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## Abstract\*

Unemployment is a pressing problem in many countries in Latin America. Financial crises and increased globalization increase job turnover and therefore the risk of unemployment. To protect workers, Chile implemented an innovative unemployment insurance (UI) system. UI protects workers but creates moral hazard and self-selection issues. Using administrative data for the period 2007 to 2010, the effect of the 2009 reform of UI on job search behavior was studied. The results revealed different job search behavior between workers who use unemployment benefits and those who do not. Search efforts were found to fall as long as unemployment benefits are in place. There is strong evidence that workers who decide not to take UI despite having the right to do so have a higher probability of finding a new job.

**Keywords:** Unemployment, Unemployment insurance, Job search behavior

**JEL Classification:** E24, J64, J65

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## 1. Introduction

Unemployment is a pressing problem in many countries. In Latin America, as in other emerging economies, financial crises and globalization have increased job turnover, and therefore the risk of job loss among workers.<sup>1</sup> Given these trends, policies helping the unemployed have gained importance and attracted the interest of policymakers. Economic growth in developing countries also pressures governments to update unemployment protection programs to the new level of economic development.<sup>2</sup>

The replacement of lost income to smooth consumption is one of the prime objectives of policies that aim to protect unemployed people. This support may be in the form of a pure income transfer, as in traditionally designed unemployment insurance (UI) systems, or through jobs created by public sector programs. Although these policies may successfully help the unemployed smooth their consumption across good and bad periods, they may create problems of moral hazard and adverse selection in the labor market. Once unemployed workers access benefits, they may reduce their job search effort to obtain the maximum amount of social benefits (moral hazard). Unemployed workers who apply for benefits are not random. They tend to have a lower probability of finding a new job. For unemployed workers who know they will find a new job quickly, unemployment benefits are less important (adverse selection).

To reduce these adverse incentives, policymakers may provide incentives for the unemployed to search for a new job by, in some cases, decreasing unemployment benefits over time and/or, in others, making job search mandatory. They also establish a range of programs such as job search assistance, subsidized work experience, and public labor exchanges to facilitate job finding and to raise transition rates out of unemployment. These programs, if successful, should improve the match between workers' skills and job vacancies. All other things being equal, better job matches imply higher hourly wages for formerly unemployed workers.

Chile presents an interesting case. In 2002, Chile introduced a new, innovative UI program that combined social insurance with the establishment of the Common/Solidarity Fund (UISF), inter-temporal self-insurance, and individual accounts (UIIA).<sup>3</sup> Contributions were split between individual accounts and a common/solidarity fund, which was partly financed by the

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<sup>1</sup> Haltiwanger et al. (2004) show that reductions in tariffs and exchange rate appreciations increase the pace of job reallocation within sectors.

<sup>2</sup> See Vodopivec (2004).

<sup>3</sup> UIIA stands for Unemployment Insurance-Individual Account.

government. Employers and workers paid contributions, and workers received benefits depending on their employment contract. Employees with permanent contracts contributed 1.6 percent of their wages to their UIIA and 0.6 percent to the UISF. Employers contributed 0.8 percent to the UISF. To access the UISF, permanent workers required a previous contribution density to the system. For fixed-term contracts, employers contributed 3 percent of wages to workers' individual accounts, but these workers did not have access to the UISF.

In May 2009, a major reform facilitated and expanded access to the UISF, increased benefits, and introduced activation policies, a part of the reform not yet implemented. As a result of this reform, i) fixed-term workers could access the UISF, ii) access requirements for permanent workers were relaxed, iii) coverage by the unemployment system increased by two months during high unemployment periods, and iv) the benefits cap increased by more than 30 percent in real terms. By the end of 2010, 70 percent of all private sector employees, formal and informal, were contributing each month to the UI system.<sup>4</sup>

The 2009 reform allows us to study the effect of unemployment benefits on workers' behavior, particularly the effect of the level of benefits on the time spent between formal jobs. The reform helps us identify this effect using a difference-in-difference estimation. It creates a group of individuals, i.e., those who claimed UI benefits after July 1, 2009, and who received benefits for longer than those first claimed claiming benefits before that date.

A substantial literature studies the effect of UI on workers' behavior. These studies focus mainly on pay-as-you-go UI systems and use unemployment status as a dependent variable. Chilean UI is funded through a system that mixes individual accounts, or self-insurance, with a Common/Solidarity Fund. Chilean administrative data allows a focus on formal jobs and not just unemployment status (Shimmer, 2010). We can study transitions from one formal job to another or from one formal job to either an informal job, unemployment, or out of the labor force.

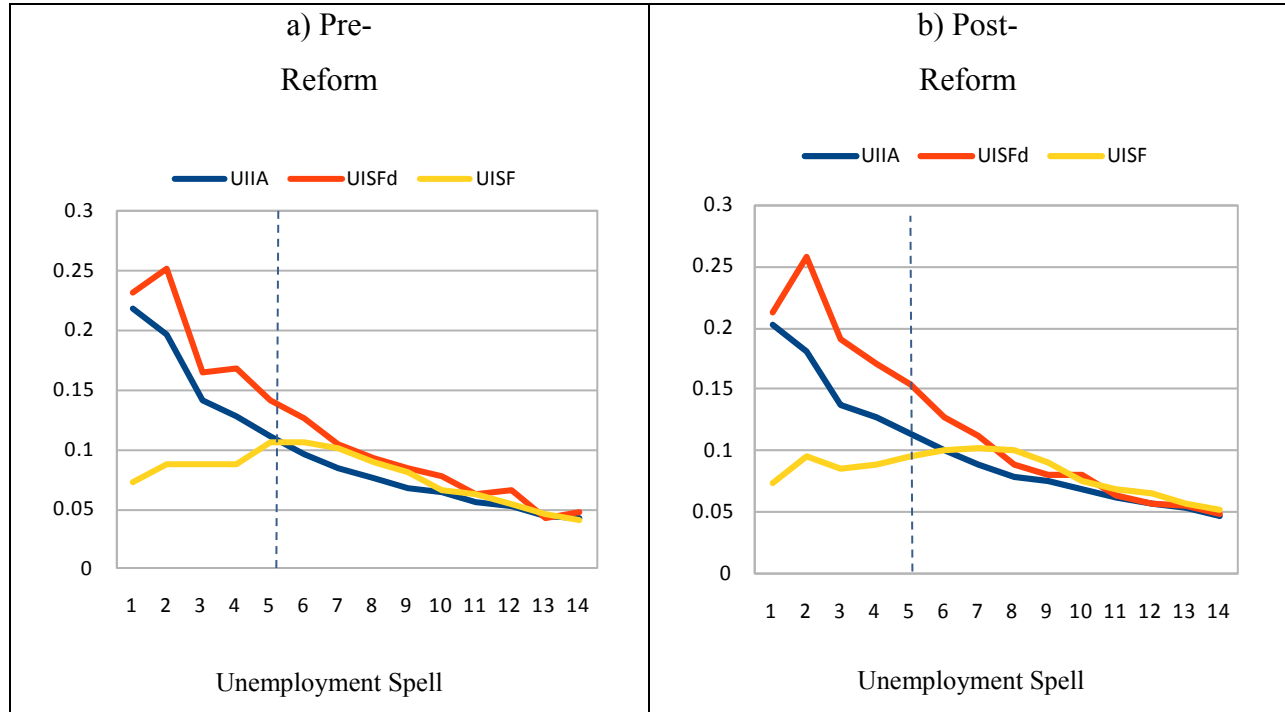
Data from the unemployment insurance system reveal signs of moral hazard issues. Following Reyes et al. (2010), Figure 1a presents the unconditional job finding rates, separately for permanent workers who are only entitled to access their individual accounts and not the solidarity fund (UIIA), for those who are entitled but do not use the solidarity fund (UISFd), and for those that use the solidarity fund (UISF), prior to the 2009 reform. Workers who apply to the UISF present lower relative exit rates from unemployment as long as UI benefits are in place.

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<sup>4</sup> This percentage does not consider self-employment.

Once UISF benefits vanish, their exit rate becomes similar to workers without access to UISF. We also find evidence that UI benefits imply self-selection between workers having the right to use the UISF who decide to use it (UISF) or not (UISFd).

**Figure 1. Unconditional Hazard Rate for UIIA, UISFd, UISF**



Source: Authors' calculations using UI data.

Note: UIIA, UISFd and UISF: unemployed workers who applied for UI benefits, who had the right only to access their IA, who had the right to use the SF but decided not to, and who used the SF, respectively.

The 2009 reform increased self-selection and moral hazard issues among unemployed workers who had previous permanent and fixed-term contracts (Figure 1b). We do not find that this increase in UI benefits and coverage improves the matching process, in terms of post-unemployment wages in the Chilean labor market.

Evidence from unemployed workers with previous permanent work who accessed the UI system after the 2009 reform suggests first that the selection issue becomes more important. Extension of the number of payments supported by the UISF (from five to seven) and the benefit ceiling increased self-selection between permanent workers with good and bad prospects of finding a job. Second, permanent workers who used the UISF post-reform presented a lower search effort during the period in which they were receiving UISF payments. Results suggest that

the 2009 reform allowing fixed-term contract workers to access the UISF induced self-selection between workers with previous fixed-term contracts that have good or bad access to new jobs. The data show that workers with fixed-term contracts that use the UISF have a lower hazard rate, but this is not related one-to-one with benefits provided by the UI system.

The next section discusses the essential features of unemployment protection in the Chilean labor market. The third section reviews the relevant literature. The fourth section describes the data and methodology used in our study. Section 5 presents results, and Section 6 concludes.

## **2. Chilean Labor Market and the UI System**

### ***2.1 Worker Protection against the Risk of Unemployment: Law and Administrative Rules***

The UI system and mandated severance payments (SPS) are the main elements of protection against unemployment. UI went into effect in October 2002. Benefits cover all employees over 18 years old who are employed in the private sector and have a formal contract, either fixed-term or permanent. This means that workers who are excluded from UI are the following: domestic service employees,<sup>5</sup> public sector employees, the self-employed, workers under 18 years old, and workers hired as trainees and retirees, except for disability pensioners. Contribution to UI has been mandatory since October 2002 for all new enrolled workers over 18 years old who satisfy the conditions mentioned above. For permanent workers hired before October 2002, contribution to the unemployment insurance system is voluntary. Therefore, there exists a fraction of these workers who are still not affiliated with the UI system, although in our sample period, these workers represented a small percentage. In May 2009, UI underwent an important reform that increased coverage and benefits.

The Severance Payments for Years of Service (SPS) has existed in Chile since 1946. Mandatory severance pay amounts to one month of gross monthly earnings per year of work. The SPS is regulated by the labor code. It states that any worker with a permanent contract who is fired for economic reasons and has at least 12 months of continuous work with the same employer has the right to receive SPS. Until the 1980s, there was no limit on the number of months of SPS payments. In the 1980s, as part of the labor reforms implemented in the country, a limit of five months was established, which was increased in the 1990s to 11 months.

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<sup>5</sup> These workers have a special unemployment system.



## ***2.2 Unemployment Insurance: Financing, Eligibility, and Benefits***

In 2002 Chile introduced a new, innovative UI program that combined social insurance, upon establishment of the Common/Solidarity Fund (UISF), with inter-temporal self-insurance, upon establishment of individual accounts (UIIA).

### ***2.2.1 Financing***

UI is funded by workers, employers, and the government. The amount contributed by workers and employers is a fraction of workers' wages and it depends on the type of contract. For permanent contracts, employees contribute 2.4 percent of their wages to the UI program. Out of this, 0.8 percent finances the UISF. The remaining 1.6 percent of wages goes to employees' individual accounts (UIIA). For these contracts, employers contribute an additional 0.6 percent to the UISF. For fixed-term contracts, employers contribute only 3 percent of wages to workers' individual accounts. Until 2009, there were no contributions to the UISF because fixed-term workers did not have the right to access the UISF.

Since the 2009 reforms, the employers' contribution has remained at 3 percent for fixed-term contracts. Only 2.8 percent goes to the worker's UIIA, and the remaining 0.2 percent goes to the UISF. The larger contribution to the UISF for permanent workers vis-à-vis fixed-term is justified by their higher benefits. There is no change in the contribution schedule for permanent workers.

The maximum period of uninterrupted contributions set by law is 11 years, after which neither employers nor workers are obliged to contribute. All monthly contributions are top-coded when the wage reaches 90 UF<sup>6</sup> (accounts are indexed to the Consumer Price Index, CPI), around US\$4,200. Funds in the UIIA are transferred to individual pension fund accounts after retirement.

The government contribution to the UISF is around \$US14 million per year, fixed in real terms.<sup>7</sup> The UI's total funds have been growing at an average of 71 percent per year in the last six years.

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<sup>6</sup> The Unidad de Fomento (UF) is an inflation-indexed unit of account.

<sup>7</sup> Regulated by law 19.728.

### *2.2.2. Access Requirements*

To access funds in the UIIA, workers with fixed-term contracts must have six months of continuous or discontinuous contributions from the moment they became affiliated or from the last time benefits were requested and granted. Workers with permanent contracts must have 12 month of continuous or discontinuous contributions from the moment they became affiliated or from the last time benefits were requested and granted. These conditions for accessing the UIIA did not change with the 2009 reform.

Before 2009, workers with fixed-term contracts did not have access to the UISF. To access the UISF, permanent workers were required to have 12 months of continuous contribution to the system. After the reform, workers with fixed-term contracts were allowed to access the UISF, and the contributions requirements were relaxed. Workers with fixed-term or permanent contracts had to have at least 12 months of continuous or discontinuous contributions over the previous 24 months, from the moment they became affiliated or from the last time benefits were requested and granted. The last three contributions had to be continuous with the same employer. To receive each monthly benefit payment from the UISF, workers must go to the Office of Labor Information at the municipal level and declare that they are still unemployed.

### *2.2.3 Benefits*

Unemployment insurance benefits are related to the amount of time that workers contribute to the system, the type of employment contract, and the cause of their unemployment. Permanent workers applying only to their UIIA, either because they do not fulfill requirements for accessing the UISF or simply because they want to do so, can withdraw from their individual accounts available monthly payments with replacement rates of 50, 45, 40, 35 and 30 percent of their average gross wage calculated over the last 12 contributions. After the fifth month, they can withdraw all remaining funds.

If workers meet the access requirements, they can choose the UISF. To reduce moral hazard, workers can access the UISF only twice every five years. Benefits are first financed with the resources accumulated in the worker's UIIA, and then with UISF resources, in case the money in the UIIA is not enough to cover guaranteed benefits. Workers with permanent contracts are entitled to up to five monthly payments with replacement rates of 50, 45, 40, 35 and

30 percent of their average gross wage calculated over the last 12 contributions. These benefits have a lower and upper limit (see Table 1).<sup>8</sup>

Workers with previous fixed-term contracts that fulfill the conditions can withdraw all of the funds in their individual accounts during the first month they are unemployed. After 2009, workers who fulfill conditions to access the solidarity fund are entitled to two payments with replacement rates of 35 and 30 percent, financed first from their UIIA and then from the UISF.<sup>9</sup>

Post-reform, in periods of high unemployment, i.e., when the monthly unemployment rate is one point higher than the average of the last four years, workers who exhausted the last month of their benefits from the UISF were entitled to two extra payments with a replacement rate of 25 percent.

### ***2.3 The 2009 Reform of the UI***

The UI was reformed in May 2009. The main changes were: i) increased UISF coverage, ii) increased benefits, and c) the addition of a framework for active labor market policies such as job placement services. To increase UISF coverage of permanent workers, the required monthly contribution was changed from 12 months of continuous contributions to 12 months of continuous or discontinuous contributions in the last 24 months, from a density of contributions of 100 to 50 percent. Access to the UISF was given to workers with fixed-term contracts. The lower and upper monthly benefit limits were increased (see Table 1), and two additional payments were created in case of high unemployment. Furthermore, the reform allowed a centralized online labor market intermediary financed by the UI, an information system, and some job preparation courses.

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<sup>8</sup> Benefits are adjusted annually, in February of each year, by two factors: the increase in the Consumer Price Index (CPI) of the National Institute of Statistics (NIS), and the increase in the real wage index of NIS, provided that the change is positive.

<sup>9</sup> Unemployed workers and their dependents who access either the UIIA or the UISF are also entitled to public health coverage. Furthermore, they continue to receive family allowances and they may receive benefits from training and employment agencies.

**Table 1. Upper and Lower Benefit Limit (2010 US\$)**

		50%	45%	40%	35%	30%	25%	25%	Max. 5 month	Mean monthly
Oct 2002 - Jan 2004	Min.	240	216	192	168	144	-	-	962	192
	Max.	125	104	88	74	58	-	-	449	90
FCS (Feb 2004 - Jan 2005)	Min.	243	219	194	170	146	-	-	972	194
	Max.	126	105	89	75	58	-	-	454	91
FCS (Feb 2005 - Jan. 2006)	Min.	249	224	199	174	149	-	-	995	199
	Max.	129	108	92	77	60	-	-	465	93
FCS (Feb 2006 - Jan. 2007)	Min.	258	232	206	181	155	-	-	1,032	206
	Max.	134	111	95	79	62	-	-	482	96
FCS (Feb 2007 - Jan 2008)	Min.	285	257	228	200	171	-	-	1,141	228
	Max.	148	123	105	88	68	-	-	533	107
FCS (Feb 2009 - May 2009)	Min.	306	275	244	214	183	-	-	1,222	244
	Max.	159	132	112	94	73	-	-	571	114
FCS-CIC (May 2009)	Min.	365	329	292	256	219	183	183	1,827	261
	Max.	169	140	123	108	92	77	77	787	112

*Note:* Upper and lower benefit limit for UISF.

*Source:* Authors' calculations.

Table 2 presents the 2009 changes in term of coverage and benefits. In the empirical part, we use changes in access requirement and in benefits—two additional months of benefits in case of high unemployment—to study the effect of unemployment benefits on the search effort.

**Table 2. Unemployment Insurance: 2009 Reform**

	Permanent Workers	Fixed-term
Access to Solidarity Fund UISF	<b>Post-reform:</b> 12 continuous or discontinuous contributions in the previous 24 months, and the previous three contributions to the same employer. -Five decreasing payments starting with a replacement rate of 50% of gross wage and ending in 25%. Two additional payments of 25% in case of high unemployment.	<b>Post-reform:</b> 12 continuous or discontinuous contributions in the previous 24 months, and the last three contributions to the same employer. - Two payment equivalent to 30% of gross wage. Two additional payments of 25% in case of high unemployment
Benefits	-Real term increase on the maximum and minimum payments.  <b>Pre reform:</b> 12 continuous contributions. -Only five decreasing payments.	<b>Pre-reform:</b> No access.

**Table 2., continued**

	Permanent Workers	Fixed-term
Access to the Individual Account (UIIA) Benefit	<b>Post- and Pre-reform:</b> 12 continuous or discontinuous contributions  Payment equivalent to the five payments described for permanent employer.	<b>Post- and Pre-reform:</b> 12 continuous or discontinuous contributions  Workers can take all the money from their currents

The two additional payments were available throughout the country between July and December 2009. The earthquake of February 27, 2010 triggered two additional UI payments of UI in six regions (Regions V to IX plus the Metropolitan Area) which account for 80 percent of total employment in Chile.

#### ***2.4 Coverage of the Unemployment Insurance System***

In December 2010, there were 6,706,752 people affiliated with the UI. Most of the affiliation was compulsory and only 2 percent affiliated voluntarily. Around 50 percent of those affiliated contributed monthly to the UI. In December 2010, 3,601,324 people contributed to the UI, 36 percent of whom were workers with fixed-term contracts and 64 percent of whom had permanent contracts.<sup>10</sup>

Data from UI coverage, measured by the number of workers contributing as a percentage of the total number of workers, indicates that about 48 percent of formal and informal workers contribute to the system. Among private sector workers who are entitled to affiliate with UI, however, 75 percent contribute to the system. Table 3 shows the number of workers contributing to the unemployment insurance system between 2002 and 2009 by gender and type of labor contract. Around 63 percent of permanent workers contributing to the UI system are men. The percentage for temporary workers is 69 percent.

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<sup>10</sup> According to CASEN (2006), 66 percent of workers with a contract have a permanent contract.

**Table 3. Contributors to the Unemployment Insurance System**

Year	Average Monthly Contribution to the UI					
	Permanent Contract		Fixed-term Contract		Total	
	Men	Women	Men	Women	Men	Women
2004	416,276	204,327	566,244	206,939	982,52	411,266
2005	633,143	325,224	687,722	251,838	1,320,865	577,061
2006	790,088	426,341	765,522	294,209	1,555,610	720,549
2007	931,386	525,572	843,433	343,658	1,774,818	869,23
2008	1,053,491	616,531	907,755	381,013	1,961,246	997,544
2009	1,219,689	719,381	755,986	344,315	1,975,676	1,063,696
2010	1,335,604	791,921	798,779	38,742	2,134,218	1,179,507

*Source:* Superintendencia de Pensiones (SUPEN).

*Note:* The information for gender is missing in around 5 percent of the data. We impute the gender for this group of contributors in the same proportion as data that include gender.

In 2009, because of the international financial crisis, the number of workers with temporary contracts fell by 14 percent, although the number of contributors with permanent contracts increased by 16 percent. The data show that temporary workers absorbed the entire employment adjustment during this crisis.

The UI awarded a total of 8.1 million benefits between 2002 and December 2010, 54 percent to short-term workers and 69 percent to men. Of those paid for permanent contracts, 82 percent had no right to access the UISF. Among those who had the right to access the USIF, 55 percent chose to do so. In 2010, the average number of benefits paid represented 25 percent of total unemployed workers each month.<sup>11</sup>

Of the 4.8 million beneficiaries between October 2002 and March 2010, 80 percent received one payment, 10 percent two payments, and 3.2 percent received five payments. Before the 2009 reform, more than 90 percent of those who claimed benefits only qualified for the UIIA. After the reform, this group decreased by around 10 percentage points.

What is more, not every individual who qualifies to use the UISF ends up using it. For example, in 2010, of those who qualified to use the UISF, around 43 percent of workers did so. Those with permanent contracts used the UISF more than workers with fixed-term contracts, and women used it more than men.

<sup>11</sup> We do not consider people who are looking for work for the first time.

In Table 4 we show the average replacement rate for the first month in UI. For men who qualified to use the UISF, the replacement rate was 36.9 percent for those who did not use it and only used their UIIA, and it was 46.7 percent for those who decided to use the UISF.<sup>12</sup> Of those who could only access their UIIA, the replacement rate for their first payment was 36.5 percent for fixed-term workers, and 35.8 percent for permanent workers. These replacement rates were lower for women.

**Table 4. Replacement Rate of First Payment**

Sex	Common Fund		Individual Account	
	Use	Not Use	Fixed-term	Permanent
Men	46.7	36.9	36.5	35.8
Women	46.2	39.6	32.5	34.3

*Source:* Authors' calculation from UI individual data.

### 3. Literature Review

There is a large body of literature measuring the effect of UI benefits on the duration of unemployment. The work of Meyer (2002), Card and Levine (2000), Carling et al. (2000), Lalive and Zweimuller (2004), Lalive (2007), and Van Ours and Vodopivec (2006) shows that, on average, a 10 percent increase in benefits raises the duration of unemployment by approximately 5 percent. The extension of benefits, which some of the UI reforms have pursued, also increases unemployment duration. For every week of potential benefit extension, unemployment duration increases between 0.5 and 1 day, see Meyer (2002). Furthermore, Cullen and Gruber (2000) find that expanded UI benefits have other effects, such as a reduced spouse/partner labor supply.

These studies are of UI systems that operate as pay-as-you-go systems. Little evidence exists on the effect of UI benefits based on individual accounts (e.g., the UIIA in Chile). The only exception is Reyes et al. (2010). These authors are interested in determining if UIIAs are “better” in terms of reemployment rates compared with traditional pay-as-you-go systems. Studying the UI system in Chile, they compare the reemployment rates of unemployed workers using only their individual accounts to those using the UISF. These authors claim that among beneficiaries not using the UISF “...the amount of accumulation on their UIIA will not affect their exit rate from unemployment, nor will their time pattern of exit from unemployment be

<sup>12</sup> By law, the replacement rate for workers with permanent contracts who use the UISF should be 50 percent the first month. The lower replacement reflects measurement error on wage data.

affected by the payment of unemployment benefits, as the costs of unemployment benefits are completely internalized.” Their results confirm these predictions. Among those who use the UISF, the higher their accumulations are in their UIIA, or number of potential withdraws, the faster workers exit from unemployment. This result implies that moral hazard is the main driving force underlying the adverse effects on unemployment duration estimated previously in pay-as-you-go systems. Moreover, they show that the greater the amount that workers have accumulated in their individual accounts (UIIA), the greater the probability of finding a job for those who use the UISF. Among those who do not use the UISF, accumulations in the UIIA do not affect the probability of finding a job. According to the authors, this finding implies that workers value their funds in the UIIA, and therefore as long as most of the UI benefits are paid from the UIIA there are strong incentives to find a new job, i.e., no moral hazard.

Reyes et al. (2010) address the selection problem that arises from claiming benefits from the UISF by comparing the unobservable of those who claim and those who do not claim these benefits. They contend that differences in the distributions of unobserved heterogeneity among workers are a sign of selection bias. They find no difference in these distributions for men, but important differences among women. Therefore, it seems that selectivity could be an issue for women, but not for men.

Another potential shortcoming of the Reyes et al. (2010) study is that it covers only individuals during the first five years in the UI system. Because the system was still in transition, their sample may not be representative of all workers. Our study covers a longer period—through March 2011—and therefore we study the system when the transition was already finished.

Our paper examines the effect that an increase and expansion of UI benefits has on the reemployment rates of recipients in Chile. We are the first study to look at this effect on i) unemployed workers whose previous job was a fixed-term employment contract and ii) the possible impacts of severance payments on unemployment transitions.<sup>13</sup>

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<sup>13</sup> Reyes et al. (2010) only study indefinite contract employees.



## 4. Description of Data

Our study examines contributions to the Chilean UI system and benefits paid to unemployed workers, both from administrative records. We selected random samples of males and females who contributed to the system at least once between November 2002 and March 2011 (2002m11 to 2011m3). This gave us a sample with an average of 865,000 men and 557,000 women. For these individuals, in addition to their records of contributions from wages and benefits,<sup>14</sup> we have information on marital status, age, educational attainment, and their pre-unemployment employer. We did not use data before January 2007 to avoid the system's transition period.<sup>15</sup> Tables 11 and 12 provide summary statistics of the whole sample by sex.

This paper defines three education levels and five cohorts of workers: primary and incomplete secondary education (Gedu=0), complete secondary and incomplete tertiary education (Gedu=1) and, complete tertiary education (Gedu=2), employees born before and during the 1940s, the 1950s, the 1960s, the 1970s, and workers born during the 1980s or later years.

The characteristics of the sample do not differ between men and women. Men represent 66 percent of the whole sample. In terms of permanent and fixed-term contracts, women represent around 35 percent of employees. The same is true for benefits paid. Men present 72 percent of workers with less than secondary education and 57 percent of those with tertiary education, and 73 percent of workers born in the 1940s, but only 64 percent of those born since the 1980s.

Focusing on workers flows, Table 5 shows that flows from unemployment to formal employment are slightly higher than from formal employment to unemployment,<sup>16</sup> but the latter shows a large standard deviation. As standard deviations show, the level of employment is driven mainly by changes in the employment-unemployment flow. Workers with fixed contracts present much higher flows than employees with permanent contracts. Women present higher flows than men, although this is not reported.

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<sup>14</sup> Contribution wage is equal to fixed and variable monthly wage plus bonuses up to a maximum of 90UF (US\$4,200). It does not include transport, lunch and other vouchers.

<sup>15</sup> Although we use data before 2007m1 to compute contribution density for workers who lost their job after 2007m1.

<sup>16</sup> The paper uses formal employment and employment indistinguishably. The same is true for unemployment, informal job and out of the labor force.

**Table 5. Description of Data**

Period	All Workers		Men		Fixed-term	
	Mean [Unit]	Stdev. [Unit]	Mean [%]	Stdev. [%]	Mean [%]	Stdev. [%]
2007m1-2011m3	864532	78815	64%	1.2%	37%	3%
Pre-crisis (<2008m7)	789692	47076	66%	0.6%	40%	2%
Post-Crisis	915081	52557	64%	0.7%	35%	2%

Flows	All Workers		Fixed Term	Permanent Contract		
	Mean	Stdev.	Mean	Stdev.	Mean	Stdev.
E → U	0.065	0.012	0.122	0.024	0.035	0.004
E → E	0.030	0.005	0.055	0.007	0.018	0.003
U → E	0.073	0.009	0.156	0.018	0.027	0.004

*Note:* E and U: employment and unemployment-out of the labor force, respectively. E → E: Flow from one job to another. Flows are percentage of total contributors to the system.

*Source:* Authors' calculations using UI data.

To identify changes in workers' behavior due to the 2009 UI reforms, we divided the sample into two subsamples. The first one, between 2007m1 and 2009m6, is the pre-reform period that was characterized by a booming economy first and then by the international financial crisis.<sup>17</sup> The second period, 2009m7 through 2011m3, is characterized by the economic recovery and implementation of the May 2009 reform to the UI system (Table 6).

The employment rate increased during the first months and started to fall after the financial crisis at the end of 2008.<sup>18</sup> The share of employees with fixed-term contracts fell from 40 to 35 percent between the pre- and post-2009 reform periods. These results are driven mainly by the business cycle. In terms of benefit and application rate, the number of benefits paid increased from 3.9 percent to 4.3 percent of employed workers between the pre- and post-reform period. The number of applications does not differ between the two periods. This implies that the

<sup>17</sup> In July 2009 the UI started paying the new benefits.

<sup>18</sup> Employment rates are higher than national figures because the dataset follows people who work at least one month during the period 2007m1 and 2011m3. This is because our data include the transition process and, more importantly, because they include the formalization process in Chilean labor market. Our sample moves one-to-one with the number of contributors to the pension system.

number of benefits paid per applications increased, reflecting a tighter labor market and an increase in the number of benefits paid by the UI system.

**Table 6. Summary Statistics by Sub-Periods**

Period	All Workers		Benefit		Application	
	Mean [Unit]	Std. [Unit]	Mean [%]	Std. [%]	Mean [%]	Std. [%]
2007m1-2011m3	864.532	78.815	4.1%	1.0%	2.2%	0.6%
Pre-crisis	789.692	47.076	3.9%	0.6%	2.4%	0.3%
Post-Crisis	915.081	52.557	4.3%	1.1%	2.0%	0.7%

*Note:* Averages for pre and post crises include 2007m1-2008m7 and 2008m8-2011m3, respectively.

*Source:* Authors' calculations using UI data.

#### **4.1 Empirical Strategy**

The main aim of this paper is to study how the UI system affects job search behavior in Chile. The analysis focuses on the pre- and post-2009 reform periods. There are two sub-periods after the 2009 reform. Between July 2009 and September 2010 the UISF was paying two additional payments due to the high level of unemployment first and then due to the 2010 earthquake.

UI implies that unemployed workers differ in two dimensions. First, unemployed workers differ as to whether they have the right to use the UI system (UIIA and/or UISF), and therefore as to whether they have access to the monetary benefit of the insurance scheme. This results in an income effect that allows higher consumption during the job searching period. Second, unemployed workers with access to the UI system differ as to whether they use the UISF in addition to their UIIA. Some workers use the UISF. Others do not use it either because they are not entitled to it or because they choose not to use it.<sup>19</sup>

Compared to workers who only have access to their UIIA, workers who use the UISF have disincentives to find a job. Workers who must rely on their UIIA stand to lose more from being unemployed since they generally receive less in benefits, and they internalize higher costs of being unemployed because they use money from their individual accounts. Accordingly, unemployed workers who have access only to their UIIA have an incentive to search harder for a new job.

<sup>19</sup> See Berstein et al., 2007.

There are also other incentives that affect job search behavior. Workers who use the UISF draw decreasing benefits for a maximum of five months, or seven in case of a high unemployment rate. This will introduce non-stationarity in their job search behavior vis-à-vis workers who do not use UISF. As the expiration date of benefits approaches, unemployed workers may increase the intensity of their job search compared to workers who do not access the UISF, a moral hazard issue. This effect is softened due to the decreasing payment schedule, from 50 percent replacement to 30 percent, or 25 percent in case of high national unemployment. Workers who do not use the UISF, and who value their money in their UIIA will not have this incentive to increase their job search effort once the unemployment benefits diminish.

It is important to note that unemployed workers with access to the UI system may decide not to use it. In addition, some workers who apply for UI only use their UIIA—even though they have access to the UISF. This creates a selection problem. Workers opting not to use UI benefits may have better access to new jobs. Therefore, they do not often need the UI system.

It is important to identify the moral hazard and selection effects. In the case of a selection problem, there is a redistribution effect between taxpayers and unemployed workers<sup>20</sup> but no increase in unemployment. If workers reduce their search effort, the result will be an increase in unemployment.

#### ***4.2 The Construction of the Control Group***

In our empirical analysis there are two sets of results that came from different datasets. First, we used only workers who claimed benefits before or after the 2009 reform. For these results, we distinguished between three groups of unemployed workers who claimed benefits: those who only had the right to use their UIIA, those who had the right to use the UISF but only asked for their UIIA, and those who accessed the UISF. The second set of results used all workers who had lost their jobs before or after 2009, and distinguished three groups of unemployed workers according to their contribution density: those without the contribution density required to access UI, those with the contribution density required to access their UIIA, and those with the contribution density required to access the UISF before and/or after the reform.

For the first set of results, we compared the unemployment duration of individuals who started claiming benefits from the UISF before and after the reform. This comparison, however,

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<sup>20</sup> In Chile, we should also add taxpaying workers/employers who contribute to the UISF.

does not take labor market conditions into account. For this purpose we used for the control group those individuals who accessed their UIIA, and whose previous employment duration was similar to those who accessed the UISF, although we controlled for tenure. For this control group, the conditions required to access their funds in the UIIA did not change with the 2009 reform. To account for self-selection issues, we distinguished between workers who used UIIA and those who had the right to access the UISF but decided not to use it. We found strong evidence of self-selection among workers.

We argue that, after controlling for tenure, workers who applied for their UIIA were a good control group for workers who applied for UISF. One can argue that the treatment and control groups are different, because the first group is composed only of individuals who were fired from their jobs, while the individuals in the control group either quit or were fired. The difference between being fired and quitting is that being fired leads to unexpected unemployment, while quitting does not. Therefore unemployment duration could be different, even when controlling for the level of benefits, wages, and previous employment duration, i.e., tenure. For our results, however, it is only important that this difference does not change before and after the reform. In econometric terms, we are running a difference-in-difference-in-difference exercise. The first difference is the one between workers who used their UIIA and those who used the UISF, and the second difference is before and after the reform.

We split the sample between fixed-term contract and permanent contract workers. After the 2009 reform, these two groups had the same rules for accessing the UISF, while before 2009 fixed-term contract workers did not have the right to access the UISSF. To the best of our knowledge, we are the first to separately analyze both types of workers. This has implications for public policy because the number of fixed-term workers is increasing in the labor market.

In our second set of results, we compared the unemployment duration of those individuals who lost their jobs before and after the 2009 reform. Among these workers we compared workers lacking the required contribution density to access UI benefits, those who had contribution density to access their UIIA, and those who had the required contribution to access the UISF. We are not comparing workers who used UI, but we are comparing workers with a different contribution density required to access UI benefits. This stratification reduces selection issues, although it does not include the decision to claim benefits. We also split the sample among fixed-term and permanent contract workers.

### 4.3 Methodology

We studied transitions from unemployment to employment using a hazard rate model. In the analysis of the unemployment spells, depending on the specification, we distinguish between different groups of workers who we indicate with a subscript  $j$ . Following Reyes et al. (2010), in our first set of results these groups are: i) workers who use the UI system and only have the right to access their UIIA, ii) workers who have the right to access the UISF but only use their UIIA and (iii) workers who access the UISF.

Our second set of results distinguishes among: i) workers without the required contribution density to access the UI, ii) workers with the contribution density required to access only the UIIA and iii) workers with the contribution density to access the UISF. We split this subset in three.<sup>21</sup>

The 2009 reform changed the UISF's benefit and access requirements. We use this change as our preferred specification to estimate the effect of unemployment benefits on worker behavior.

We model the hazard rate ( $\theta$ ), the probability of finding a job, as:

$$\theta_{ij}(\tau | x_{ijt}) = \lambda_j(\tau) \exp(x_{ijt}' \beta_j^1 + z_t' \beta_j^1) \quad (1)$$

where  $\lambda$  represents the individual duration dependence. It may differ across different types of unemployed workers  $j$  depending on the specification. The variable  $x$  represents unemployed workers' characteristics, i.e., gender, age, marital status, education, tenure in previous job, etc., and  $z$  represents time-varying labor market characteristics, i.e., UI benefits and access requirements, unemployment rates, seasons-months, etc. In our specifications we assume a non-parametric function for  $\lambda$ . In particular we use the Cox model and we do so in most specifications with strata to allow for complete and not parametric duration dependence for each  $j$ -type of workers. The Cox model does not compute individual duration dependence; it only computes the beta coefficients.

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<sup>21</sup> Data for applications and right to use the UISF come from a different dataset than worker-employer contributions to the system. For the first set of results, we used mainly the application dataset, and for the second the contribution dataset.

## 5. Results

We divided our results into two sets. First, we focused only on workers who accessed the UI system once they became unemployed. In this first set of results, we distinguished between workers with previous permanent and fixed-term contracts. Second, we focused on all workers who, loosely speaking, lost their jobs. We also distinguished between different types of contracts.

### 5.1 Unemployed Workers Who Access the UI System

#### 5.1.1 Workers with Previous Permanent Contracts

Following Reyes et al. (2010), we first focused on unemployed workers with previous permanent work who accessed the UI system (Tables 7 and 8 and Figure 1). We present the hazard rate estimations using the Cox semi-parametric model controlling for seasonality by using monthly dummies and previous tenure using dummies, although the latter is not reported.

For the subsample of workers with previous permanent contracts, the share of applications from workers *without* the right to use the UISF fell from 75.8 percent to 66.9 percent between the pre- and post-reform period (Table 7). The use of the UISF increased from 15.8 percent to 23.3 percent. This may be due to an increase in the number of workers fired due to economic reasons who therefore had the right to access the UISF (to have the required density of contribution), or due to the 2009 reform, which relaxed the contribution density to access the UISF. To disentangle these two effects, we controlled for the change in benefits and access requirement to the UI system and for the aggregate monthly unemployment level.

**Table 7. Number of Applications from Permanent Contract Workers to the UI System, Period 2007m1 – 2011m3**

	Wo/ UISF Right		W/ UISF Right		Total
	Wo/SF	W/SF	Wo/SF	W/SF	
Pre-Reform	772,957		85,669	160,849	1,019,475
	75.82%		8.40%	15.78%	48.67%
Post-Reform	719,410		104,774	250,942	1,075,126
	66.91%		9.75%	23.34%	51.33%

*Note:* W/UISF Right: unemployed workers with right to access the SF. W/UISF unemployed workers using the UISF.

*Source:* Authors' calculations using UI data.

Reyes et al. (2010) show that unemployment benefit schemes change the duration dependence. In Figures 1a and b, we showed the unconditional hazard rate for unemployed workers, which we split among those with the right to access only their UIIA, those with the right to use the UISF but who did not take it (UISFd), and those who took the UISF. In Figure 5a) and 5b) we graph hazard rates before and after the 2009 reform. In both periods, workers lacking the right to access the UISF and those who had the right but did not use it share a similar hazard-rate shape, although the latter is slightly higher. Workers who took the UISF present a completely different hazard shape. As long as unemployment benefits are still in place, the hazard rate for UISF is considerably lower than the hazard for UISFd and UIIA. As theory predicts, this difference falls as long as the benefit is falling, i.e., a 50 percent replacement rate for the first period and 25 percent for the fifth month. During the post-reform period (Figure 5b), the differences between hazard rates last longer. Post-2009m6, UISF benefits were increased by two months (from five to seven).

From these figures we have five conclusions to take into account in the econometric exercise. First, it is important to allow for different individual duration dependence ( $\lambda(\tau)$ ) for these three groups. Second, unemployed workers who use the UISF show a lower hazard rate than those with the right to decide not to take the UISF. This difference falls as long as unemployment benefits fall over time. It vanishes once benefits end. Third, from the pre- to post-reform period, the difference in hazard rate between unemployed workers who do or do not use the UISF lasts two more months, the same as the monthly increase in UISF benefits. Fourth, unemployed workers with the right to access the UISF but who only use their UIIA present a higher hazard rate than those workers with only the right to access their UIIA. This result suggests a selection bias. Workers who decide to use the UISF seem to have less of an incentive to quickly find a job vis-à-vis those who decide not to take the UISF. Fifth, the selection issue seems to be larger in the post-reform period, when benefits increased.

Now we move to the econometric exercise. The first column in Table 8 assumes there is a unique non-parametric functional form for the hazard rate (unique  $\lambda(\tau)$ ) for all types of unemployed workers and for the whole period. It controls for marital status, gender, and age (using cohorts), education and national unemployment rate at the moment of application to UI, and seasonal effects, (using monthly dummies—not reported), tenure (using a dummy per year



until 20 or more years—not reported), post-reform dummy, and measures of whether workers have the right to use the UISF, and whether they do so or not.

**Table 8. Hazard Rate for Worker with Previous Permanent Contract  
Period 2008m1-2011m3**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Men	0.432 (98.84)***	0.428 (97.67)***	0.424 (97.05)***	0.424 (97.05)***	0.429 (98.25)***	0.428 (98.13)***	0.428 (98.15)***
Married	0.030 (6.72)***	0.024 (5.30)***	0.022 (4.91)***	0.022 (4.89)***	0.028 (6.35)***	0.028 (6.35)***	0.028 (6.35)***
Primary Edu.	0.160 (22.59)***				0.158 (22.56)***	0.159 (22.70)***	0.159 (22.64)***
Secondary Edu.	0.104 (15.49)***				0.102 (15.45)***	0.102 (15.43)***	0.102 (15.39)***
Previous Rel. Wage (ln)		0.067 (22.42)***	0.069 (23.17)***	0.069 (23.19)***			
Cohort 40s	-0.837 (43.72)***	-0.819 (42.74)***	-0.820 (43.01)***	-0.821 (43.05)***	-0.839 (44.01)***	-0.838 (43.98)***	-0.838 (43.97)***
Cohort 50s	-0.288 (35.94)***	-0.286 (35.74)***	-0.287 (36.12)***	-0.288 (36.18)***	-0.290 (36.34)***	-0.290 (36.33)***	-0.289 (36.28)***
Cohort 60s	-0.110 (18.77)***	-0.117 (20.02)***	-0.119 (20.40)***	-0.119 (20.46)***	-0.112 (19.16)***	-0.112 (19.16)***	-0.111 (19.11)***
Cohort 70s	-0.052 (10.53)***	-0.073 (14.80)***	-0.073 (14.97)***	-0.074 (15.05)***	-0.052 (10.68)***	-0.052 (10.69)***	-0.052 (10.65)***
Unemployment	-0.055 (34.49)***	-0.056 (34.89)***	-0.052 (32.33)***	-0.058 (30.66)***	-0.057 (30.08)***	-0.056 (29.85)***	-0.057 (29.86)***
Contribution Req. to access UISF (Post Ref Rules)	-0.013 (1.35)	-0.028 (2.90)***	-0.025 (2.64)***	-0.025 (2.64)***	-0.010 (1.01)	-0.009 (1.00)	-0.013 (1.35)
Right to access UISF	0.184 (28.86)***	0.177 (27.63)***					
Use of UISF	-0.444 (60.04)***	-0.417 (55.94)***					
Post Reform			0.012 (2.42)**	-0.021 (2.90)***	-0.016 (2.21)**	-0.018 (2.39)**	-0.018 (2.41)**
Right to access UISF x Post Reform			0.021 (1.66)*				
Use of UISF x Post Reform			-0.029 (1.79)*				
Post Reform 2 extra month				0.048 (5.89)***	0.045 (5.54)***	0.046 (5.60)***	0.046 (5.61)***
Right to access UISF x Post Reform 2 extra month				0.031 (2.47)**	0.032 (2.59)***	-0.014 (1.27)	-0.014 (1.31)
Use of UISF x Post Reform 2 extra month				-0.089 (5.75)***	-0.087 (5.65)***		
Prev. Tenure ≥ 12 months x Right to access SF							-0.052 (3.29)***
Prev. Tenure ≥ 18 months x Right to access SF							0.027 (2.34)**
U spells 1 x Post Reform						-0.078 (2.30)**	-0.078 (2.30)**
U spells 2 and 3 x Post Reform						-0.009 (0.39)	-0.010 (0.40)
U spells 4 and 5 x Post Reform						-0.086 (3.22)***	-0.086 (3.23)***
U spells 6 and 7 x Post Reform						0.031 (0.76)	0.031 (0.75)
U spells 8 and 9 x Post Reform						0.042 (1.19)	0.041 (1.17)
U spells 10 and 11 x Post Reform						0.045 (1.00)	0.044 (0.99)
U spells 12 and more x Post Reform						0.220 (7.15)***	0.219 (7.14)***
U spells 6 and 7 x Post Reform 2 extra month						-0.150 (3.81)***	-0.150 (3.81)***
Observations	1855756	1855756	1855756	1855756	1855756	1855756	1855756
Strata	None		Three groups: Use of UIIA, Right to UISF, and Use of UISF				

Robust z statistics in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

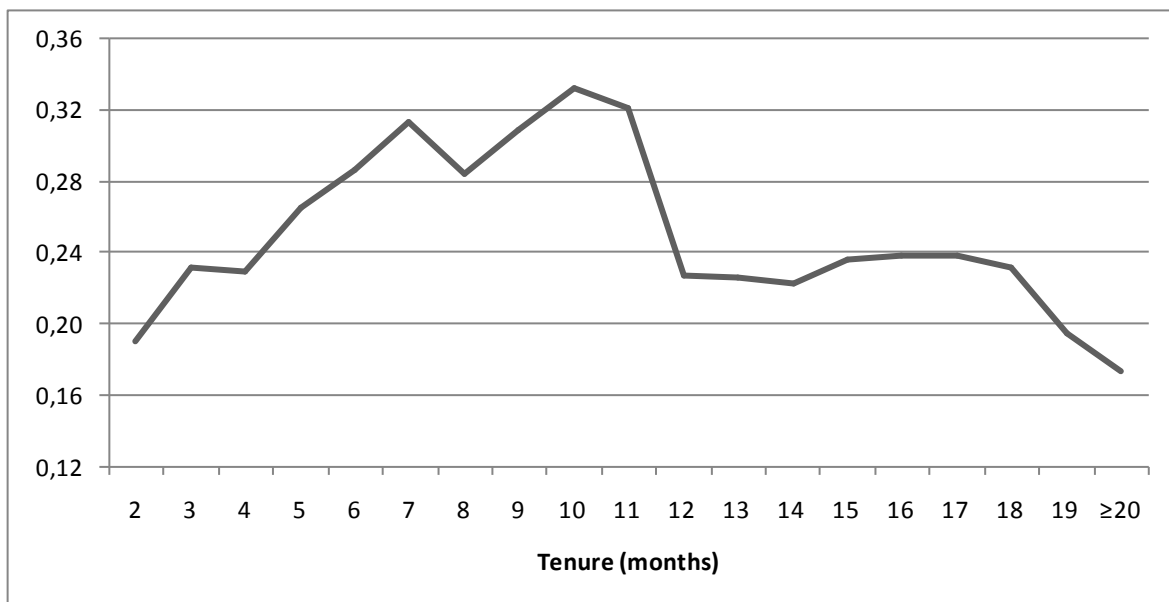
All regressions include dummies for the number of months of previous tenure (20 dummies – last is 20 or more months), and dummies for each month of the year. *Contribution Req. to access UISF (post reform)* has a value of 1 when the contribution density fulfills the contribution condition under the post-reform rules (regardless of whether the unemployment occurred before or after the reform). When we use the three strata to compute the Cox Model, we do not have to include the main effect of UIIA, Right to UISF, or Use of UISF because they are collinear the strata groups.

Results from Table 8 indicate that unemployment spells for men are shorter than for women (Coef. Men). Their hazard rate is 54 percent higher on average.<sup>22,23</sup> Since male wages generally provide the main household income, men cannot bear a long period of unemployment. The opposite is true for single workers whose hazard rate is 3 percent lower (Coef. Married).

Skilled workers with more education have a lower hazard rate. For example, compared to employees with tertiary education, the omitted group, workers with only secondary education present an 11 percent higher hazard rate (Coef. Secondary Edu.). This may reflect two issues. First, for specialized workers with higher human capital, the matching process takes longer. Second, skilled workers may have more savings to endure periods of unemployment. Column 2 controls for previous wage (ln) instead of education as proxy for human capital.

There is a monotonic and negative relationship between hazard rates and age. Workers from older cohorts have a lower probability of leaving unemployment. For example, compared with workers born during the 1980s or later (omitted group), employees from the 1970s have a hazard rate that is 5 percent lower (Coef. Cohort 70s). Using age as a proxy for worker experience, this result implies that workers with more experience, controlling for education, face longer periods of unemployment.

**Figure 2. Hazard Rate and Tenure**



*Note:* Coefficient from tenure dummies not reported in Column (1) Table 8.

*Source:* Authors' calculations using UI data.

<sup>22</sup>  $\text{Exp}(0.43)-1=0.54$ .

<sup>23</sup> Reyes et al. (2010) find similar results.

Workers with different previous tenures experience different spells of unemployment. Figure 2 reports dummies' coefficients for different tenures not reported in Table 8 (column 1). We observe an increasing hazard rate with tenure during the first year, with a large fall in the hazard rate after 12 months of tenure. This fall could be explained by severance payment. After 12 months with the same employer, permanent workers who are fired for economic reasons have the right to receive a severance payment equivalent to one month's salary. Workers with 18 or more months with the employer have the right to two months' salary. We also see a fall in the hazard rate after 18 months. We test whether the average value of dummies for tenures between 2 and 11 months is higher than the average for tenures between 12 and 17 months. The difference is 0.05, and it is significant at 1 percent (not reported).

In column 7, we include two additional dummies. One is for 12 or more months of previous tenure related to "Right to access the UISF," and the other is similar for 18 months. To receive severance payments beside tenure, workers must be fired for economic reasons, which is the same condition required to access the UISF. Contrary to the results in Figure 2, the coefficient for these dummies provides mixed support for the idea that severance payments create a positive income effect that induces unemployed workers to search for jobs for longer periods; only the "12 or more months dummy" has the right negative sign.

The national unemployment rate has the expected effect on the hazard rate. An increase in unemployment reduces the hazard rate. Moving from the 25th (7.3 percent) to 75th percentile (9.1 percent) of monthly unemployment during the period reduces the hazard rate by 9.4 percent (Coef. Unemployment).<sup>24</sup>

Focusing on UI benefits, column 1 in Table 8 replicates previous results by Reyes et al. (2010) for Chile, although here we do not control for pre- and post-reform. Workers with access to the UISF who use it (Coef. Use of UISF) stay unemployed longer than those who do not. Their hazard rate is on average 36 percent lower than for workers who can only use their individual account (omitted group). For unemployed workers who have the right to use the UISF and decide not to use it, the hazard rate is 20 percent higher (Right to access UISF). These results reflect two issues. First, unemployed workers using the UISF have less incentive to leave their unemployed status because they want to take advantage of UI benefits (Coef. Use of UISF). Second, workers who decide to use the UISF know ex ante that they have a low probability of

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<sup>24</sup>  $\text{Exp}(-.0559 \times (9.1 - 7.3)) - 1 = -0.094$

finding a new job. The higher hazard rate for workers who do not take the UISF compared to workers who may only access their individual accounts, after controlling for tenure, supports the idea that there is an important selection issue (Coef. Right to access UISF).

Columns 1 and 2 in Table 8 assume that the individual duration dependence ( $(\lambda(\tau))$ ) is the same for all unemployed workers. Figure 1 does not support this assumption. Column 3 in Table 8 allows different and non-parametric duration dependence forms i) for workers who can only access their UIIA, ii) for workers who can access the UISF but do not do so, and iii) for the ones that use the UISF ( $\lambda_j(\tau)$ ).<sup>25</sup> This regression also controls for the 2009 reform (Coef. Post Reform, Coef. Right to access UISF \* Post Reform and Coef. Use of UISF \* Post Reform). The main UI benefits effects (Coef. Right to access UISF and Coef. Use of UISF) are captured by each of the three non-parametric duration dependences, which are not computed by the Cox method and therefore not reported. The 2009 reform increases UI benefits for those who use the UISF. It increases the benefit ceiling and the number of months that unemployed workers may access the UISF during high unemployment, which was the case from July 2009 until September 2010 (from 5 to 7 months).<sup>26</sup> The dummy “Post Reform” accounts for the whole period post July 2009, and “Post Reform 2 add. months” for the periods in which the UISF had two additional payments (by far the largest increase in UI benefit for permanent workers).

Variables that control for workers’ characteristics, such as gender and tenure, and for labor market conditions, remain almost the same. The reform dummy (Coef. Post Reform) has a negative coefficient, suggesting the Chilean business cycle control (national unemployment rate) is unable to capture the whole effect of the international financial crisis on the economy, and concomitantly workers’ job search behavior. Relative to workers who can only use their UIIA, employees that used the UISF after the reform presented an even lower hazard rate than workers who used the SF before the reform (-2.1 percent), significantly at 10 percent. This suggests either an increase in moral hazard or in the selection problem, or both, because of the increase in UI benefits. The positive coefficient for workers who do not use the UISF, 2.9 percent, confirms the selection hypothesis. During the sub-period July-2009 and September-2010, UISF benefits were higher; therefore moral hazard and adverse selection issues should be larger. Column 4 reports

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<sup>25</sup> Cox’s model with 3 strata.

<sup>26</sup> The additional two payments were available to unemployed workers in only 6 regions, although they represent 80 percent of total employment in Chile. Since we cannot identify the region in our dataset, we assume that all unemployed workers with UISF have right to these two additional payments.

the same exercise but the dummies “Right to access UISF” and “Use of UISF” are interacted with the “Post Reform 2 add. months” time dummy. As predicted, both effects are larger for this sub-period and they are highly significant. The new points estimates imply that the moral hazard reduces the hazard rate 9 percent and the adverse selection 3 percent. Column 5 reports the same exercise but controls for education instead of previous relative wage (ln). The coefficients that account for UI benefits post-reform are almost the same.

Figures 1 a) and b) suggest that the 2009 reform had a different effect on the hazard rate depending on the unemployment spell. Column 5 uses a non-parametric setup to study the effect of the 2009 reform on the duration dependence form. We include dummies for different unemployment spells (1, 2-3, 4-5, 6-7, 8-9, 10-11, 12, and more). For the 6-7 unemployment spells we include an additional interaction with the time dummy that accounts for the sub-period in which UISF benefits covers 7 instead of 5 months. The hazard rate is around 5 percent lower for the first 5 months of unemployment and significant. The dummies that control for the UI reforms after the fifth unemployment spell are not statistically different from 0, but the dummy that controls for unemployment spells 6-7 during the period in which the UISF benefits were extended from 5 to 7 months. These additional payments reduce the hazard rate by 15 percent. This result suggests that workers who used the UISF post-reform reduced their effort to find a job, compared to the pre-reform period, as long as they received payment from UI system (7 months).

For robustness, Column 7 includes dummies to account for an additional 12 and 18 months of tenure and right to access the UISF. These are additional controls for the severance payment effect.<sup>27</sup> As already mentioned, only the coefficient for 12 months or more has the right sign. Our main results for posterior unemployment benefits hold (coeffs. U spells x Post Reform/ Post Reform 2 add. months).

Summing up, the evidence from unemployed workers with previous permanent work that access the UI system post-2009 reform suggests: first, that the selection issue becomes more important. The extension of the number of payments supported by the UISF (from 5 to 7) and the benefit ceiling intensified self-selection between workers with good and bad chances to quickly

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<sup>27</sup> To have access to a severance payment, the worker has to be fired due to economic reasons. The same is true for accessing the UISF.

find a job. Second, workers who used the UISF post-reform presented a lower job search effort during the period they were receiving payments from the UISF.

### 5.2 Workers with Previous Fixed-Term Work

Figure 3 and Tables 9 and 10 focus on unemployed workers with previous fixed-term contracts who access the UI system.

**Table 9. Number of Fixed-Term Workers Applications to the UI System  
Period 2007m1 – 2011m3**

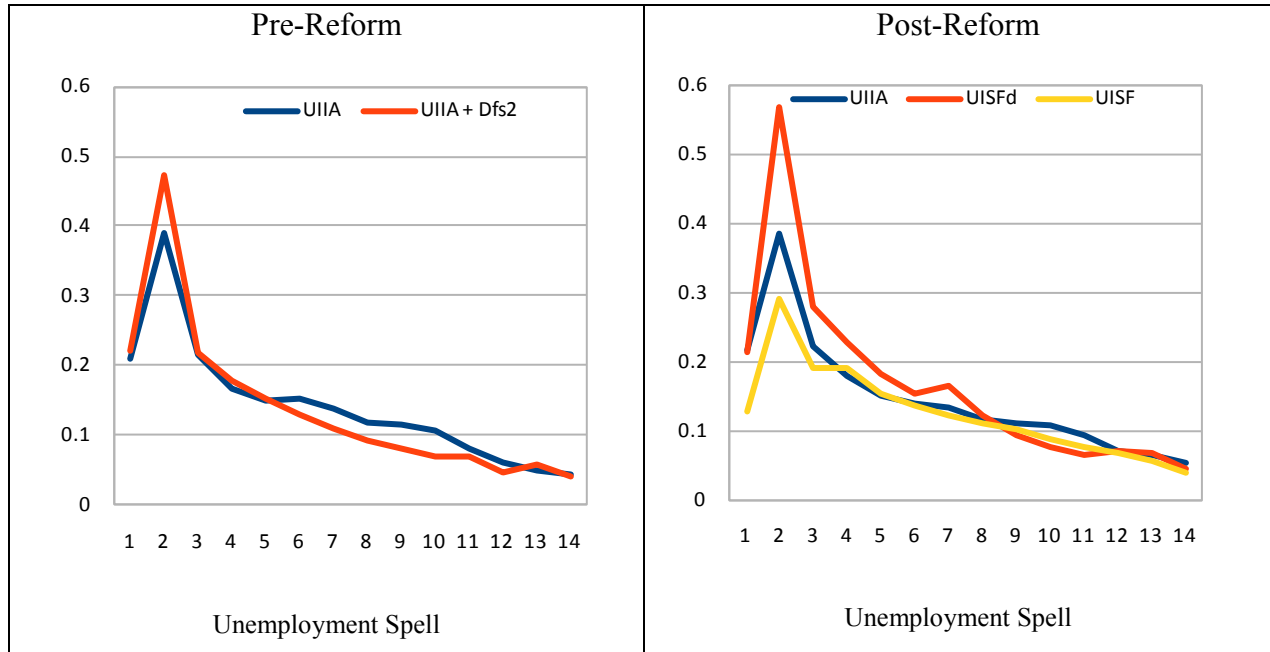
	Wo/ SF Right		W/ SF Right		Total
	Wo/SF	W/SF	Wo/SF	W/SF	
Pre-Crisis	1,425,861		2,640	3,344	1,431,845
	99.6%		0.2%	0.2%	57.5%
Post-Crisis	982,151		48,804	26,668	1,057,623
	92.9%		4.6%	2.5%	42.5%

*Source:* Authors' calculations using UI data.

For the subsample of workers with previous fixed-term contracts, the fraction of applicants with access to the SF increased to 8.1 percent during the post-reform period, but only 35 percent of them used it. The data shows there are some fixed-term contracts that had access to the UISF before the reform (0.4 percent). These are obvious measurement errors. In our estimations, we do not consider these observations.

Figure 3 shows the unconditional hazard rate for unemployed workers with the right to access only their UIIA, with the right to the UISF but who did not use it (UISFd), and those who took the UISF. Prior to the 2009 reform, fixed-term contract workers did not have access to the UISF. Therefore, for this period, we split the sample between the unemployed who have the required contribution density to access the UISF taking post-reform rules and those who do not. Figure 3a) shows that hazard rates are similar for these two groups of unemployed workers. Workers who have the required density to apply in the future to the SF show a slightly higher hazard rate. Focus on the post-reform period, Figure 3b) shows that unemployed workers with the right to use the SF have a higher hazard rate during the first months of unemployment. The opposite is true for workers who access the UISF. Once the UI benefits end, the hazard rate for these groups becomes almost the same.

**Figure 3. Unconditional Hazard Rate for UIIA, UISFd, UISF (Fixed-Term Contract)**



Source: Authors' calculations using UI data.

Note: UIIA, UISFd and UISF: unemployed workers who applied for the UI benefits, with only the right to access their IA, with the right to use the SF but who decided not to, and who used the SF, respectively.

Table 10 presents the hazard rate estimation using the Cox semi-parametric model controlling for seasonality using monthly dummies and tenure (not reported). All results, except for Columns 3-5, assume there is a unique non-parametric functional form for the hazard rate for the whole period.<sup>28</sup> It controls for marital status, gender, and age (using cohorts), education, national unemployment rate, and seasonal effect (using dummies for each month), tenure, post-reform period, whether unemployed workers have the right to use the SF and whether they do in fact use it.

The results for most controls are similar to those for permanent contracts. Unemployment spells for men are shorter than for women. The opposite is true for single workers. There is a negative relationship between the hazard rate and education, and a positive relationship with age/cohort. The unemployment rate reduces the hazard rate. The results for tenure are different, though not reported. This is not surprising, because for fixed-term contracts there is no severance payment involved.

<sup>28</sup> For workers with previous fixed-term contracts we cannot use the Cox model with Strata, as group access to the UISF because before the 2009 reform, these workers did not have right to use the UISF.

As for permanent contracts, in Column 1, the Coef. “Right to access SF” is positive (.107) and highly significant. Workers with the right to access the UISF but who do not use it each month have a 11.3 percent higher probability of exiting unemployment than do the unemployed with no right to access the UISF. Workers who use the UISF present a lower hazard rate than those who do not have the right to use it (-33 percent).<sup>29</sup>

In all models we controlled for the post-reform required density to access the UISF (Coef.Contr.Dens.to access UISF—Post-Ref. Rules), even though unemployment occurred during the pre-reform period. This dummy variable accounts for any non-observable correlated with contribution density before and after the 2009 reform. As Figure 3 suggests, the coefficient for this contribution density is positive and highly significant (Column 1). It suggests that workers with higher contribution density have better abilities or networks to quickly find a new job. Column 2 presents the same regression, controlling for prior relative wage instead of education. The results were not affected. Column 3 allows for a completely different form of duration dependence between workers who have the post-reform required contribution density to access the UISF (we use the Cox model with two strata). In this specification, the right to access UISF post-reform rules becomes redundant, and the results remain unchanged.<sup>30</sup>

As for permanent workers, between July 2009 and September 2010, the UISF covered two additional payments (4 instead of 2). Column 4 studies the differential effect of these additional payments on job search effort. As predicted by the theory, the adverse selection is higher during the period in which the UISF benefit is higher ( $0.62+0.115$ ). Points estimate imply that during the period in which the UISF covers 4 months the hazard rate is 19 percent higher for those workers who decide not to use the UISF even though they have the right to access it. This percentage is only 7 percent when the UISF covers 2 months. For workers who decide to take the UISF, moral hazard is higher during the period with four payments ( $-0.340-0.067$ ) than with two payments 2 ( $-0.340$ ).

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<sup>29</sup>  $\text{Exp}(-0.396)-1$ .

<sup>30</sup> Workers with previous fixed-term contracts did not have access to the UISF before the 2009 reform. Therefore we cannot use different dependence forms for workers who do or do not access the UISF.



**Table 10. Hazard Rate For Worker with Previous Fixed-Term Contract  
Period 2008m1-2011m3**

	(1)	(2)	(3)	(4)	(5)
Men	0.264 (85.51)***	0.237 (73.81)***	0.263 (85.02)***	0.263 (85.29)***	0.263 (85.27)***
Married	0.054 (17.51)***	0.049 (15.88)***	0.054 (17.47)***	0.054 (17.40)***	0.054 (17.42)***
Primary Edu.	0.200 (28.08)***		0.197 (27.87)***	0.197 (27.85)***	0.197 (27.88)***
Secondary Edu.	0.137 (19.11)***		0.135 (18.92)***	0.135 (18.95)***	0.135 (18.95)***
Cohort 40s	-0.271 (28.79)***	-0.233 (24.86)***	-0.269 (28.71)***	-0.271 (28.91)***	-0.272 (28.95)***
Cohort 50s	-0.001 (0.19)	0.023 (4.70)***	-0.001 (0.17)	-0.002 (0.46)	-0.003 (0.53)
Cohort 60s	0.058 (14.40)***	0.071 (18.07)***	0.057 (14.36)***	0.056 (14.06)***	0.056 (14.02)***
Cohort 70s	0.062 (16.98)***	0.060 (16.42)***	0.062 (17.01)***	0.061 (16.73)***	0.061 (16.69)***
Previous Rel. Wage (ln)		0.099 (41.51)***			
Unemployment	-0.040 (35.01)***	-0.039 (34.20)***	-0.040 (34.83)***	-0.055 (40.52)***	-0.055 (40.26)***
Contribution Req. to access UISF (Post Ref Rules)	0.066 (19.03)***	0.062 (17.80)***			
Right to access UISF	0.107 (14.25)***	0.114 (15.07)***	0.091 (12.38)***	0.062 (4.95)***	0.065 (5.44)***
Use of UISF	-0.396 (27.68)***	-0.382 (26.67)***	-0.382 (27.39)***	-0.340 (13.71)***	
Post Reform	0.010 (3.44)***	0.009 (2.99)***	0.012 (4.08)***	-0.077 (14.60)***	-0.077 (14.51)***
Post Reform 2 add.months				0.115 (19.96)***	0.115 (19.95)***
Right to access UISF x Post Reform 2 add. months				0.053 (3.56)***	0.046 (3.31)***
Use of UISF x Post Reform 2 add. months				-0.067 (2.16)**	
U spells 1 and 2 x Post Reform					-0.571 (28.15)***
U spells 3 and 4 x Post Reform					-0.043 (0.96)
U spells 5 and 6 x Post Reform					-0.146 (3.51)***
U spells 7 or more x Post Reform					-0.116 (3.16)***
U spells 3 and 4 x Post Reform 2 add. months					-0.275 (4.83)***
Observations	2073690	2073690	2073690	2073690	2073690
Strata	None		Contribution Dens. Req access UISF		

Robust z-statistics in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%  
All regressions include dummies for the number of months of previous tenure (20 dummies—the last is 20 or more months), and dummies for each month of the year. *Contribution Req.to access UISF (post reform)* has a value of 1 when the contribution density fulfills the contribution condition under the post-reform rules (whether unemployment is before or after the reform).

Source: Authors' calculations using UI data.

Column 5 presents a non-parametric setup to account for a differential effect of the 2009 reform on the duration dependence form ( $\lambda_j(\tau)$ ). As predicted by the theory, the hazard rates for the first two months of unemployment are negative by an average of -43 percent, significantly different from 0. Also as predicted by the theory, the hazard rate for the third and fourth months during the post-reform period is not different from the pre-reform period but during July 2009 and September 2010 when the UISF covers 4 months instead of two (-0.043, -0.275). Contrary to what we expected, because during the post-reform period the UISF covers at most four months for fixed-term contracts, the dummies for months “5 through 60” and “7 and more” are also negative and significantly different from 0 at conventional levels, although they average -0.13, which is significantly higher than the average for the “1 through 4” dummies, which on average are -0.44.

As the results strongly suggest, UI benefits imply self-selection among workers who have the right to access the UISF. Those who had a good chance of finding a job quickly did not take the UISF. The others did take it and, as results also suggest, they adjusted their behavior to take more advantage of UISF benefits. If we are interested in the effect on aggregate employment in the economy, we would like to see the total effect on job search behavior. Self-selection does not affect aggregate employment. A first proxy to account for the total effect on employment is to see whether workers with the right to access the UISF—both those who use it and those who do not—exhibit on average different behavior than those who only have the right to use the UIIA. When we only include the “Right to access UISF” variable, and we leave out the “Use of UISF” variables, the coefficient for the former is negative, as predicted by the theory, although not significantly different from zero at conventional levels (Column 5). This result answers our question under the strong assumptions that: i) unemployed workers who apply for UI benefit and only have the right to access their UIIA are a good control group for workers who apply and have the right to use the UISF (higher contribution density and specific condition to finish their contract relationship); and ii) access to better benefits does not change workers’ propensity to apply to the UI system, whether to UIIA or UISF. The next sub-section explores this question under other assumptions.

Summing up, results suggest that the 2009 reform that allowed fixed-term contract workers to access the UISF, induced self-selection between workers who had good or bad access

to new jobs. The data show that workers using the UISF have a lower hazard rate, but this is not related one-to-one with benefits provided by the UI system.

### ***5.3 All Workers Who Lost Their Jobs***

This section focuses on unemployed workers who lost their jobs. This could have occurred because they were fired or because they quit, given that we only know the reason workers left their jobs who applied to the UI system. For each worker, we know their contribution density; therefore we know whether or not they fulfill one of the conditions for application to the UISF. These workers may or may not have applied for UI benefits. In this setup we can study the effect of the 2009 reform on five groups of workers in terms of their contribution density to the UI system:

1. Workers who have the required contribution density to apply to the UISF either under the pre- or post-reform rules, whether before or after July 2009 (UIIA & UISF1 & UISF2).
2. Workers who only have the required contribution density to access the UISF under the post-reform rules, whether this was before or after July 2009 (UIIA ~ UISF1 & UISF2).
3. Workers who only have the required contribution density to access the UISF under the pre-reform rules but do not have it under the post-reform ones (UIIA & UISF1 ~ UISF2).<sup>31</sup>
4. Workers who only have the contribution density to apply to their UIIA and not to the UISF either under the pre- or the post-reform rules (UIIA ~ UISF1 ~ UISF2). The 2009 reform did not change requirements for accessing UIIA, either for permanent or for fixed-term contracts;
5. Workers who do not have the contribution density to access the UI, whether UIIA or UISF. These are benchmark workers for most results.

Contribution density is only one of the requirements for accessing the UISF. Workers also need to be fired for an economic reason, and they should not have used the UISF more than once in the previous five years. Assuming that workers' contribution density is independent of

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<sup>31</sup> After the 2009 reform, to access the UISF, workers were required to have at least the last three contributions with the same employers. This was not the case before the reform.

UI benefits, which is not a strong assumption particularly just after the reform,<sup>32</sup> we can study the effects of the 2009 reform on job search behavior without selection issues. Compared to the previous section, measurement error becomes more important.<sup>33</sup> In particular, using contribution data, we do not know the precise month in which the unemployed workers who applied to the UISF started using the benefit.

**Table 11. Contribution Density and Right to Access the UISF, Permanent and Fixed-Term Contract, Period 2008m1–2011m3**

Req. Contrib. to access:	Pre-Reform			Post-Reform		
	Total	Right to Access UISF		Total	Right to Access UISF	
		No	Yes		No	Yes
No UI benefit	189,371 39%	99.96%	0.04%	204,778 36%	99.9%	0.15%
UIIA~UISF1~UISF2	26,115 5%	99.7%	0.3%	29,274 5%	99.5%	0.5%
UIIA&UISF1~UISF2	8,054 2%	98.6%	1.4%	8,398 1%	99.0%	1.0%
UIIA&UISF2~UISF1	59,423 12%	98.9%	1.1%	65,205 12%	93.1%	6.9%
UISF1&UISF2&UIIA	202,090 42%	85.4%	14.6%	258,657 46%	83.9%	16.1%
<b>Total</b>	<b>485,053</b>	<b>93.7%</b>	<b>6.3%</b>	<b>566,312</b>	<b>91.7%</b>	<b>8.3%</b>

Req. Contrib. to access:	Pre-Reform			Post-Reform		
	Total	Right to Access UISF		Total	Right to Access UISF	
		No	Yes		No	Yes
No UI benefit	487,780 45%	100.0%	0.01%	517,135 44%	99.9%	0.11%
UIIA~UISF2	438,983 40%	100.0%	0.0%	474,297 41%	99.9%	0.1%
UIIA&UISF2	157,406 15%	99.3%	0.7%	173,844 15%	90.8%	9.2%
<b>Total</b>	<b>1,084,169</b>	<b>99.9%</b>	<b>0.1%</b>	<b>1,165,276</b>	<b>98.5%</b>	<b>1.5%</b>

*Note:* UIIA Unemployment Insurance Individual Account, UISF1 and UISF2 Solidarity Fund with pre- and post-reform requirements. Requirements for accessing the UIIA did not change with the 2009 reform. UIIA and UISF1 and UISF2 required density to access UIIA and UISF1, but not UISF2. We do not use the year 2007 because for computation of the required contribution density we need at least 24 lags for SF2. We compute density using data since 2006m1.

The percentage of “Right to access UISF” is computed as the number of workers who apply for UI benefits and have the right to apply to the UISF divided by the total number of workers who have the required contribution density to apply to the UISF.

For workers with previous fixed-term contracts we should not have workers with the right to access the UISF.

*Source:* Authors’ calculations using UI data.

<sup>32</sup> Workers are required to make at least 12 contributions in the last 24 months to be eligible to access the SF.

<sup>33</sup> Whenever there is a misreport of employer identity, there is a fake case of a worker losing her job.

Table 11 shows the relationship between contribution density and the right to use the UISF. The latter is only available for unemployed workers who applied to the UI system. For unemployed workers with previous permanent contracts, we have that conditional to having the required contribution density to access neither UIIA nor the UISF. Less than 0.5 percent of these unemployed workers applied for UI benefits and had the right to use the UISF during the pre- and post-reform period (~ UIIA ~ UISF1 ~ UISF2). This percentage jumps to 14.6 and 16.1 percent when unemployed workers have the required density either under the pre- or post-reforms rules (UIIA & UISF1 & UISF2) for the periods before and after 2009, respectively. For unemployed workers who only had contribution density to apply the UISF under the post-reform rules, only 1.1 percent appeared to have the right to access the UISF before 2009. As we expect, this percentage jumps to 6.9 percent post-2009 (UIIA & ~ UISF1 & UISF2). For the group of unemployed with only the required contribution density to access the UISF under the pre-reform rules and not under post-reform rules, the percentage is almost the same before and after 2009 (UIIA & UISF1 & ~ UISF2). This unexpected result could be driven by the small sample in this bracket and measurement error. To be included in this case, workers must have moved from their previous job to another one at most three months before they became unemployed.

For unemployed workers with previous fixed-term contracts, the results are as expected. For workers without the required contributions to access the UISF, less than 0.11 percent appears in the dataset with the right to access the UISF either before or after the reform (UIIA & ~ UISF2). For workers with the required contributions under the post-reform rules (UIIA & UISF2), only 0.7 percent appears with the right to use the UISF before the reform, and this percentage jumps to 9.6 percent post-2009.

Focusing on (UIIA&UISF1&UISF2), we can study how the level of UI benefits has an effect on job search behavior, and focusing on (UIIA&UISF1& ~ UISF2) and (UIIA ~ UISF1&UISF2), we can study the effects of changes on coverage.<sup>34</sup> The definition of these groups is not affected by an unemployed worker's decision to use or not use the UISF. Therefore, it is difficult to argue that changes in the hazard rates of these groups before and after the 2009 reform are due to selection bias. Table 11 shows the percentage of workers who lost

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<sup>34</sup> To access the SF after the 2009 reform, the last three contributions have to be with the same employer. This condition implies that in our dataset any missed report of employer ID in the last three months will imply that the conditions for accessing the SF after the reform are not fulfilled. This explains why "SF only Pre-" is so high and "SF only Post-" is so low.

their jobs in each of the previously defined categories, before and after the reform. The distributions of workers across these categories remain roughly constant after the 2009 reform.

Table 12 computes the hazard rate using the Cox model with a non-parametric functional form for the dependence forms for each of the previous groups defined in terms of their contribution density ( $\lambda_j(\tau)$ ).<sup>35</sup> These different dependence forms account for the main effect of different contribution densities across unemployed workers. Table 12 controls for marital status, gender, and age (using cohorts); education, previous wage, national unemployment rate, seasonal effect (using monthly dummies not reported); tenure (using dummies not reported); and post-reform dummies to account for changes in benefits and access to the UISF.

Columns 1 to 4 focus on workers with previous permanent contracts, and the last three columns focus on employees with fixed-term contracts. Regressions reassure previous results on gender, marital status, education, age, unemployment rate, and tenure.

Focusing on UI benefits, most results are in line with the moral hazard theory. Unemployed workers with contribution density that allowed them to access the UISF after the 2009 reform reduced their hazard rate on average. For those who had the required density to access the UISF with pre- and post-reform rules (UIIA & UISF1 & UISF2), the average hazard rate fell by 2.8 percent (Column 1). This is a large number if we consider that only 16 percent of them ended up applying to the UI system and had the right to access the UISF because they did not fulfill other requirements, they did not apply, and/or measurement errors occurred in the contribution density variable.

For workers with the required density to access the UISF after the reform but did not have the density required before July 2009 (UIIA ~UISF1 & UISF2), their hazard rate fell on average by 1.7 percent (Column 1). For this last group of workers who did not have the right to access the UISF before the 2009 reform, and therefore faced the largest difference in benefits before and after, we should expect the largest fall in hazard rate. This is the case once we adjust 1.7 percent of the share of workers who ended up with the right to access the UISF (2.33=16.1 percent/6.9 percent Table 11). The puzzling result is the coefficient for (UIIA & SF1 ~SF2). For this group the moral hazard hypothesis predicts a positive sign. Because they lost the UISF benefit, they should increase their search effort. This result may reflect measurement error. Table 11 shows that for this group our measure of required density has low predictive power for “Right

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<sup>35</sup> For permanent contracts there are four strata and for fixed-term contracts there are two strata.

to access the UISF;” it only increases the probability of ending up having the right to use the UISF by 1 to 1.4 percent.

**Table 12. Hazard Rate Using Contribution Density,  
Period 2008m1 – 2011m3**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Ind.Term	Ind.Term	Ind.Term	Ind.Term	Fixed Term	Fixed Term	Fixed Term
Men	0.306 (123.80)***	0.293 (118.23)***	0.306 (123.91)***	0.293 (117.93)***	0.226 (137.46)***	0.226 (137.43)***	0.247 (152.00)***
Married	0.014 (5.46)***	0.008 (2.98)***	0.014 (5.48)***	0.008 (3.15)***	0.032 (19.27)***	0.032 (19.24)***	0.039 (22.92)***
Primary Edu.	0.063 (14.96)***		0.063 (14.89)***				0.003 (0.78)
Secondary Edu.	0.049 (11.98)***		0.049 (11.97)***				0.068 (17.38)***
Previous Rel. Wage (ln)		0.089 (58.05)***		0.084 (54.83)***	0.080 (84.03)***	0.080 (83.94)***	
Cohort 40s	-0.592 (58.50)***	-0.589 (58.23)***	-0.592 (58.54)***	-0.588 (58.12)***	-0.285 (52.08)***	-0.285 (52.18)***	-0.262 (47.57)***
Cohort 50s	-0.193 (43.38)***	-0.201 (45.29)***	-0.193 (43.39)***	-0.194 (43.80)***	-0.030 (10.95)***	-0.030 (11.05)***	-0.006 (2.22)**
Cohort 60s	-0.072 (21.98)***	-0.086 (26.31)***	-0.072 (21.99)***	-0.080 (24.52)***	0.026 (12.78)***	0.026 (12.70)***	0.047 (22.56)***
Cohort 70s	-0.022 (7.86)***	-0.045 (16.18)***	-0.022 (7.89)***	-0.043 (15.39)***	0.036 (19.57)***	0.036 (19.50)***	0.054 (29.34)***
Unemployment	-0.039 (42.03)***	-0.039 (42.11)***	-0.047 (43.51)***	-0.045 (40.89)***	-0.039 (63.53)***	-0.050 (67.90)***	-0.050 (68.16)***
Contribution Density (UIIA&UISF1&UISF2) x Post Reform	-0.028 (5.92)***	-0.029 (6.01)***			-0.010 (2.68)***		
Contribution Density (UIIA&UISF1~UISF2) x Post Reform	-0.065 (3.81)***	-0.059 (3.51)***					
Contribution Density (UIIA&UISF2~UISF1) x Post Reform	-0.017 (2.31)**	-0.017 (2.29)**					
Post Reform	-0.010 (2.65)***	-0.008 (2.20)**	-0.075 (18.97)***	-0.064 (16.17)***	-0.010 (2.68)***	-0.051 (20.18)***	-0.059 (23.69)***
Prev. Tenure ≥ 12 months x Right to access SF				-0.391 (46.49)***			
Prev. Tenure ≥ 18 months x Right to access SF				0.104 (9.24)***			
Prev. Tenure ≥ 24 months x Right to access SF				-0.046 (5.35)***			
Contribution Density (UIIA&UISF1&UISF2) x Post Reform 2 add. Months			-0.022 (4.39)***	-0.016 (3.30)***		-0.023 (5.95)***	-0.020 (5.08)***
Contribution Density (UIIA&UISF1~UISF2) x Post Reform 2 add. Months			-0.049 (2.84)***	-0.046 (2.65)***			
Contribution Density (UIIA&UISF2~UISF1) x Post Reform 2 add. Months			-0.029 (3.91)***	-0.024 (3.14)***			
Post Reform 2 add. Months			0.078 (15.28)***	-0.391 (46.49)***		0.080 (29.06)***	0.082 (29.67)***
Observations	4039417	4039411	4039411	4039411	7670866	7670840	7670866
Strata		UIIA - UISF1	- UISF2			UIIA-UISF2	

Robust z statistics in parentheses, \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

All regressions include dummies for the number of months of previous tenure (20 dummies – the last is 20 or more months), and dummies for each month of the year. In all regression the use of strata controls for the main effect of contribution densities.

Source: Authors’ calculations using UI data.

Previous results for UI benefits are robust to controls for previous relative wage (Column 2) and to computing the post-reform marginal effect only considering the period in which the UI system gave two additional payments (Column 3) and conditions to access severance payments

(Prev. Tenure  $\geq$  12 months x Right to access SF) (Column 4).<sup>36</sup> Results for severance payments are mixed. Our proxy to have the right to one monthly wage of severance payment has the right sign (-0.391). One monthly wage severance payment implies an income effect that reduces search effort. But the sign for our proxy to have the right to a second monthly wage is positive (Prev. Tenure  $\geq$  12 months x Right to access SF).

For fixed-term contract workers, results on UI benefits have the expected sign and they are significant at standard levels. After the 2009 reform, workers with density contributions that allowed them to access the SF had on average a 1 percent lower hazard rate (Column 5). To see the economic effect of this coefficient, we have to consider that only 9.2 percent of these workers ended up applying for UI benefit with the “right to access the SF.” The coefficient becomes -2.3 percent and significant at 1 percent when we interact the required density to access the UISF with the post-reform period when the UISF paid two additional months (Column 6). Column 7 reaffirms the previous results using education instead of previous wage has proxy for human capital.

#### ***5.4 UI Benefits and Wages***

The standard job search theory implies that longer entitlement periods for unemployment benefits, as higher benefits, increase the expected duration of unemployment until workers accept a new job. In these models, unemployment benefits act as a search subsidy.<sup>37</sup> Whether this subsidy increases the quality of post-unemployment jobs and wages depends on the specific assumptions regarding the model, particularly on the endogeneity of search effort.

To test this idea, we regressed wages of new matches, relative to the average wage in the economy,<sup>38</sup> on previous relative wage, workers’ characteristics (education, age, etc. not reported), market condition (year-month fixed effect), and UI benefits (dummies pre- and post-reforms). The first fourth columns in Table 13 present the regressions for the sample of unemployed workers who applied to the UI system, and the last two columns present results for

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<sup>36</sup> To have right to severance payment a worker needs to have at least 12 continuous contributions with their last employer and to be fired for economic reasons. In Table 19 we multiply the 12 month condition by “Right to access the SF” as a proxy for “economic reasons.”

<sup>37</sup> See Katz and Meyer (1990) and Meyer (2002).

<sup>38</sup> To compute the relative wage we use the average wage of all contributors to the UI in our dataset for the month in which the unemployed worker lost or found a new job.



the sample of all workers who lost their jobs. To the best of our knowledge, this is the first evidence of the impact of UIIA/USIF on reemployment wages.

Column 1 shows relative wages for unemployed workers with previous permanent contracts and who apply to the UI system. We controlled for the same worker characteristics as in column 2 in Table 8. The results show that workers who use the SF find lower-wage jobs. This result is in line with the selection hypothesis. Unemployed workers who decide to use the UISF are the ones with the best likelihood of finding a good high-paying job. Before the reform, this effect implied a 20 percent lower wage, and post-reform this negative effect was increased by an additional 4.6 percent.<sup>39</sup> Column 2 shows the results taking into account that during July 2009 and September (2010) the UISF covered 2 additional months. The previous results are reinforced: the unemployed who use the UISF have even lower wages, and those who have the right to use UISF but decide not to do so display a positive coefficient post-reform (selection issue).

Column 3 shows the results for unemployed workers with previous fixed-term contracts. They also support the selection hypothesis. Unemployed workers who use the UISF find jobs with wages 15 percent lower than the average wage in the economy.

For all workers who lost their jobs, columns 5 and 6 show no clear pattern for ex-post wages. For previous workers with permanent contracts, coefficients on required contributions to access the SF are negative, but in most cases not statically significant at conventional levels, in particular for “(UIIA & UISF1 & UISF2) x Post Reform” (-0.3 percent,  $t=-0.71$ ). We find the same results for unemployed workers with previous fixed-term contracts. We find no evidence to support the hypothesis that higher unemployment benefits increase the quality of ex-post matches (higher wages).

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<sup>39</sup> The 2008 recession cannot explain this fall because we use time-fixed effects.

**Table 13. Post Matching Relative Wages with Time Fixed-Effect  
Period 2008m1 – 2011m3**

	(1)	(2)	(3)	(4)	(5)	(6)
	Ind.Term	Ind.Term	Fixed Term	Fixed Term	Ind.Term	Fixed.Term
Previous Rel. Wage (ln)	0.521	0.521	0.462	0.462	0.531	0.333
	(94.02)***	(94.00)***	(101.07)***	(101.06)***	(232.30)***	(235.97)***
Contribution Density UISF2	0.089	0.089	0.044	0.044		0.012
	(7.09)***	(7.12)***	(8.14)***	(8.14)***		(4.28)***
Contribution Density UIIA					-0.006	-0.057
					(0.72)	(32.16)***
Right to access UISF	-0.012	-0.012				
	(1.33)	(1.33)				
Use of UISF	-0.228	-0.228				
	(13.08)***	(13.08)***				
Right to access UISF x Post Reform	0.035	0.000	0.003	0.010		
	(2.59)***	(0.00)	(0.28)	(0.60)		
Use of UISF x Post Reform	-0.056	-0.007	-0.161	-0.135		
	(2.24)**	(0.21)	(6.49)***	(3.70)***		
Right to access UISF x Post Reform 2 add. Monts		0.059		-0.012		
		(2.81)***		(0.56)		
Use of UISF x Post Reform 2 add. Monts		-0.081		-0.045		
		(2.19)**		(0.90)		
Contribution Density (UIIA&UISF1&UISF2)					0.048	
					(5.39)***	
Contribution Density (UIIA&UISF1~UISF2)					0.024	
					(2.14)**	
Contribution Density (UIIA&UISF2~UISF1)					-0.005	
					(0.53)	
Contribution Density UISF2 x Post Reform						0.001
						(0.24)
Contribution Density (UIIA&UISF1&UISF2) x Post Reform					-0.003	
					(0.71)	
Contribution Density (UIIA&UISF1~UISF2) x Post Reform					-0.003	
					(0.18)	
Contribution Density (UIIA&UISF2~UISF1) x Post Reform					-0.021	
					(2.86)***	
Observations	59498	59498	89797	89797	274973	682435
R-squared	0.26	0.26	0.23	0.23	0.29	0.18

Absolute value of robust t statistics in parentheses, \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

All regressions include year-month fixed effect, dummies for the number of months of previous tenure (20 dummies – last is 20 or more months), and control variables for gender, education (3 cat.), and cohorts (5 cat.). We drop all in relative wage below -3 and above 1.

Source: Authors' calculations using UI data.

## 6. Conclusions

Using the 2009 reform of the UI system in Chile, we studied the effect of an increase in benefits and coverage on unemployment duration for workers who had fixed-term and permanent contracts. The evidence from unemployed workers with previous permanent work who access the UI system post-2009 reform suggests that the unemployed with the right to use the UISF but who do not take it have a higher exit rate from unemployment than workers who do use it. They also have a higher exit rate than workers who only have the right and applied to their UIIA. This result suggests there is an important selection issue, in the sense that the unemployed who decide not to use the UISF have better job-finding prospects. The 2009 reform reinforced this result. The increase in the number of months paid by the UISF reduced the exit rate of workers who accessed the UISF, although it increased the exit rate from unemployment for those who decided not to take it. As a whole, for unemployed workers with previous permanent jobs, the 2009 reform did not seem to increase the unemployment spell for workers who applied for UI benefits; it only increased the self-selection process between workers with a higher and lower probability of finding a new job.

The subsample of workers who applied to the UI system with previous fixed-term contracts reinforces our previous results. The 2009 reform, which allows fixed-term workers to access the UISF, induced the same self-selection phenomenon observed among permanent workers. Unemployed workers who applied to the UISF showed lower exit rates from unemployment than workers who only accessed their UIIA having the right to access the UISF. Workers who could only access their UIIA showed an exit rate in between.

Evidence from studying the sample of workers who lost their jobs, i.e., workers who were fired or who quit their jobs, and not only those who accessed the UI system, suggests that the 2009 reform increased the unemployment spell, although the effect was small for the whole labor market. For the group of permanent contract workers who had the required contribution density to apply to the SF, the 2009 reform reduced their exit rate on average around -2 percent. Given that unemployed workers with the required contribution density represented 60 percent of total permanent workers who lost their jobs, the total average effect was a reduction of the hazard rate of around 1 percent. The way we computed these results did not seem to be driven by self-selection.

For fixed-term contract workers, we also found the expected results. Workers with a density contribution that allows them to access the UISF have a lower exit rate (-1 percent). Unemployed workers who have the required contribution density represent no more than 10 percent of total fixed-term contract employees that lost their jobs—access to the SF just becomes available for this group. Therefore, for all fixed-term contracts, the 2009 reform implied a small reduction in the hazard rate (around -0.1 percent).

Our results do not support the idea that higher unemployment benefits improve the quality of new matches (higher wages). The results show that unemployed workers who access the UISF have lower wages *ex-post*. These results are in line with selection hypothesis. Unemployed workers who decide to use the UISF have low probabilities of quickly finding a good high wage job.

Summarizing, the 2009 reform implies a small negative impact on total search effort because few workers end up using the UISF. Higher benefits mainly imply a strong selection effect among workers who decide to use or not the UISF. We find that the evidence is in line with the moral hazard hypothesis, i.e., lower hazard rates as long as there are UI benefits, and lower average hazard rates after the reform, although the average effect on the whole labor market seems small

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