start (24 months before and 24 months after the introductory date), while the dots on the Y-axis show the differences in wages (log transformed) and contract types between the initial and subsequent employment relation.<sup>23</sup>

Figure 1a does not show a significant jump in the wages of workers around the policy introduction, nor any significant changes over the time period analysed. The difference in wages seems to be approximately stable and independent of UISA affiliation. In Figure 1b the picture is similar. The discontinuity is not very pronounced around the UISA introduction, and only a small drop in the difference in contract types can be observed. In both time periods the fitted linear lines show a small, but steady increase, implying an overall small improvement in the contract type difference over the time period observed.

**Figure 1:** Wage and Contract Type Differences (Post-Employment)

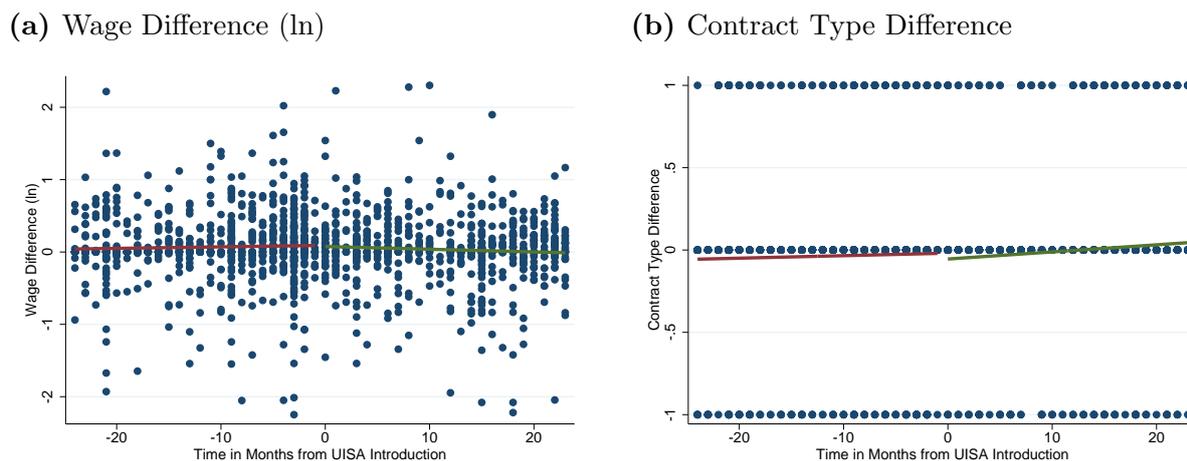


Figure 2 shows the differences in wages (log transformed) and contract types between

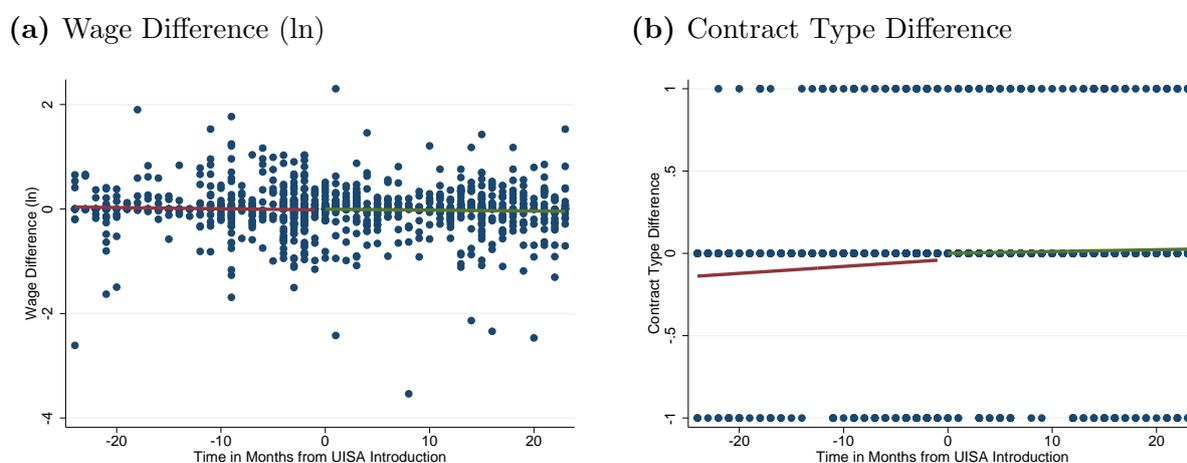
<sup>22</sup> I do not take the length of the initial employment into account. It can last from one month to various years.

<sup>23</sup> For the contract type the value -1 represents a switch from permanent to temporary contract type, the value +1 a switch from temporary to permanent contract type, and the value 0 represents no change: either two temporary or two permanent subsequent contract types.

the initial and the subsequent employment relation of workers who started their initial employment in the two years before or after UISA introduction, and who started a new employment after experiencing a period of unemployment.<sup>24</sup> The dots on the X-axis therefore show the month of the initial employment start (24 months before and 24 months after the introductory date), while the dots on the Y-axis show the differences in wages and contract types between the initial and the subsequent employment relation.

Figure 2a shows again a very smooth level in the wage difference for workers who experienced a period of unemployment, and no discontinuity can be observed around the UISA introduction. In Figure 2b the discontinuity is small around the cutoff point, but a difference can be observed in the slope over the time period observed. Before UISA introduction the slope is positive and rising, afterwards the slope is largely stable.

**Figure 2:** Wage and Contract Type Differences (Post-Unemployment)



In sum, I do not find indications for a sharp discontinuity in the differences of wages or contract types for workers in both samples. The difference in wages is largely stable over the time period observed, and the difference in contract types shows only a small discontinuity around the cutoff point for both samples. To identify if these differences are statistically significant, I estimate a set of regressions, accounting for the observational type of data. In the following subsection I use a difference-in-differences methodology to account for further aspects in the study of subsequent employment quality since UISA affiliation of workers was not randomised.

## 6.2 Difference-in-Differences

For the econometric analysis I estimate a set of regressions. First, I analyse the sample of formal private sector workers and use the differences in wages and contract types between the initial and the subsequent employment relation as the dependent variables. Second, I use a difference-in-differences methodology to account for time trends, where I take informal private sector workers as the control group. I make the assumption that

<sup>24</sup>I do not take the length of the initial employment, nor the length of the unemployment period into account. Both can last from one month to various years.

informal private sector workers experience similar trends in the labour market and are therefore comparable to the formal private sector workers, with the difference that they do not have a contract. Consequently these workers are not affiliated to the new UISA scheme if they started a new work relation after October 2002, since their work relation is informal, and are excluded from unemployment protection.

Table 4 shows the results for the sample of formal private sector workers using the differences in wages (log transformed) and contract types as dependent variables. For the change in contract type I estimate an ordered probit model. In the upper part of the table, where  $(\ln)\text{wage change}$  is the dependent variable, the results are not significant for wages when taking only UISA affiliation as explanatory variable. However, with additional covariates, the wage change is significant at the 5 or 10 percent level and negative. In the regressions (2) and (5) I add a binary variable indicating if the workers started the initial employment before UISA introduction and the subsequent employment relation afterwards, since the wage of the subsequent employment is potentially affected by the policy scheme. In the post-unemployment sample this binary variable is indeed significant and negative. In the regressions (3) and (6) I also add the length of the initial employment relation in months and the information if the worker changed the sector for the subsequent employment relation.<sup>25</sup> The variable “same sector” is significant and positive, indicating that remaining in the private sector has a positive effect on the wage difference compared to workers who find employment elsewhere. For the post-unemployment sample I also add the length of unemployment duration, which is not significant for the wage difference. Overall the results show that the wage difference is 5 to 6 percent lower for UISA affiliates in the post-employment sample, and 6 to 7 percent lower in the post-unemployment sample.

In the lower part of the regression table, where the change in contract types is the dependent variable, the coefficients for UISA affiliation are positive, but not significant in all regressions. The binary variable D2 is significant for both samples with contradicting effects (negative in regression (2), but positive in the regressions (3) and (6)), and previous employment duration significant and negative. Remaining in the same sector is positive at the 1 percent level for the post-employment sample, while unemployment duration has no significant effect.

In summary the results indicate that UISA introduction had a significant and small negative effect on the wage difference (of about 5 to 7 percent), but did not have an effect on the difference in contract types. To further study the negative effect on the difference in wage change, I take next a control group to account for labour market trends.

The results in Table 5 largely confirm the outcomes of the previous table. In the difference-in-differences analysis with the control group I estimate wage growth only, since informal private sector employees do not have a contract and a differentiation between permanent and temporary contract is therefore not possible. The overall effect (marginal effect) of UISA affiliation is again significant and negative for the wage difference. However, using the control group, it is now furthermore possible to study if the difference in the differences

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<sup>25</sup> The variable “same sector” is equal to 1 if the worker remains in the private sector. The change of sector can be into different types of employment relations: employer, self-employed, the public sector, domestic worker, non-remunerated family worker or military service.

**Table 4:** Before-After Regression Analysis (Without Control Group)

$\Delta$ (ln)wage	Post-Employment			Post-Unemployment		
	(1)	(2)	(3)	(4)	(5)	(6)
UISA	-0.036 (0.03)	-0.047* (0.03)	-0.055** (0.03)	-0.025 (0.03)	-0.063** (0.03)	-0.065** (0.03)
D2		-0.043 (0.04)	-0.065 (0.05)		-0.105** (0.05)	-0.098* (0.05)
Emp. Duration			0.002 (0.00)			-0.000 (0.00)
Same Sector			0.159** (0.04)			0.211*** (0.06)
Unemp. Duration						-0.002 (0.00)
Constant	0.068*** (0.02)	0.079*** (0.02)	-0.108** (0.04)	0.004 (0.02)	0.041 (0.03)	-0.091 (0.07)
N	1,386	1,386	1,386	1,019	1,019	1,019

$\Delta$ contract type	Post-Employment			Post-Unemployment		
	(1)	(2)	(3)	(4)	(5)	(6)
UISA	0.063 (0.06)	0.027 (0.06)	0.093 (0.06)	0.100 (0.07)	0.083 (0.07)	0.115 (0.07)
D2		-0.165* (0.09)	0.322*** (0.12)		-0.071 (0.12)	0.321** (0.14)
Emp. Duration			-0.025*** (0.00)			-0.025*** (0.01)
Same Sector			0.253*** (0.09)			0.049 (0.13)
Unemp. Duration						-0.010 (0.01)
Cut 1	-1.009 (0.05)	-1.045 (0.05)	-1.037 (0.10)	-1.083 (0.06)	-1.100 (0.06)	-1.261 (0.15)
Cut 2	1.169 (0.05)	1.135 (0.05)	1.199 (0.10)	1.218 (0.06)	1.201 (0.06)	1.077 (0.14)
N	1,562	1,562	1,562	1,281	1,281	1,281

*Note(s):* Standard errors in parentheses and clustered at the individual level. Coefficients are reported in the ordered probit analysis. See Table 6 in Appendix B for marginal effects. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

is significant when comparing the treatment group, formal private sector workers, to this control group. The interaction term UISA x Formal suggests that the difference in the differences of wages between treatment and control group is not significant for the post-employment group, but positive and significant for the post-unemployment group. While the difference in wages is overall negative, the difference in the differences is positive. This outcome suggests that the UISA introduction only had a significant effect on the wage difference for workers experiencing a period of unemployment before re-entering the labour market, but that the effect on the post-employment group might be

insignificant. The positive effect on the post-unemployment group further suggests that UISA affiliation, and therefore financial benefits during unemployment, fulfills the goal of allowing unemployment workers to be more selective while searching for new employment, leading to an advantageous wage difference compared to the control group.

**Table 5:** Difference-in-Differences (With Control Group)

$\Delta$ (ln)wage	Post-Employment			Post-Unemployment		
	(1)	(2)	(3)	(1)	(2)	(3)
UISA x Formal	0.069 (0.059)	0.070 (0.059)	0.058 (0.059)	0.147** (0.064)	0.140** (0.064)	0.140** (0.064)
UISA	-0.106** (0.052)	-0.117** (0.053)	-0.114** (0.053)	-0.172*** (0.058)	-0.200*** (0.060)	-0.203*** (0.061)
Formal	-0.134*** (0.040)	-0.134*** (0.040)	-0.134*** (0.039)	-0.234*** (0.053)	-0.227*** (0.053)	-0.230*** (0.054)
D2		-0.045 (0.040)	-0.067 (0.046)		-0.098** (0.042)	-0.092* (0.049)
Emp. Duration			0.002 (0.002)			-0.000 (0.002)
Same Sector			0.217*** (0.037)			0.144*** (0.054)
Unemp. Duration						0.000 (0.003)
Constant	0.202*** (0.036)	0.213*** (0.037)	0.023 (0.048)	0.238 (0.049)	0.118*** (0.034)	0.144** (0.073)
- Marg. Effect UISA	-0.036**	-0.047**	-0.056**	-0.025***	-0.060***	-0.063***
- Marg. Effect Formal	-0.064***	-0.064***	-0.075***	-0.088***	-0.088***	-0.090***
Wald Test UISA	0.043	0.021	0.012	0.009	0.001	0.001
Wald Test Formal	0.001	0.001	0.001	0.000	0.000	0.000
N	1,902	1,902	1,902	1,331	1,331	1,331

*Note(s):* Standard errors in parentheses. Clustered at the individual level. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Summarising the econometric analysis I find only significant effects for the difference in wages, which are negative for both groups. Taking informal private sector workers as control group, I find that the difference-in-differences is only significant for the post-unemployment sample, and positive. Since the effect on the wage difference is negative, three explanations are at hands. First, the cost of the new unemployment protection was passed on to the workers' wages by their employers. While the subsequent wage is higher for post-employment workers with and without UISA affiliation, the difference is smaller for UISA affiliates. In the post-unemployment group the subsequent wage is even lower than the initial wage for UISA affiliates. Second, workers affiliated to the UISA scheme might give less importance to an equal or higher wage in the subsequent employment compared to workers without unemployment protection. They are more willing to leave their current employment relation and change into another job, even if wages are similar or below their initial employment wage (see also Nagler, 2013). Third,

workers experiencing a period of unemployment might take more time to find a new job due to unemployment protection. While this gives unemployed workers more leeway to find a job with adequate conditions, it could equally lead to skills depreciation and constitute the dominant effect in this case. Workers who are longer unemployed might face inferior conditions when re-entering the labour market. This last hypothesis, however, casts doubts, since the regressions in Tables 4 and 5 do not indicate a significant negative effect of unemployment duration on wage growth.

### 6.3 Robustness

To test the robustness of my previous estimates I conduct two falsification tests and furthermore estimate additional regressions using, adding the UISA amount to net wages.<sup>26</sup> In the first falsification test I change the introduction date “as if” the UISA scheme had been introduced two years later, in October 2004. In the second falsification test I estimate the same set of regressions for the difference-in-differences analysis using public sector employees as an alternative control group. In the additional regressions I add the UISA amount to net wages of UISA affiliates to test if the costs of the protection scheme have been deducted from the wages, presenting a delayed payment.

The first robustness test takes an alternative introduction date for UISA affiliation, “as if” the unemployment insurance had been introduced two years later. I choose the alternative introduction date of two years, since the sample for the analysis is taken from all formal private sector employees who started two years before or two years after the official UISA introductory date. Therefore the alternative sample only includes workers who are affiliated to UISA, and where no official introductory date in between could falsify the differences in wages or contract types. For the wage difference the results show that the “as if” UISA variable is not significant in all regressions. For the difference in contract types, the UISA variable is significant at the 5 percent level and positive in the simple regression for the post-employment sample, but no longer significant when adding covariates. The results for the UISA variable are all insignificant for the post-unemployment sample. I therefore conclude that the results in the analysis with the official introduction date, showing significant results for the wage change of UISA affiliates and insignificant results for the change in contract types, can be considered valid.

The second robustness test takes a different control group for the difference-in-differences estimations. The drawback of this alternative control group is the relatively small sample size. Therefore the larger group of informal private sector employees were previously selected for a more comprehensive analysis.<sup>27</sup> However, it has the advantage of allowing to include the difference in contract types. A permanent contract is more prevalent among public sector employees, with a difference of approximately 10 percentage points in both samples. I concentrate on the simple regressions and the regressions including

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<sup>26</sup> I also examine the economic cycle in Chile during the time period studied and summarise the results in Appendix C. Overall Chile showed a stable economic performance, leading to limited concerns about the impact of external factors that could influence the results of this paper.

<sup>27</sup> The sizes of the control groups are: 84 (wages, post-employment), 105 (wages, post-unemployment), 61 (contract type, post-employment), 70 (contract type, post-unemployment).

the D2 variable for this robustness test, where the only covariate is UISA affiliation for the former, and UISA affiliation plus the D2 variable for the latter. The results of the difference-in-differences analysis show that the differences between the treatment and control group are not statistically significant for all regressions. UISA affiliation is not significant in any of the simple regressions and equally insignificant for the regressions including the D2 variable, with the exception of the difference in contract types for the post-employment sample, where UISA affiliation is significant at the 10 percent level and positive. Therefore I cannot identify a difference in the differences of wages or contract types using this alternate control group. However, these results could be also caused by the small sample size of public sector employees.<sup>28</sup>

Finally, I add the UISA amount that is paid by the employer (2.2 percent for a permanent contract and 3.0 percent for a temporary contract) to net wages. In the regressions of the post-employment sample, the UISA variable is significant at the 1 percent level and positive, but wage growth very small with a 0.4 percent increase compared to non-UISA affiliates. In the post-unemployment sample, UISA is significant at the 1 or 5 percent level and positive, but the wage growth with a 0.1 percent increase even smaller compared to non-UISA affiliates.

Summarising the analysis after conducting the two falsification tests and the additional regressions, the first falsification test (using the alternative “as if” introductory date) shows that the alternative UISA variable does not have a significant effect on the wage difference. It only has a significant effect on the simple regression for the difference in contract types for the post-employment sample. It therefore shows that the UISA variable using the “as if” UISA introductory date largely reports no significant results, strengthening the outcomes of the econometric analysis. Using the different control group the results show that the differences between treatment and control group are not statistically significant. While this outcome does not support the findings in the econometric analysis, it needs to be interpreted with care, since the control group is relatively small. Finally, running the additional regressions including the UISA amount to net wages shows that the difference for UISA affiliates is significant and positive, but very small. If the UISA amount is taken as a delayed payment and added to net wages, then UISA have a small positive effect on subsequent employment quality measured by wages.

## 7 Conclusion

This paper analyses whether the introduction of UISA in Chile had an impact on the differences in wages and contract types of (i) workers directly changing into a new employment, and (ii) workers experiencing a period of unemployment before re-entering the labour market. Based on the results, I find evidence that the introduction of the UISA scheme had a small negative effect on the wage difference, a small positive effect on the difference in the differences compared to a control group, and no effect on the

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<sup>28</sup> I do not report the regression tables for both falsification tests in the paper, they are available upon request.

difference in contract types. In the remaining section I first summarise the empirical results, before discussing policy implications and proposing areas of future research.

Summarising the results of the econometric analysis, I find evidence that the wage difference was negatively affected by the UISA introduction, but that the new unemployment insurance had no effect on the difference in contract types. With regard to wage growth I find that the difference is between 5 to 7 percent lower compared to workers who are not affiliated to the UISA scheme. Apart from the cost of UISA affiliation that might be passed on to the employees' wages, two other explanations are possible: that employees with UISA affiliation put less emphasis on their subsequent wage, since they face lower opportunity costs when changing employment. And that workers with UISA affiliation who experienced a period of unemployment take more time to re-enter the labour market and suffer from declining skills and other negative effects of longer unemployment duration. In the empirical analysis, however, I do not find evidence that unemployment duration had a significant effect on wage difference. Using a control group, the results show that the difference-in-differences in wage growth is significant and positive for the post-unemployment sample, suggesting that the unemployment protection allowed unemployed workers to search for a new employment with more favourable conditions.

Testing the robustness of these results, I find the following. The first falsification test, taking another date "as if" the UISA scheme had been introduced two years later, supports the results. The outcomes of this artificial UISA variable are not significant for wage growth and, in their majority, not significant for the difference in contract types. The second test does not show any statistically significant difference between treatment and control group, suggesting that the difference in wages could also be explained by labour market trends of the Chilean economy. However, this outcome must be interpreted with care, since the sample size of the alternative control group is small. Finally, adding the UISA amount to net wages shows that wage growth is significant and positive, but that the difference is very small and amounts to less than 1 percent.

These findings may be explained by the nature of the UISA scheme. The scheme is in fact not an insurance, but a forced savings scheme. Employers and employees contribute with a share of the monthly gross wage to an individual savings account from which transfers are withdrawn in case of unemployment. In the case of wages, costs can easily be shifted onto the employees' wages, since they will eventually have access to the accumulated savings. The point in time when they can access the money, has simply changed and is now delayed. In the case of contract types the introduction is of limited importance, since the costs are similar for temporary and permanent contracts. For workers changing directly into a new employment, the new scheme presents reduced opportunity costs for UISA affiliates. For workers experiencing a period of unemployment, UISA affiliates have access to their accounts, but since savings are individualised and belong to the worker, the motivation to extend the job search to find better jobs is limited (see also [Reyes et al., 2011](#)). Furthermore the savings amount is rather small and can only provide partial consumption smoothing during unemployment. Only for workers who have access to the solidarity fund, the job search period was found to be significantly longer ([Huneus et al., 2012](#)).

The policy implications depend on the goals of the Chilean government with regard to

this new unemployment insurance. While the literature provides inconsistent results of subsequent employment quality for unemployment insurance schemes based on risk-pooling, a number of studies do find positive effects on subsequent wages, contract types and employment stability. If the Chilean government aims to improve subsequent job quality, the insurance component of the scheme (the solidarity fund) might need to be extended to provide better and more generous protection to workers, since the contributions to the individual accounts can simply be deducted from the workers' wages. However, this goal might still not be achieved as outcomes are controversial (as shown in the literature review), and furthermore stand in contrast to the other goals of the scheme, such as the intended avoidance of moral hazard and financial sustainability.

Research on the impact of unemployment insurance savings accounts on labour market outcomes is still limited. To the best of my knowledge, this paper provides for the first time an evaluation of the impact of this type of unemployment protection on subsequent employment quality. This type of analysis is also conducted for the first time using data from an emerging economy. labour market research continues to be largely concentrated on advanced economies and well-known social protection schemes. More research is needed to evaluate policies and schemes that are not only different to the schemes found in advanced economies, but that also face a diverging labour market context, for example a large informal economy.

With regard to the impact of the Chilean UISA on subsequent employment quality more research is recommended on differentiating the analysis by unemployed workers with and without access to the solidarity fund to investigate the impact of the insurance component. Furthermore I suggest studying the impact on subsequent employment duration, another indicator for job quality, and the impact of a change in the policy scheme that was introduced in 2009. Another aspect involves the unemployment duration for workers who experience a period of unemployment before re-entering the work force, as unemployment leads to skills depreciation of workers, and different lengths of unemployment spells can therefore be expected to have a different impact on subsequent job quality. Finally, employment quality can be defined by further variables, as mentioned in footnote 3, for example more adequate matching of job requirements and worker's qualifications, distance to travel to the work place, or development opportunities within the company. Since these aspects are more challenging to study using quantitative methods, further research could also entail a qualitative research approach. Due to the importance of labour income, and given limited social protection and underdeveloped financial markets in developing countries, further research is highly recommended.

## Acknowledgements

I am thankful to Pierre Mohnen, Wim Naudé and Milan Vodopivec for their support, discussions and guidance. I have also benefited from comments, discussions and conversations with Mira Bierbaum, Richard Bluhm, Denis de Crombrughe, Neil Foster-McGregor, Andrés Mideros Mora, Markus Nagler and Anton Nivorozhkin, and participants of the UNU-MERIT Research Tutorial for the Poverty, Public Policy and Inclusive Innovation Group in Maastricht. Further I would like to thank the Secretariat for Social Security of Chile for letting me use the database of the Social Protection Survey. The findings, interpretations and conclusions expressed in this paper are solely mine and do not necessarily present policies or views of UNU-MERIT/MGSoG or the Secretariat for Social Security of Chile. All remaining errors are mine.

## References

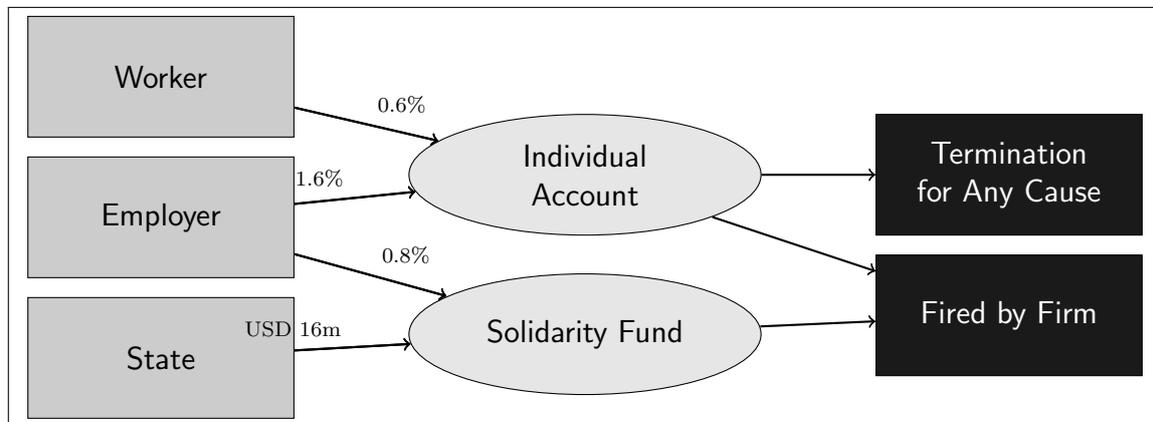
- Acemoglu, D. and Shimer, R. (1999). Efficient Unemployment Insurance. *The Journal of Political Economy*, 107 (5):893–928.
- Acemoglu, D. and Shimer, R. (2000). Productivity Gains from Unemployment Insurance. *European Economic Review*, 44:1195–1224.
- Acevedo, G., Eskenazi, P., and Pagés, C. (2006). Unemployment Insurance in Chile: A New Model of Income Support for Unemployed Workers. *SP Discussion Paper No. 0612, Social Protection, The World Bank*.
- Addison, J. and Portugal, P. (2008). How Do Different Entitlement to Unemployment Benefits Affect the Transition from Unemployment into Employment? *Economics Letters*, 101 (3):206–209.
- Belzil, C. (2001). Unemployment Insurance and Subsequent Job Duration: Job Match versus Unobserved Heterogeneity. *Journal of Applied Econometrics*, 16 (5):619–636.
- Berstein, S., Fajnzylber, E., and Gana, P. (2012). The New Chilean Unemployment Insurance System: Combining Individual Accounts and Redistribution in an Emerging Economy. In R. Holzmann, & M. Vodopivec, *Reforming Severance Pay (pp. 259-284)*. Washington DC: World Bank.
- Brown, A., Orszag, J., and Snower, D. (2008). Unemployment Accounts and Employment Incentives. *European Journal of Political Economy*, 24 (3):587–604.
- Brunner, L. and Colarelli, S. (2004). Individual Unemployment Accounts. *The Independent Review*, 8 (4):569–585.
- Burdett, K. (1979). Unemployment Insurance Payments as a Search Subsidy: A Theoretical Analysis. *Economic Inquiry*, 17 (3):333–343.
- Caliendo, M., Tatsiramos, K., and Uhlenhorff, A. (2013). Benefit Duration, Unemployment Duration and Job Match Quality: A Regression-Discontinuity Approach. *Journal of Applied Econometrics*, 28 (4):604–627.
- Cameron, A. and Trivedi, P. (2009). *Microeconometrics Methods and Applications*. Cambridge University Press.
- Card, D., Chetty, R., and Weber, A. (2007). Cash-On-Hands and Competing Model of Intertemporal Behavior: New Evidence from the Labor Market. *The Quarterly Journal of Economics*, 122 (4):1511–1560.
- Card, D. and Levine, P. (2000). Extended Benefits and the Duration of UI Spells: Evidence from the New Jersey Extended Benefits Program. *Journal of Public Economics*, 78:107–138.
- Centeno, M. and Novo, A. (2009). Reemployment Wages and UI Liquidity Effect: A Regression Discontinuity Approach. *Portuguese Economic Journal*, 8 (1):45–52.

- Ehrenberg, R. and Oaxaca, R. (1976). Unemployment Insurance, Duration of Unemployment, and Subsequent Wage Gain. *American Economic Association*, 66 (5):754–766.
- Feldstein, M. and Altman, D. (2007). Unemployment Insurance Savings Accounts. *Tax Policy and the Economy*, 21:35–63.
- Ferrer, A. and Riddell, W. (2011). Unemployment Insurance Savings Accounts in Latin America: Overview and Assessment. *IZA Discussion Paper No. 5577*.
- Gangl, M. (2002). Unemployment Benefits as a Search Subsidy: New Evidence on Duration and Wage Effects of Unemployment Insurance. *Discussion Paper FS I 02-208*.
- Huneus, C., Leiva, S., and Micco, A. (2012). Unemployment Insurance and Search Effort in Chile. *IBD Working Paper Series No. IDB-WP-313*.
- Katz, L. and Meyer, B. (1990). The Impact of the Potential Duration of Unemployment Benefits on the Duration of Unemployment. *Journal of Public Economics*, 41 (1):45–72.
- Lalive, R. (2007). Unemployment Benefits, Unemployment Duration, and Post-Unemployment Jobs: A Regression Discontinuity Approach. *The American Economic Review*, 97 (2):108–112.
- Lalive, R. and Zweimüller, J. (2004). Benefit Entitlement and Unemployment Duration: Accounting for Public Endogeneity. *Journal of Public Economics*, 88 (12):2587–2616.
- Lentz, R. (2009). Optimal Unemployment Insurance in an Estimated Job Search Model with Savings. *Review of Economic Dynamics*, 12 (1):37–57.
- Nagler, P. (2013). How Unemployment Insurance Savings Accounts Affect Employment Duration: Evidence from Chile. *IZA Journal of Labor & Development*, 2:9.
- OECD (2007). *OECD Economic Surveys Chile*. Organisation for Economic Co-operation and Development.
- OECD (2013). *OECD Economic Surveys Chile*. Organisation for Economic Co-operation and Development.
- Orszag, J. and Snower, D. (2002). From Unemployment Benefits to Unemployment Accounts. *IZA Discussion Paper No. 532*.
- Reyes, G., van Ours, J., and Vodopivec, M. (2011). Incentive Effects of Unemployment Insurance Savings Accounts: Evidence from Chile. *Labour Economics*, 18 (6):798–809.
- Schmieder, J., von Wachter, T., and Bender, S. (2010). The Effects of Unemployment Insurance on Labour Supply and Search Outcomes. Regression Discontinuity Estimates from Germany. *IAB Discussion Paper No. 4/2010*.
- Sehnbruch, K. (2004). Privatized Unemployment Insurance: Can Chile’s New Unemployment Insurance Scheme Serve as a Model for Other Developing Countries? *Working Paper No. 12, Center for Latin American Studies, University of California, Berkeley*.

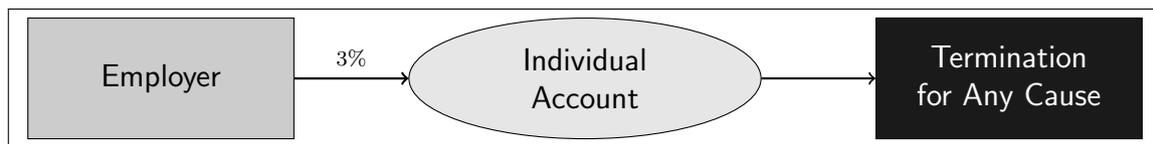
- Simanovska, I. and Söderling, L. (2008). Business Cycle Accounting for Chile. *IMF Working Paper No. WP/08/61*.
- Subsecretaría de Previsión Social Chile (2002-2009). Encuesta de Protección Social. Available at [www.proteccionsocial.cl](http://www.proteccionsocial.cl) [accessed on 18 December 2013].
- Tatsiramos, K. (2009). Unemployment Insurance in Europe: Unemployment Duration and Subsequent Employment Stability. *Journal of the European Economic Association*, 7 (6):1225–1260.
- van Ours, J. and Vodopivec, M. (2008). Does Reducing Unemployment Insurance Generosity Reduce Job Match Quality? *Journal of Public Economics*, 92 (3-4):684–695.
- Vejlin, R. (2011). Optimal Unemployment Insurance: How Important is the Demand Side? *Aarhus University and LMDG*.
- Vodopivec, M. (2013). Introducing Unemployment Insurance to Developing Countries. *IZA Journal of Labor Policy*, 2:1.
- Wulfgramm, M. and Fervers, L. (2013). Unemployment and Subsequent Employment Stability: Does Labour Market Policy Matter? *IZA Discussion Paper No. 7193*.

# A Overview UISA Scheme

**Figure 3:** Permanent Contract



**Figure 4:** Temporary Contract



*Note(s):* [Berstein et al. \(2012\)](#).

## B Ordered Probit Model

**Table 6:** Marginal Effects

$\Delta$ contract type	Post-Employment			Post-Unemployment		
	(-1)	(0)	(+1)	(-1)	(0)	(+1)
UISA	-0.021 (0.01)	0.002 (0.00)	0.019 (0.01)	-0.024 (0.01)	0.001 (0.00)	0.023 (0.01)
D2	-0.073*** (0.03)	0.007 (0.01)	0.065*** (0.02)	-0.066** (0.03)	0.002 (0.00)	0.064** (0.03)
Emp. Duration	0.006*** (0.00)	-0.001* (0.00)	-0.005*** (0.00)	0.005*** (0.00)	-0.000 (0.00)	-0.005*** (0.00)
Same Sector	-0.057*** (0.02)	0.006 (0.00)	0.051*** (0.02)	-0.010 (0.03)	-0.000 (0.00)	0.010 (0.03)
Unemp. Duration				0.002 (0.00)	-0.000 (0.00)	-0.002 (0.00)
N	1,562	1,562	1,562	1,281	1,281	1,281

*Note(s):* Standard errors in parentheses and clustered at the individual level. Marginal Effects are calculated for the models (3) and (6) of Table 4 and report the marginal effects for the three possible scenarios of contract type differences. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

## C Economic Cycle Chile

During the time frame studied in this paper, approximately the period from 2000 to 2009, Chile showed a stable economic performance.<sup>29</sup> The country achieved macroeconomic stability and its per-capita income tripled by the end of the decade compared to 1990. Furthermore the poverty-rate was cut by two-thirds through a reduction in economic vulnerabilities due to pro-poor policies (Simanovska and Söderling, 2008). After a cyclical slowdown from 1998 to 2003, growth has reinitialised since 2003 due to strong policy settings (OECD, 2007). The unemployment rate was approximately stable in the time period from which the sample is drawn, and only decreased in the years 2006 to 2008, before it increased again due to the world economic crisis. The business cycle was more volatile in 2000 and 2001, but has shown a reduced volatility since 2002, with a smaller peak in 2005.

Even though the overall performance was rather stable in the decade from 2000 to 2010, the increased economic growth after 2003 could still have affected wages and contract types due to the importance of the macroeconomic environment on labour market outcomes. However, during the time the sample is selected, the unemployment rate was stable. During the two years before UISA introduction, the unemployment rate ranged from 9.5 to 10.2 percent (average: 9.9 percent) and during the two years after from 9.2 to 10.5 percent (average: 9.8 percent).

Table 7 provides a detailed overview of basic macroeconomic indicators describing the Chilean economic cycle, Figure 5 shows the volatility of the business cycle from 2000 to 2007, and Figure 6 the unemployment rate from 2000 to 2010.

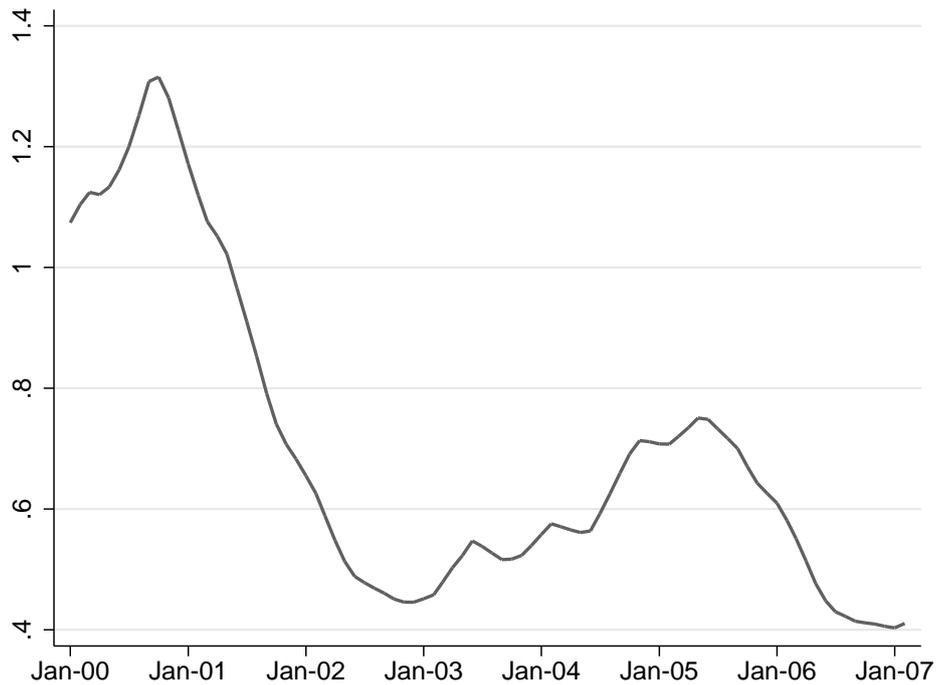
**Table 7:** Basic Macroeconomic Indicators - Overview

	2001	2002	2003	2004	2005	2006
GDP Growth Rate (real, in %)	3.4	2.2	4.0	6.0	5.7	4.0
Nom. Budget Balance (in % of GDP)	-0.5	-1.2	-0.4	2.1	4.7	7.9
Current Account Balance (in % of GDP)	-1.6	-0.9	-1.1	2.2	1.1	3.6
Exchange Rate (CLP per USD, period avg)	634.9	688.9	691.4	609.5	559.8	530.3
CPI Inflation (IPC, in %, end of period)	2.6	2.8	1.1	2.4	3.7	2.6
Unemployment Rate (in %)	9.9	9.8	9.5	10.0	9.2	7.8

*Note(s):* OECD (2007), OECD Economic Surveys Chile (based on: Central Bank of Chile, Instituto Nacional de Estadísticas and Ministry of Finance).

<sup>29</sup> Time period studied: two years before UISA introduction in October 2002 until the last survey round was conducted in 2009.

**Figure 5:** Business Cycle



*Note(s):* OECD (2007), OECD Economic Surveys Chile (based on: Ministry of Finance, Central Bank of Chile and OECD calculations). Business cycle volatility is defined as the 12-months moving average of the standard deviation (calculated over 12-months) of the output gap, defined as the percent difference between the seasonally adjusted IMACEC index (monthly indicator of economic activity) and its trend.

**Figure 6:** Unemployment Rate



*Note(s):* OECD (2013), unemployment rates (indicator). doi: 10.1787/997c8750-en (Accessed on 13 November 2014).

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