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Matching, adverse selection and labour market flows in a (post)transition setting: The case of Croatia

This paper studies employment prospects of different types of job-seekers in Croatia by upgrading the *model of adverse selection with firing costs.* Based on Labour Force Survey data for the period 1996-2006 we find the existence of adverse selection in Croatian labour market. Reservation wage, as the main determinant of firing costs in the model, positively affects the probability to change a job for employed job-seekers, while it has negative impact on the probability to 'switch' for unemployed job-seekers. However, if reservation wage is treated as endogenous in the model, instrumental variable estimation shows that its effect on the probability to 'switch' becomes positive and significant only for the unemployed group. This is explained by the effect of educational attainment that serves as the 'instrument' and obviously works as efficient *signal* for workers' productivity among the unemployed. Nevertheless, the effect of reservation wage on employment probabilities for both groups is getting lower over time, especially after legislation reform in 2004, indicating lower impact of firing costs. Finally, the hypothesis on self-discrimination of the unemployed receiving unemployment benefits is tested, showing positive impact of unemployment benefits on the reservation wage, and a negative one on the probability to find a job.

Keywords: matching, adverse selection, firing costs, unemployed, transition, Croatia

Introduction

High unemployment is a disease that has caught almost all European countries for more than two decades now. Both the academic community as well as the economic 'practitioners' developed numerous theories about the causes of this aggravating problem. Over the years, they have also suggested several possible solutions, but evidently none of them worked that well. One of the most prominent theories about the sources of high level of unemployment (and inactivity) in Europe is the rigidity of the labour market; that is, strict employment protection legislation (see, for instance, Siebert, 1997; Feldman, 2005). Rutkowski (2003) states how high unemployment is strongly related to the slow dynamics of job creation, which in turn can be attributed to poor business environment, especially the strict employment protection legislation. In addition, strict regulations in labour market discourage entry of new firms to the market (Scarpetta, 1996). Analogously, it is believed that a cure for high unemployment is the removal of the rigidities. According to Saint-Paul (2002), employment protection is more likely to arise in economies with slow growth and greater economic rents evidenced in higher wages suggesting that the appropriate time for increasing labour market flexibility are periods of high growth.

All these problems are even more emphasised in the case of the European post-transition countries (Gabrisch and Buscher, 2006; Winiecki, 2008). It is a well documented fact how transition from a centrally-planned to market economy leads to large scale reallocation of labour. After the transformation process has started all labour markets in CEE countries experienced constant flows between different statuses (unemployment, employment, inactivity). In general, these flows are dominated by the separation rate in the early stages of transition, while in the later stages hiring rate should outpace the separation rate. However, many of these flows are involuntary, since they are driven by job destruction and job creation (Haltiwanger et al., 2003).

The situation in Croatia did not apply completely to the theoretical predictions. First of all, at the beginning of transition many of the dismissed workers went out of the labour force by accepting a chance for an early retirement. Many others became unemployed, and were left in that

status for a longer period of time because their skills were obsolete for the new, privatized and service oriented, economy. Even though it was expected that after this first phase the employment will increase and the unemployment will decrease, the situation remained quite unfavourable for many years. In addition, the legislation imposed in the labour market did not help to speed up the process of adjustment. Those that were employed were highly protected which decreased the scope for activating the rest of the population. In fact, high dismissal costs have shown to be the main obstacle towards more flexible labour market in Croatia. For instance, Rutkowski (2003) points out that strict employment protection legislation and high dismissal costs are the reason for a small number of vacancies and employment, long periods of unemployment and low rates of 'escape' from unemployment, and the concentration of unemployment among groups of disadvantaged workers. Furthermore, high dismissal costs discouraged hiring as employers limited recruitment in order to avoid future costs of employment adjustment to potential shocks. Thus, limited employment is a reflection of limited dismissal (Rutkowski, 2003).

As a result, the main aim of this paper is to discover the main causes of high inactivity and unemployment rates in Croatia during a period of transition as well as post-transition, focusing on different employment opportunities for different types of job-seekers: employed, unemployed and inactive. The paper also tests the role of labour market institutions on the 'willingness to search for a job' for unemployed job-seekers receiving unemployment benefits. Moreover, it tries to identify a group of active population who may be hurt by implicit discrimination due to underdeveloped labour market institutions.

In order to do this, we employ model of adverse selection with firing costs. The model is adjusted in the paper so that it could better correspond to (post)transition setting. First of all, the dismissal (or firing) costs became endogenous variable in the model. In this case, the dismissal costs are an increasing function of the wage. In addition, reservation wage concept is introduced in order to better capture the process of decision making and subsequent matching of firms and job-seekers in the (Croatian) labour market.

The paper is structured as follows. In the next section we briefly set the theoretical background by reviewing the relevant literature, which permits us to put this paper into a broader framework of studies that cover uncertainty, asymmetric information, and adverse selection in the labour market. Subsequently, we provide analytical framework for the theoretical model that incorporates endogenous dismissal costs into the original model of adverse selection with firing costs developed by Kugler and Saint-Paul (2004). On top, the reservation wage influence on the dismissal costs and a chance to find an employment is added into the model. Next section describes the context of institutional and economic environment in Croatian labour market for the period 1996-2006 for which the empirical analysis is done. After that, the description of the used variables and the sketch of the empirical model are provided. Empirical methodology uses probit estimation and additionally controls for endogeneity in independent variables by using nonlinear (probit) IV estimator. The results, together with the discussion, are presented in Section 6. In addition to examining the probability of switching to employment among different groups of job-seekers, the effect that unemployment benefits have on the probability to switch is also examined in this section. Concluding remarks, which summarise the most important results, are given in Section 7.

Theoretical background

This work is primarily related to works dealing with uncertainty, asymmetric information and adverse selection in the labour market (Akerlof, 1970; Spence, 1973; Gibbons and Katz, 1991) that have made distinction between different job-seekers. Additionally, Blanchard and Diamond (1994) introduced the ranking among different job applicants while Kugler and Saint-Paul (2004) and Domadenik (2007) deal with adverse selection among employed and unemployed job-seekers introducing firing (dismissal) costs. Economics of information in the classical *search theory* developed in the works by Stigler (1961; 1962) and McCall (1970) is used in order to show how agents in the market acquire information about market conditions and how are they brought together based on their individual optimal strategy.

Akerlof (1970) and Spence (1973) stress out the importance of s*ignalling* in the market that potential seller (job-seeker) sends towards the potential buyer (firm) and *screening* that the 'buyers' need to do before buying the product. Asymmetry in available information appears because the 'sellers' have more knowledge about the quality of their product than the 'buyers' and the purchaser's problem is to identify this quality (Akerlof, 1970). Hence, potential employees confront an offered wage schedule based on their *signals* (Spence, 1973).

Gibbons and Katz (1991) extend the analysis giving the empirical support for an asymmetric information model of layoffs. They show how layoff event, based on the worker's productivity, signals unfavourable information to the market. In that case, the offered wages in the market differ for layoff and retained workers. However, postdisplacement wages and unemployment duration differ according to the cause of displacement: displacement by layoffs or displacement by plant closing. Furthermore, Canzianni and Petrongolo (2001) indicate how firing costs increase the stigma suffered by dismissed workers, reducing their re-employment prospects.

Waldman, on the other hand, (1984), uses individual's job assignment as an imprecise signal of the individual's ability for an employed job seeker. In addition, Greenwald (1986) argues how adverse selection in the labour market may seriously impair a worker's freedom to change jobs. He explains this by the fact that the current employer has better information about the ability of its workers and, thus, these firms do their best to prevent turnover on their better workers. In this way, employed persons willing to change their job are of a lower ability than the ones not wanting to change their employer. This has many repercussions in the labour market; for instance, higher turnover costs on workers who seek new job, lower wages offered for the employed job-seekers, and even lower wages that the firms pay their current workforce (Greenwald, 1986).

As already mentioned, Blanchard and Diamond (1994) developed the so-called *ranking model* in order to differentiate among the prospective employees. They assumed that firms have preferences over job applicants based on the time they were searching for employment, that is, if they compete for the same job short-term unemployed always get the job ahead of long-term

unemployed. Here, the duration of unemployment *signals* the productivity of the job applicant. They indicate several reasons why the assumption that ranking by duration is important, including the fact that the training costs of a new worker increase with unemployment duration as well as the decrease in the searching activities of the long-term unemployed (Blanchard and Diamond, 1994).

Another way to make a distinction between job-seekers is to divide them into groups of those that are employed and those that are unemployed or inactive[1]. This is done in the work by Kugler and Saint-Paul (2004) where they assumed that firms are more willing to employ out of a group of already employed job-seekers and showed that the increases in hiring and firing costs intensify the discrimination against the unemployed. Also, they demonstrated that large enough reductions of hiring and firing costs would remove discrimination against unemployed workers completely. This model was adjusted in the work of Domadenik (2007) where she showed that high dismissal costs, created mostly by the adverse selection and rigid legislation, introduce distortions in the labour market that are not similar for all groups of job-seekers.

Classical *search theory* takes the side of job-seekers who must screen the signals from the prospective employers in the world of imperfect information. Here, the focus is on the information about the wage rates, as this is the main determinant of worker's acceptance of a given job offer. In the end, the amount of search depends on the wage rate that the individual thinks his services can command in the labour market and on the opportunity cost of the searching activity (McCall, 1970: 114). Stigler (1962) emphasises how one way to reduce hiring costs is to pay higher relative wages which would not only reduce the quit rate of the existing workers, but it would also attract high-quality workers to accept the job offer. He also states that the marginal cost of search may rise as search increases and, also, that the increased search will yield diminishing returns as measured by the expected reduction in the minimum asking price. However, it pays more to continue searching if the prospective period of employment is longer (Stigler, 1961).

[1] Since it is very hard to make a distinction between unemployed and inactive job-seekers (Petronoglo and Pissarides, 2001; Fahr and Sunde, 2001) they are often grouped together. In addition, it is possible that, due to length of time between survey points, the employed job seekers were actually unemployed for some time before transiting to new work.

Analytical framework

The model in this paper actually upgrades the models of Kugler and Saint-Paul (2004) where, on the one hand, we have simplified some aspects to preserve analytical tractability, but, on the other hand, we have introduced some novelties in order to better correspond to the situation in (post)transition setting.

Following Kugler and Saint-Paul (2004), the total labour force is normalized to one and split between two types of workers: 'good' and 'bad'. The proportion of workers who are 'good' is denoted by *z*. However, firms do not observe the productivity of a potential employee before the hiring. But, immediately after the production takes place, firm is aware of its worker productive potential. It is also assumed that firms enter the market freely by creating vacant positions. Once the position is created, firms face a cost equal to *C* of holding a vacancy. Because of free entry in the market, in equilibrium *C* always equals to zero. A job seeker meets a vacant job with probability *a* per unit of time while firm decides whether to hire a worker or not conditionally on her labour market status. In this model labour market status serves as proxy for worker's productivity.

Once a position is filled, production takes place. The firm's output per unit of time is $m+\eta$, where *m* is a firm-specific and η is worker-specific component. The assumption is that firms make higher profits out of 'more productive' workers than out of 'less productive' ones; that is, the productivity of a 'good' worker (η_H) is greater than the productivity of a 'bad' worker (η_L). This could be even more accentuated if we assume that the newly created jobs are more productive than the existing ones as it was assumed in Mortensen and Pissaridies (1994). When the match is initially formed, the match specific component is equal to $\overline{m}$ but, with probability γ per unit of time, the firm is hit by a shock that changes the productivity of the match. Every time such a shock occurs, the new productivity is drawn from a distribution *G*(*m*) over the interval [$\underline{m}$, $\overline{m}$].

Wages are assumed to be equal to a constant fraction, φ, of output with worker-specific productivity, η, and a firm-specific productivity, *m*, plus a fraction of reservation (base) wage, w^r:

$$w(m,\eta) = \varphi(m+\eta) + (1-\varphi)w^r \quad (1)$$

where $0 \le \varphi \le 1$. This expression again implies that firms make higher profits out of good workers than out of bad ones.

Production takes place until either the firm decides to close the position or the worker quits voluntarily. When hit by a shock, firms may decide to fire the worker, in which case they have to pay a tax *F*. In that case, the position is closed and the firm's value drops to zero. In our model the dismissal costs are set as a function of wage which in turn depends on the reservation wage and a constant fraction of firms' output (equation 1). In Croatia (and other post-transition countries) this assumption is a plausible one as dismissal costs are usually in the form of severance pay paid to the dismissed workers and determined in the process of collective bargaining[2]. Hence, in this case the tax (firing costs) is represented as:

$$F(w) = F\left[\varphi(m+\eta) + (1-\varphi)w^r\right] \quad (2)$$

where it is assumed that $\frac{dF(w)}{dw} \ge 0$. In case worker quits voluntary, firm does not have to pay the tax *F*. The day the workers leave to take another job, the position becomes vacant and its value falls back to *C*. Highly related to firing costs are the costs of hiring. Namely, when firms decide to hire a worker they must take into account training expenses and potential future shocks that would require dismissing some of their employees. Since firing costs are high, firms need to be very cautious when hiring new workers what increases both the time and the costs of the hiring process. Thus, the wage function in this case not only affects firing costs but also hiring costs, which are like two sides of the same coin.

[2] In the original model it was assumed that this tax *F* represents firing costs where substantial fraction of these costs goes to third parties such as lawyers, insurers, and the government. Therefore, it was set to be exogenous in the model. Since in the described (post-transition) setting dismissal costs are usually not paid to the third parties but to the dismissed workers, they now become endogenous. Additionally, the conditions and the minimum (maximum) amounts for severance pay are regulated by law in Croatia. Some earlier researches have shown how imposed legal obligations on payment of severance pay can reduce employment (see, for instance, Laezar, 1990; or Scarpetta, 1996). Additionally, firing (dismissal) costs are also influenced by the duration of employment at the present employer in Croatia. Namely, the notice period as well as the severance payments are depended upon the years that the worker has spent at his/her current firm. It is assumed that all this is captured by the firm-specific component (*m*) in the wage function, which in the model directly affects the dismissal costs.

In a matching process firms hire workers and then output is produced. If *J(m, η)* is the value of a job to the firm, with worker-specific productivity η and firm-specific productivity *m*, and given that the residual value of firing the worker is zero, the firm fires the worker if $J(m,\eta) < -F(w)$. The quit rate is endogenous and is given by the probability of engaging in on-the-job search times the instantaneous probability of receiving an offer, *a*. Workers also face a flow search cost, *c*, from searching on the job, but the benefit of searching is that they move to a match with the highest possible level of firm-specific productivity. It is also assumed that some fraction υ of employed workers is constantly looking for another job. Search while on the job for an employed worker with firm-specific productivity, *m*, takes place if $E(m,\eta,S) \geq E(m,\eta,NS)$, that is, if worker's value of being employed while searching is greater of his value of a job when not searching. Since the cost of search is constant and the benefit from searching is that the person moves from the current match to the highest possible match-specific productivity, the gains from searching while on the job increase as the current match level decreases. This means that on-the-job search is given up at the unique value, $\tilde{m}$, below which there is always on-the-job search, and which satisfies the condition: $E(\tilde{m},\eta,S) = E(\tilde{m},\eta,NS)$. Since the case of interest is given by the condition where some workers engage in search, we limit ourselves to the case where the *search threshold* exceeds the so-called *dismissal threshold*, that is, $\tilde{m} > m_c(\eta)$, for one or both type of workers. In order to get the expression for *dismissal threshold* we set $J(m_c(\eta),\eta) = -F(w)$ [3] and get:

$$m_c(\eta) = \frac{-F(w)(r+\gamma+a) - (1-\varphi)\eta + (1-\varphi)w^r - \gamma\hat{J}(\eta)}{1-\varphi} \tag{3}$$

[3] This holds for $m_c(\eta) \leq \tilde{m}$, that is, the case where some workers search before reaching the *dismissal threshold*. If there is no on-the-job search then: $m_c(\eta) = \frac{-F(w)(r+\gamma) - (1-\varphi)\eta + (1-\varphi)w^r - \gamma\hat{J}(\eta)}{1-\varphi}$, indicating that search lowers the *dismissal threshold*. $\hat{J}(\eta)$ is expressed as $\hat{J}(\eta) = \int_{m_c}^{\overline{m}} J(m,\eta)g(m)dm - G(m_c(\eta))F(w)$ and represents the average value of the match to the firm over the current value of the shock.

It is evident that dismissal threshold for low productivity workers is higher than for high productivity workers ($m_c(\eta_L) > m_c(\eta_H)$)[4] assuming that both types of workers search, that is, $\tilde{m} \geq m_c(\eta_L) > m_c(\eta_H)$. Moreover, the *dismissal threshold* of good workers is more responsive to changes in *F*, that is, *w*, and w^r than the dismissal threshold of bad workers. Consequently, $\left|\frac{dm_c(\eta_L)}{dw}\right| < \left|\frac{dm_c(\eta_H)}{dw}\right|$ and $\left|\frac{dm_c(\eta_L)}{dw^r}\right| < \left|\frac{dm_c(\eta_H)}{dw^r}\right|$ (see the appendix for the proof).

The quality (productivity) of the applicant is unobservable, but his status is observable and provides a *signal* to the firm. If we set z_E and z_U to be the proportion of good workers among the employed and unemployed job seekers, then we can express the expected present discounted values (Π) associated with hiring an employed and an unemployed job applicant:

$$\Pi_E = z_E J(m,\eta_H) + (1 - z_E) J(m,\eta_L) \quad (4)$$

$$\Pi_U = z_U J(m,\eta_H) + (1 - z_U) J(m,\eta_L) \quad (5)$$

where $\Pi_E > \Pi_U$[5]. Therefore, the firm hires a worker if $\Pi_i > 0$, where *i* = *E*, *U*.

From the above equation, we can see that $\frac{\partial \Pi_U}{\partial z_U} = J(\overline{m},\eta_H) - J(\overline{m},\eta_L) > 0$ which means that there exists a unique value of $\bar{z}_U$ such that $\Pi_U = 0$ is satisfied. If $\Pi_U = 0$ all employed applicants are hired and unemployed are hired with probability p_U **.** Hence, lower hiring rate of the unemployed relative to employed workers reflects statistical discrimination, since firms use employment status to predict productivity ($p_U < 1$). However, the thing that we're ultimately interested in is the effect of changes of the firing costs *F*, being endogenously determined as a fraction of wage bill, on the hiring of the unemployed. It is shown that an increase in the firing costs decreases the job loss rate more for good workers than for bad workers and, thus, worsens the quality of the unemployed, that is, $\frac{dz_U}{dF(w)} \Rightarrow \frac{dz_U}{dw} < 0$ (see appendix for the proof). Moreover,

[4] In addition, $J(m, \eta_H) > J(m, \eta_L)$.

[5] Since $z_E > z_U$ and $J(\overline{m},\eta_H) > J(\overline{m},\eta_L)$.

higher firing costs increase the value of $\bar{z}_U$ such that $\Pi_U = 0$ is satisfied further lowering the probability for unemployed to be hired and increasing statistical discrimination against unemployed.

The reservation (alternative) wage in the model is defined according to Addison et al. (2009) for unemployed job-seekers and Van den Berg and Ridder (1998) for employed job seekers. In the first case the reservation wage is dependent[6] upon unemployment benefits, wage offer, and the discount rate; while in the second case it is assumed that an employed job seeker accepts a wage offer if and only if it exceeds his current wage (Van den Berg and Ridder, 1998: 1187). Thus, the reservation wage of an employed job seeker is equal to his current wage. Essentially, this variable is different for these two types of job-seekers. Usually, employers set the wage and frictions in the labour market are regarded as the time required for workers to gather information about wage offers in the market (Mortensen and Pissarides, 1999). Evidently, employed job-seekers would generally have higher wage rate than those that are without the job. But, government aid, like social and unemployment benefits, could increase reservation wage for those out of the employment (Boeri and Terrell, 2002; Boeri and Van Ours, 2008).

Development of labour market institutions in Croatia

Before turning to data description and empirical model, we should say something about the context of institutional and economic environment in the Croatian labour market for the period 1996-2006, for which the presented study is done.

In the early transition, privatization and restructuring of the old state-owned firms was indispensable. Nonetheless, Croatia was somehow specific in this process what dictated the path and the pace of both transition and integration (with the EU) processes (Čučković, 2011). Croatian transition process coincided with the war and violent disintegration from Yugoslavia what also

[6] The reservation wage is expressed as: $w^r = b + \frac{\delta}{\rho}\int_{w_r}^{\infty}(w - w^r)\partial F(w)$, where b is the (constant) amount of unemployment benefits net of any search costs, δ is parameter from Poisson process according to which independent realizations of wage offers from a known wage offer distribution are received, ρ is the discount rate, w is the wage offer, and $F(w)$ is the cumulative wage distribution (Addison et al., 2009: 2).

implied that Croatia needed to establish a new independent state and its administrative structures in the beginning of nineties. Additionally, in the latter stages of transition process continued regional instability in the Western Balkans further contributed to Croatia lagging behind the most of CEE countries in terms of transition and integration. Evidently, this was reflected in weak economic transition outcomes such as missing achievement of the positive economic growth and efficiency gains from economic reforms, privatization and restructuring, structural economic reforms targeted to improve enterprise efficiency and generate visible productivity gains, etc. (Čučković, 2011). However, the privatization process was considered as the key one that will determine the success of all other economic reforms.

Even though it officially started in 1991[7], the privatization process in Croatia in its first decade, especially until 1996[8], was not conducted in a way it was proclaimed by law, i.e. new owners being mostly former employees and citizens, but most of the state firms that were privatized in this period ended up in hands of "a politically sponsored class of new entrepreneurs", the so-called 'Tycoon Class' (Čučković, 2011). After the political turning point in 2000, a new 'era' of privatization process started which is not quite over yet[9]. It is said that the main motive for privatization in the early years of transition was the change of the ownership structure, while in the second half of 1990-ies and 2000-s, privatization was largely motivated by the need to cover the budget deficit (Vehovec and Domadenik, 2003). Still, privatization scandals from both the 1990-ies and 2000-s are still emerging to the surface.

Clearly, the impact of the privatisation process on the expected labour market mechanisms was also specific in Croatia. Labour market adaptation to numerous supply and demand shocks reflected in lowering employment, not wages[10]. For instance, Vehovec and Domadenik (2003) show

[7] Privatization Law was enacted in April 1991.
[8] When the new Privatization Law was enacted.
[9] For instance, shipbuilding industry is still on the privatization agenda.
[10] This can be justified with powerful unions in Croatia (see, for instance, Vehovec and Domadenik, 2003). As known from microeconomic literature unions may have different objectives that lead to different strategies. Unions in the most developed countries of former Yugoslavia were very powerful in the period of economic transition and it resulted in slow institutional labour market development and higher wages (Rutkowski, 2003). Anecdotic evidence shows that preserving wages at current levels

in their research that in the period from 1995 to 2000 privatized firms have reduced their employment by more than 22 percent, while in the same period average wage increased by more than 18 percent (with the increase of productivity by 30 percent). Šošić (2008), on the other hand, shows how after 2000 corporate restructuring in Croatia slowed down, with smaller job destruction, mostly in large, state owned enterprises, causing a growth in employment.

Thus, many people in the nineties were left without the work. Some of them accepted incentives for an early retirement, some of them went out of the labour force, and most of the others remained unemployed. This new spell of unemployment was mostly considered as structural problem (Obadić, 2003), and this situation asked for a new incentives and policy measures. New institutional structure needed to be developed as well. Therefore, legislation concerning labour market was introduced and changed every couple of years in order to adapt to market conditions. However, inherited system of protecting workers' rights from socialism remained in the newly developed market economy, especially in the public sector.

First Labour Act[11] in Croatia was adopted in 1995, and entered into force on 1 January 1996. The intention of the Labour Act was to encompass and arrange all the issues concerning labour market following Western European (German) practice. Thus, high level of employees' social rights was embedded in the Act which meant lower flexibility for employers, especially concerning hiring and firing procedures. Actually, Labour Act imposed a series of barriers, difficulties and responsibilities for employers during layoffs Law aimed at high protection of those employed and union members in the period of transition from planned to market-oriented economy could have been a factor that slowed more than needed restructuring of the Croatian economy (Oračić, 1997).

were much more important for unions than employment level being protected by rigid employment legislation.

[11] Before this law, labour relations were regulated by the Employment Act from 1992 and the Basic Employment Rights Act from 1991.

After two changes concerning less contentious items in 2001, Labour Act was finally amended in 2003 with the aim to have more flexible labour legislation[12]. Changes that happened with this Act can be divided into following categories: modernization and democratization of labour relations; simplification of regulation of labour relations (flexibilization) in order to facilitate employment and the consequent increase of employability in the labour market; and the need for further harmonization of labour relations regulation in Croatia with those in the European Union (Gotovac, 2003). Flexibility was improved by introducing atypical forms of work such as work in a separate place of work and temporary employment agencies as well as reduction of workers' rights to severance payments and notice periods what caused the most disagreement among the general public. . However, it has been said that more flexibility in the labour market was only quantitative in nature, especially in the case of severance payments[13] but the overall effect might have been negligible Although the overall employment protection legislation index (EPL) decreased in 2004, it still remained above the EU and OECD average (Matković and Biondić, 2003). The relaxation of the EPL was accompanied by certain government concessions in the form of increased level and duration of unemployment benefits (Šošić, 2004).

In spite of the orientation towards market rules and accompanying legislation, the situation in the Croatian labour market remained quite unfavourable for many years after the transition has started. For instance, job destruction continued to exceed job creation until 2001, although there was strong output growth for a number of years. And even though the improvement in the aggregate net job creation rate is recently evidenced, it resulted from a decreasing job destruction rate and not from a higher job creation rate. Although it was expected that the new private sector will contribute to new job creation, it actually reported significant proportion of job destruction as well (Šošić, 2008), which indicates deeper structural problems. Though one may say that the slow pace of restructuring in state-owned enterprises is a consequence of the poor management, it appears that in

[12] The articles concerning firing procedures (notice period and severance payment) entered into force on 1 January 2004.

[13] Now defined in gross amount, as opposed to earlier definition in net amount.

the private sector it is prevented generally by institutions and regulations (Rutkowski, 2003). While the adjustment of employment in state owned and privatized enterprises on average takes a long time, the new private sector takes a disproportionate burden of adjustment which lends support to the *dualism hypothesis* in Croatian labour market (Šošić, 2004). Adjustment has been further limited also by inherited process of collective bargaining preserving the existing wage structure (Vujčić and Šošić, 2008).

However, Croatia is still, twenty years after the transition process has started and after all sorts of institutional and legislative adjustments, a country characterized by underdeveloped labour market institutions with strict employment protection legislation. Additionally, very high inactivity rates among the working-age population (37.6 percent in 2009) and high share of those who are unemployed for more than 12 months (56.1 percent of total unemployed persons in 2009) aggravated the situation in the labour market even before the current economic crises. Financial and economic crises that in Croatia started at the end of 2008, brought into light all the problems in the labour market that were hidden under the surface all those years before. Massive layoffs in the private sector with the protected public sector employees by unions and collective agreements once more showed all the inflexibility embedded in the Croatian labour market system. Today the situation is the rate of unemployment of 11.5 percent[14] while the rate of activity for those over 15 years of age is only 46.3 percent. Low activity rate usually reflects poor employment opportunities associating with the effect of discouraged workers (Rutkowski, 2003).

All these things search for a further assessment of what actually happened in Croatia in the period of analysis, by taking into an account different factors in the labour market. Thus, economic, institutional, as well as individual characteristics are taken into account when assessing the reasons for high unemployment and inactivity in Croatia.

[14] Based on Labour Force Survey for the period July-September 2010. However, the registered (at the Croatian Employment Office) rate of unemployment for the December 2010 was much higher, it amounted 18.7 percent. This might suggest that a number of people actually work in an informal sector of the economy.

Empirical model and the description of the data

Data description

The data used in the paper are from Croatian Labour Force Survey (LFS) conducted on consecutive years in the period 1996-2006. Following the structure of the survey together with the above described changes in legislation considering dismissal costs the data are pooled into three different groups based on three different time periods: 1996-1998, 2000-2003[15], and 2004-2006. First group of data is pooled together based on first Labour Act in Croatia that entered into force on January, 1, 1996, while the second reason concerns the specific structure of the survey being different in many aspects if compared to the surveys following after 1998. This period is characterized by quite rigid labour market, but with solid rate of economic growth. The second group is composed of the data from surveys conducted in the period from 2000 to 2003, before the new amended Labour Act that implemented decreasing dismissal costs entered into force at the beginning of 2004. In addition, political (government) changes that happened in this period also affected the overall economic activity. Following group consists of the data from 2004 to 2006, the period of more flexible labour market and higher economic growth. In these years surveys were mostly conducted on half-yearly basis with independent sample. Thus, looking only at the legislative changes, we have two sub-periods:

- *pre-reform*, before 2004 with more rigid labour market legislation, and
- *post-reform*, after 2004 with more flexible labour market legislation.

Research on the labour market participation of people follows the assumption that their labour market status is mutually exclusive. According to their answers to similar questions in the surveys, respondents have been grouped into one of three homogeneous statuses:

[15] The LFS for 1999 is left out of the analysis because of the inexistence of data on wages (for the employed) in the survey which is an important variable for further analysis. Similar reason applies for the omission of LFS for the period from 2007 onwards since there were no data on reservation wages (for the unemployed) in those questionnaires. However, the results using imputed data on wages and reservation wages for these time periods are available from authors upon request.

- *employment*, including those holding permanent or temporary paid jobs, or the self-employed;
- *unemployment*, including those who are jobless and registered at the employment agency;
- *inactivity*, including those still undergoing some kind of schooling, those holding domestic unpaid jobs, and retirees; while those undergoing military service, imprisoned or disabled are left out of the sample.

[Table 1 near here]

Table 1 presents summary statistics of the main variables used in the analysis for each of the above-mentioned periods. The data in the table are presented for two groups: entire sample from the Labour Force Survey and the sub-sample of the so-called *switchers*, who are defined as the individuals within a group of the employed that switched from inactivity or unemployment to employment, or from one employer to another in the period of one year. However, besides the *successful switchers* (those that became employed or changed their employer within a year) that are presented in the table, we also have the *unsuccessful switchers* who searched a job or wanted to change their existing job but failed to do so in a given year. All the variables in the table, that is, all the characteristics of the individuals from the survey are grouped into four different categories: individual characteristics, distribution by occupation, distribution by industry, and general economic conditions.

It needs to be emphasised that all variables except age, local rate of unemployment, wages, and years of schooling, are in a binary (dummy) form (1 or 0). Several variables deserve additional clarification. Industry variables are defined according to NACE[16] classification, that is, *services* are codes G to N; *manufacturing* is D to F; while all other NACE codes are in the category *other industry*. Similar is done with occupations, where the division was done according to ISCO[17] classification: *white collar* for codes 1 and 2; *blue collar* for codes 5, 6, 7, 8, and 9; and other ISCO codes are in *other occupations*. Local rate of unemployment is calculated for each year separately

[16] Classification of Economic Activities in the European Community.
[17] The International Standard Classification of Occupations.

on a county (NUTS 3) level. Unfortunately, for the first group of data (1996-1998) there is no information about the identification of counties and, therefore, no local unemployment rate could have been calculated.

The reservation wage is represented by the net monthly wage in the current job for employed job seeker and net wage for which the unemployed/inactive would be 'willing' to accept a job offer, for which the Labour Force Survey provides information. Obviously, for the first group of the respondents in the survey (employed job-seekers) the reservation wage is an objective measure of their actual monthly earnings while for the second group (unemployed job-seekers) the reservation wage is a subjective measure of their desires and expectations. Hence, in the empirical analysis the reservation wage will be differentiated for the two types of job-seekers.

If we look at the presented data in Table 1 we can see that those persons that became employed or changed their employer within a year were on average younger, male, single, more educated, worked in a service sector, and had lower reservation wage relative to the entire sample. Looking at the changes over periods, we can observe that people included in the survey are getting older, both in the entire sample as well as in the sub-sample of switchers. Naturally, both the reservation wage and the average industry wage have increased over time also. In addition, years of schooling increased a little bit, while local unemployment rate decreased on average in the two sub-periods for which it was calculated. No significant changes are visible in the data pre- and post-labour legislation reform. However, this is only descriptive statistics, where stronger evidences are given in the next section using probit estimation.

We are aware of certain limitations using Croatian Labour Force Survey for studying switching behaviour of individuals. Probably the major limitation of the data is that Croatian Labour Force Survey has not been structured in a 'panel mode' (until couple of recent years) which disabled tracking individuals over the years. Therefore, different groups (based on their labour market status) among 'switchers' were created and analysis was done following these groups. Another limitation is the change of the survey configuration over the years which made it

impossible to have the same construction of the used variables in all the years[18]. However, it is important to mention that we have utilized all LFS series available in order to analyse labour market dynamics as deep as possible. If we assess time period of LFS from an institutional point of view, we can see that the beginning of our analysis falls in the period of late privatization of former socialist firms, while the latter period corresponds with the period of intense restructuring.

The empirical model

In the model it is assumed that firms don't have perfect information about job applicants when trying to fill vacant position. Yet, hiring depends on the information available to potential employers (Mortensen and Pissaridies, 1994) who are guided by the profit maximization goal. We have already stated how one of the main assumptions in the model implies that firms make higher profits out of good workers than out of bad ones. Due to the high dismissal costs employers will become very cautious when employing a new worker, which means that hiring costs are dependent upon firing costs. In the asymmetric information model, firms can use discretion in terms of whom to fire and, thus, low quality workers are more likely to be dismissed than high quality workers. As a consequence, the portion of low quality workers is higher among the unemployed than among the employed, and the employers who intend to hire are aware of this fact.

Therefore, we firstly make the distinction between two types of job-seekers: one that is already employed and the other that is searching for a job being out of the official employment status, that is, either unemployed or out of the active population. Nonetheless, all these potential employees have one thing that ultimately determines whether they will accept a job offer or reject it and continue searching. It is assumed that the individual will continue searching until the expected

[18] Some of the questions were left out from the survey in some years, and additional questions were added that helped to define our variables in different time periods. For example, the definition of 'switchers', i.e. those job-seekers that successfully found a job or changed their employer relayed on different, yet similar, set of questions depending on the time period. In the period 1996-1998 a combination of questions was used in order to get labour market status of a person one year ago (there was a question that asked about the number of years spent at current employer); later on there was the exact question about the labour market status one year preceding the survey; while in the last period there was no question indicating number of years at current employer (thus, the year of the first employment in combination with the year that the survey took place was used).

marginal return equals the marginal cost of search (Stigler, 1962). In this fashion, all job-seekers set their optimal reservation wage (Blackaby et al., 2006).

Success in finding a job depends on the *contact rate*, on the *job offer rate*, and on the *acceptance rate*. The main difference between 'good' and 'bad' workers is in the job offer rate that depends on expected productivity of potential employee. The dependent variable *y* takes the value of 1 if the person was successful in finding a job within a given time interval and the value of zero otherwise. If *J(m, η)* is the value of a job to the firm, we might assume that firms extend a job offer if the expected profits *(J)* out of hiring an applicant are greater than or equal to the hiring cost, and they do not make a job offer if the expected profits fall below the hiring cost, or:

$$y = \begin{matrix} 1 & if & EJs \geq C \\ 0, & otherwise & \end{matrix} \tag{6}$$

Assuming *EJs–C* be a continuous random variable measuring expected individual productivity over hiring costs, it can be expressed as a linear function of a vector of explanatory variables and a random term, ε:

$$EJ - C = y_{it}^* = \beta_0' X_{it} + \beta_1' OCC_{it} + \beta_2' IND_{it} + \beta_6' Y_t + \beta_3 U_{it-1} + \beta_4 u_{it}^l + \beta_5 w_{it}^r + \varepsilon_{it} \tag{7}$$

From this, we can derive the following:

$$y = \begin{matrix} 1 & if & y_{it}^* = \beta_0' X_{it} + \beta_1' OCC_{it} + \beta_2' IND_{it} + \beta_6' Y_t + \beta_3 U_{it-1} + \beta_4 u_{it}^l + \beta_5 w_{it}^r + \varepsilon_{it} \geq 0 \\ 0 & if & y_{it}^* < 0 \end{matrix} \tag{8}$$

Thus, if ε is assumed to be normally distributed the expression for the probability of finding a job is:

$$\begin{aligned} &\Pr(y = 1) = \Pr(\beta_0' X_{it} + \beta_1' OCC_{it} + \beta_2' IND_{it} + \beta_6' Y_t + \beta_3 U_{it-1} + \beta_4 u_{it}^l + \beta_5 w_{it}^r + \varepsilon_{it} \geq 0) = \\ &= \Phi(\beta_0' X_{it} + \beta_1' OCC_{it} + \beta_2' IND_{it} + \beta_6' Y_t + \beta_3 U_{it-1} + \beta_4 u_{it}^l + \beta_5 w_{it}^r) \end{aligned} \tag{9}$$

where Φ is cumulative normal distribution, index *i* stands for an individual, while index *t* determines period (year). X_{it} is a vector of individual characteristics of job seekers like: age, gender, marital status, has the person had any training in the last three months, is it head of the household, and its place of residence concerning urban vs. rural settlement. Variables OCC_{it} and IND_{it} represent vectors of job-seeker's occupation and industry, respectively. Here, the *white collar* category in occupations and *services* in industries are treated as the base, captured in the regression

constant. U_{it-1} is unemployment dummy being 1 for those that were unemployed a year before; u_{it}^{l} is local unemployment rate; w_{it}^{r} represents reservation wage; and Y_t is the annual dummy variable that controls for general economic conditions.

Evidently, variables contained in vector *X* influence all three parts of the *job finding rate*: the *contact rate*, the *job offer rate*, and the *acceptance rate*[19]. However, the *acceptance rate* is also influenced by the reservation wage (w^r) while the *job offer rate* is mainly characterized by the employment status in the previous period (U) which serves as a signal of the applicant's productivity. *Contact rate*, on the other hand, should be additionally affected by the local unemployment rate and economic activity (proxied by year dummies). Hence, the model in the paper estimates the probability of finding a job for different types of job-seekers, that is, probability of switching from inactivity or unemployment to employment, or from one employer to another in the period of one year.

However, it is expected that in the original specification of the model (equation 9) the reservation wage is endogenous, that is, this variable is determined within the model. It is usually explained that there is a correlation between this (endogenous) variable and the error term, that is $\text{cov}(w^r, \varepsilon) \neq 0$. Therefore, instead of the original probit estimation, we actually have:

$$\Pr(y = 1 \mid X = x, Z = z) = \Phi(\beta_x^{'} x + \beta_z^{'} z) \tag{10}$$

where $X = (1, X_*^{'})^{'}$, X_* is a vector of covariates presumably measured without error, and Z (w^r) is a predictor vector subject to measurement errors (Buzas and Stefanski, 1996). If the endogeneity of w^r is ignored, the coefficient is inconsistently estimated.

In order to solve this problem, instrumental variable probit estimation[20] is used. This technique deals with the problem of endogeneity using instrumental variables (instruments) that have to be uncorrelated with the error term and correlated with the endogenous independent

[19] Brown et al. (2009) have done similar thing in their paper where they showed how matching and separation probabilities can be understood in terms of *job offer*, *job acceptance*, *firing*, and *quit* probabilities, which may be derived from the optimizing decisions of firms and workers. Thus, they showed that this evades the need for the classical matching function.

[20] By default, ivprobit uses maximum likelihood estimation.

variable, that is, $\text{cov}(z, \varepsilon) = 0$ and $\text{cov}(z, w^r) \neq 0$. Usually it is very hard to find variable that is correlated with endogenous variable (*reservation wage* in our case*)* but not with the error term in the presented model. For example, Addison et al. (2009) use unemployment benefits, unemployment duration, and job offers as determinants of reservation wage. Yet, they made their work based only on the reservation wages for unemployed, while this paper defines reservation wage for both employed and unemployed. Therefore, information on unemployment benefits and unemployment duration could not have been used in this instance since they apply only for those that are currently unemployed, while the information on job offers in Croatian Labour Force Survey does not exist.

Taking into account institutional characteristics and variables in equation 9, years of schooling and regionally adjusted industry wage[21], were chosen as the appropriate instruments for reservation wage in the presented model. We assume that they highly affect reservation wage, but not switching to employment[22]. Average wage in the individual's industry (according to NACE classification) in all the regions except the one where he/she lives (works) evidently has impact on his/her reservation wage, but there is no visible impact on the probability to switch to employment. This is especially plausible in the Croatian case where geographical mobility of workers is almost inexistent (Botrić, 2007). Again, for the first group of data (1996-1998) there is no information about the identification of counties and, therefore, different instrument needed to be used. In this case, the wage for each sector (industry) in a particular year served as an instrument for endogenous regressor, that is, reservation wage. Our choice of instruments was based on characteristics of wage setting process in Croatia. We have already mentioned that labor market adjustment did not occur as much through changes in relative prices, i.e. relative wages of different categories of workers, as through an adjustment in quantities (Vujčić and Šošić, 2008). Central bargaining at the industry level set initial wage structure imposing minimum levels for different levels of education.

[21] Average wage in one's industry of employment, but different regions. For those not employed at the time of the survey industry of previous employment was used in order to calculate average industry wage.

[22] Correlation matrices in appendix (Appendix 3) show that these variables are correlated with reservation wage but not with the variable that determines 'switchers'.

Employers, especially in the state sector, stick to this pre-determined wages. Therefore we argue that educational attainment explains variation in reservation wage[23] but not being correlated with error term in the main equation. Part of variation in dependent variable (switching to employment) that might be contributed to educational attainment is already picked up by variables indicating blue/white collar occupation (see correlation matrices in appendix).

Results

Based on equation 9 that represents the central part of our empirical model we first ran probit estimation in order to predict the probability that a person would switch to employment (either from unemployment and inactivity, or to switch employers) within a period of one year using all the variables that could have impact on the *job finding rate* (presented in Table 1). After this first step, in order to correct for endogenous independent variable (reservation wage), we ran instrumental variable probit (IV probit) estimation with the same set of variables used in the first step, but with the change that reservation wage has been 'instrumented' by years of schooling and regionally adjusted industry wage (industry wage for the period 1996-1998). In the end we test the effect that unemployment benefits have on the probability to switch (via reservation wages).

Probability to switch

Since the coefficients from the probit model are difficult to interpret, marginal effects of different variables on the probability of switch to employment for all three groups of data (1996-1998; 1999-2003; and 2004-2006) are presented in Table 3. Table 4 presents the same analysis but with the ivprobit estimation. Additionally, in order to better grasp the differences in probabilities of employment between different types of job-seekers, the result for both probit and ivprobit models are presented separately for employed and unemployed/inactive job-seekers[24] (Table 2). The control

[23] Years of schooling usually serves as an important explanatory variable for wage differentials as showed, for instance, in Mincer (1974) or Tachibanaki (1998).

[24] Descriptive statistics for the two types of job-seekers (employed and unemployed/inactive) is given in Table 2. Unemployed and inactive are grouped together because even though a year before the survey took place some of them were inactive in the labour market, when they started to look for a job they

group in both models is represented by male, married, white collar worker working in service sector.

[Table 2 near here]

In general, results in Table 3 show that younger male job-seekers have the highest probability of switching from unemployment (or inactivity) to employment or from one employer to another. Yet, if they work in manufacturing industry or live in the region with higher unemployment rate they are less likely to change their job or to become employed. The latter means that since the *contact rate* is smaller in the regions with higher unemployment rate, all other being constant, the overall *job finding rate* should be smaller for the job-seekers who live in counties with higher unemployment rate. Looking at the results over periods, one can observe that there is a general increase in the probability to 'switch' for the control group, with this effect being higher for the employed type of job-seekers.

Indeed, more interesting results come up when looking at the two types of job-seekers separately. For instance, the age variable has much higher negative impact on the probability to find an employment for unemployed job-seekers indicating that unemployed job seekers are most probably subject to statistical age discrimination. When looking at the estimates between two periods concerning the changes in the legislation (2000-2003 and 2004-2006) one can observe even stronger effects of age and gender variables for the unemployed group after the 2004, which confirms previously said about the partial reform and only quantitative increase of flexibility in the labour market.

Additionally, reservation wage has a positive impact on the probability to change a job for employed job-seekers, while it negatively affects the probability to 'switch' for unemployed job-seekers. The first case probably indicates that these flows are more supply than demand driven. If

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were probably unemployed for some time (not visible in the survey data) before they become employed. In addition, the share of those inactive is pretty low to be singled out in a separate group (except for the period 1996-1998 (see Table 2)). Therefore, for the rest of the chapter, this group will be called only 'unemployed' having in mind that is composed of both unemployed and inactive job-seekers.

people with higher reservation wages are more likely to switch and if they switch on their intention, there are no dismissal costs. Nevertheless, the second case is much more compelling. Here, the higher the reservation wage the lower the probability to find an employment. Lower probability for employing this type of people signals the effect of firing costs. As explained earlier, firing costs in the model depend on the reservation wage. Apparently, employers perceive labour market status as a *signal* of job-seekers' productivity, that is, they believe that there are more bad workers among the unemployed group and since firing (and hiring) costs are high they cannot 'afford' to hire from this group. Hence, the *job offer rate* is smaller for the unemployed job seekers, which indicates that there is *adverse selection* in the Croatian labour market when it comes to employment of different types of job-seekers (employed vs. unemployed). However, this coefficient gets lower in every observed period, especially after reform indicating smaller effects of the firing costs on the employment of unemployed job-seekers.

[Table 3 near here]

Other important differences between these two types of job-seekers are in their occupation and industry of employment, mostly demand driven processes. For instance, job seekers being employed in service sector had higher probability to switch their jobs within a period of one year, if compared to employees in manufacturing or other industries. Similarly, unemployed job seekers that fell into group of white-collar occupation exhibited higher probability of switching to employment in all periods under study while there were no significant differences in the case of employed job seekers (except of the positive impact for blue collar workers in the second period of the study). Additional variables in the tables (not explained earlier) are year dummies which should control for economic conditions (along with local unemployment rates) and affect the *contact rate*. In each of the three groups of data the first year is taken to be a base against which the effects of other years in the pool are being estimated. As evidenced in table 3, there are different effects of general economic conditions on the probability to find an employment for different types of job-

seekers. For example, after labour legislation reform in 2004, employed job seekers find a new job more easily in 2005 and 2006, while for the unemployed ones it was the opposite.

Table 4 reports the estimated coefficients using ivprobit methodology that controls for endogeneity of the reservation wage. If we look at the outcomes in Table 4 and compare to those in Table 3, we can find some interesting distinctions. When controlling for endogeneity of the reservation wage, the age effect is less negative for unemployed job seekers but having the same magnitude for employed job seekers. The significant change appears in the case of gender differences: if we control for endogeneity of reservation wage, unemployed women exhibit higher probability of employment indicating that average unemployed men had lower education then average unemployed women[25]. As expected, local unemployment rate (where significant) always negatively affects the probability to 'switch'. In addition, general economic conditions (proxied by year dummies) in most of the cases have opposite effect on the employed and unemployed switchers. Again, the overall probability to find an employment in a given year is higher for the unemployed/inactive population, while pre- and post-reform estimations give similar results as with the probit estimation.

[Table 4 near here]

Still, the most interesting thing happened with the endogenous variable in the original model – the reservation wage. This variable is significant and positive only for the unemployed job seekers while for the employed ones is negative and insignificant. By modelling reservation wage – it depends on educational attainment (in addition to regionally adjusted industry wage) and obviously unemployed job seekers with higher education were more likely to switch to employment if compared to their less educated counterparts. Evidently, educational attainment signals higher productivity individuals in the pool of unemployed job seekers.

Willingness to search for a job

[25] These differences in the average years of schooling for unemployed women vs. unemployed men in the period 1996-1998; 2000-2003; and 2004-2006 are 0.36; 0.15; and 0.20, respectively.

Although previous results (Tables 3 and 4) indicated that there exists a statistical discrimination against the unemployed in the Croatian labour market, how can one be sure that the employers are the ones who are discriminating, not the unemployed themselves? Namely, willingness to search for a job (or accept an offered one) highly depends on the amount of income that unemployed person has at his/her disposal. Evidently, government transfers like social and unemployment benefits, could increase the disposable income for those out of the employment, and thus lower the willingness to search for a job. For instance, Mortensen and Pissarides (1999) explain how unemployment insurance influences both the incentives to accept a job, and, therefore, the duration of unemployment and wages. Even though it has already been said that information on unemployment benefits apply only for those that are currently unemployed and, thus, could not have been used in the model for the overall sample, this standard assumption in the literature should be further checked.

In order to examine this, we calculate elasticity estimates of the reservation wage with respect to unemployment benefits, following the methodology used in Blackaby et al. (2006). If we return to Section 3 we can see that the reservation wage for the unemployed population (as defined according to Addison et al., 2009) depends upon unemployment benefits, wage offer, and the discount rate. Pretty much the same definition is used in the Blackaby et al. (2006) paper[26]. Accordingly, they express the elasticity of the reservation wage with respect to state benefits as:

$$\frac{\partial Lnw^r}{\partial Lnb} = \frac{b}{w^r}\frac{1}{1+\theta/\rho} = \frac{b}{w^r}\frac{x-w^r}{x-b} \tag{11}$$

where w^r is the reservation wage; b is the amount of unemployment benefits; θ is the probability of finding a job (the product of the job arrival probability and the probability of accepting a job offer which is also the *hazard rate*); ρ is the discount rate; and x represents expected wages in employment ($x = E(w \mid w > w^r)$).

[26] $w^r = \frac{\lambda}{\rho}\int_{w_r}^{\infty}(w-w^r)dF(w) + b - c$, where b are non-employment benefits, λ is the arrival rate of job offers, ρ is the discount rate, $F(w)$ is the wage offer distribution, and c is the cost of search (Blackaby et al., 2006: 3).

In addition, assuming that the wage offer distribution is Pareto distributed, they also expressed the elasticity of the *hazard rate* with respect to the unemployment benefits:

$$\frac{\partial Ln\theta}{\partial Lnb} = \frac{f(w^r)}{1-F(w^r)^{1+\theta/\rho}} = -\frac{b}{\sigma w^r}\frac{x-w^r}{x-b} \qquad (12)$$

where $f(\cdot)$ is the density function of wage offers and σ is the standard deviation of the log of wage offers, which in turn equals to $(x-w^r)/x$.

Since in our original database (LFS) there was no information about monetary amount of the unemployment benefits we used the average monthly amount of the unemployment benefit[27] for the respective year for every person who indicated that he/she received unemployment benefits in monetary terms[28] at the time the survey was conducted. The expected wages in employment are also represented as the averages in each year of study. In order to proceed with the estimation, one additional thing needs to be satisfied, the so-called *rationality condition*: $b \leq w^r \leq x$.

Elasticity estimates based on expressions 11 and 12 are reported in Table 5. Values of the elasticity of reservation wages to unemployment benefits fall within a narrow range for all the periods analysed – from 0.17 to 0.18. In addition, the changes expressed in monetary terms[29] range between 0.40 and 0. 48, that is, the increase in benefits by 1 Croatian kuna increases the reservation wage by 0.40 kunas to 0.48 kunas. These results are similar to those obtained in the work by Blackaby et al. (2006), although somewhat higher. However, this is not a surprise since this analysis is done for the unemployed persons, while they did their research using the data for the economically inactive population.

[Table 5 near here]

[27] Obtained from the Croatian Employment Service.

[28] There is also the possibility to get pension and/or health insurance while unemployed and registered at the Employment Office.

[29] In this case we use formulas from Lancaster and Chesher (1983) where $\frac{\partial w^r}{\partial b} = \frac{1}{1+\theta/\rho}$, with $\frac{\theta}{\rho} = \frac{w^r - b}{x - w^r}$ which yields: $\frac{\partial w^r}{\partial b} = \frac{x-w^r}{x-b}$.

On the other hand, increasing benefits reduces the *exit rate*, with elasticity estimates ranging from -0.47 to -0.67. Again, this result is expected since higher benefits for the unemployed should decrease their probability to find a job. In addition, after the reform of labour market legislation in 2004, the elasticities decreased. However, this result is expected since that law increased both the level and the duration of unemployment benefits for the unemployed. On the whole, putting these two results together should tell us that the higher the unemployment benefits the higher the reservation wage and the lower the *exit rate*. This is very similar to the estimations reported in Table 4[30].

However, being that relatively small number of unemployed persons in Croatia receives some kind of monetary benefit during the period of unemployment[31], this variable probably has no significant negative impact on the employability of the unemployed job-seekers. In addition, the *replacement rate*[32] as well as the duration of the eligibility for those that that actually receive it are also quite low. All these factors condition that unemployment benefits are probably not significant de-motivating factor of activating the population, so one can assume that the system of unemployment benefits has no greater impact on the level of unemployment in Croatia (Rutkowski, 2003). Therefore, some other conclusion should apply here. Evidently, according to our second model, if we model variation in reservation wage being explained by different educational attainment, the higher the reservation wage the higher the probability to become employed for the unemployed job-seekers.

Conclusions

[30] These results should be taken with caution since we have used the average monetary benefit in one year for all the unemployed persons that stated they receive benefits, and the situation in reality is different since the amount of monetary benefits depends on many factors and almost every person receives different amount. Still, the results are in accordance with the theory, that is, assumption that unemployment benefits increase reservation wage and decrease the probability to find a job.

[31] Coverage ratio was below 20 percent during most of the observed period, while, despite its increase, in 2009 only 28 percent of all the unemployed were covered by the unemployment benefits (World Bank and UNDP, 2010).

[32] The share of monetary fee in the average wage.

This paper combines several different aspects of the job search literature in order to study employment prospects of different groups of job-seekers in Croatia. It addresses the issue of matching and adverse selection in transitional and post-transitional context by augmenting the standard *model of adverse selection* in a country characterized by underdeveloped labour market institutions with strict employment protection legislation. Although some aspects of the model are simplified to preserve analytical tractability, new variables, like (endogenous) dismissal costs and reservation wage, are introduced in order to capture the process of decision making and subsequent matching between employers and employees. Additionally, when addressing these issues, the study focuses on differences in institutional characteristics over time and controls for moral hazard problems.

Using the data from Croatian Labour Force Survey in the period 1996-2006, the analysis covers considerably long time span, which captures both the period during the transition as well as the one after transition. Based on the institutional and economic environment in the Croatian labour market, in addition to the structure of the survey, the empirical analysis was conducted by grouping the data into three different periods: 1996-1998; 1999-2003; and 2004-2006. The main goal was to identify the characteristics of job-seekers (employed and unemployed/inactive) who have the highest probability to 'switch'; that is, to change an employer or to find an employment in a period of one year.

By employing probit estimation, our main results show that there exists an adverse selection in the Croatian labour market for the unemployed (inactive) job-seekers. Namely, the reservation wage has a positive impact on the probability to change a job for employed job-seekers, while it negatively affects the probability to 'switch' for unemployed job-seekers. One of the main assumptions of the model is that employers perceive labour market status as a *signal* of job-seekers' productivity, that is, they believe that there is higher proportion of lower productivity workers among the unemployed group. Since firing (and hiring) costs are high they cannot 'afford' to hire from this group and, thus, lower probability for employing the unemployed signals the effect of

firing costs, that is, adverse selection in the labour market due to high dismissal costs. Still, the overall probability to find an employment in a given year is higher for the unemployed/inactive population. Results show no significant differences between the periods, except that there is a general increase in the probability to 'switch' for the control group (male, married, white collar worker working in service sector), with this effect being higher for the unemployed type of job-seekers.

However, if we treat reservation wage variable as being endogenous and use instrumental variable (IV) probit estimation, the effect of reservation wage on probability to switch becomes significant and positive only for the unemployed job seekers and insignificant for the employed job seekers. This result could be explained by the effect of one of the 'instruments'. Educational attainment, used as an instrument, appeared to be more important variable for the unemployed than for the employed 'switchers'. Education, therefore, serves as an important signal of higher productivity individuals in the pool of unemployed job seekers.

In the end, we test the possibility of self-discrimination for the unemployed job-seekers receiving unemployment benefits. In order to do that, we estimate elasticities of the reservation wage with respect to unemployment benefits. Depending on the period of analysis, an increase in benefits by 1 Croatian kuna increases the reservation wage from 0.40 kunas to 0.48 kunas, with the higher increase after the reform of labour market legislation in 2004. On the other hand, increasing benefits reduces the *exit rate*, that is, probability to find an employment. These results are consistent with regression estimation if not controlling for educational attainment.

Finally, the effect of reservation wage on employment probabilities for employed and unemployed job seekers is getting lower indicating lower impact of reservation wage on firing costs. This indicates less stringent labour market regulation that leads to lower firing costs at the firm level. Even though changes in legislation were not considered to be adequate enough, they evidently have some impact on the decreasing effect of firing (and hiring) costs on the employment.

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Appendix 1. Effects of firing costs on dismissal thresholds

In the original model (Kugler and Saint-Paul, 2004) $J(m,\eta)=\frac{(1-\varphi)(m+\eta-w^r)+\gamma\hat{J}(\eta)}{r+\gamma+a}$

represented the value of a job filled if $m \le \tilde{m}$ [33], where

$\hat{J}(\eta)=\int_{m_c}^{\overline{m}} J(m,\eta)g(m)dm - G(m_c(\eta))F(w)$ (now F is a function of w), which after some

transformations becomes:

$$\hat{J}(\eta)=\frac{\left[\int_{\tilde{m}}^{\overline{m}}\frac{(1-\varphi)(m+\eta-w^r)}{r+\gamma}g(m)dm+\int_{m_c}^{\tilde{m}}\frac{(1-\varphi)(m+\eta-w^r)}{r+\gamma+a}g(m)dm-G(m_c(\eta))F(w)\right]}{\left\{1-\frac{\gamma}{(r+\gamma)}\left[G(\overline{m})-G(\tilde{m})\right]-\frac{\gamma}{(r+\gamma+a)}\left[G(\tilde{m})-G(m_c(\eta))\right]\right\}} \quad \text{(a.1)}$$

Totally differentiating equation 3 with respect to η, w^r, and w (as a replacement for F) and equation a.1 with respect to η, w^r, and w (as a replacement for F), we get the following results:

$$\frac{dm_c}{d\eta}=-1-\frac{\gamma}{(1-\varphi)}\frac{d\hat{J}(\eta)}{d\eta};$$

$$\frac{dm_c}{dw^r}=\frac{-dF(w)}{dw}(r+\gamma+a)+1-\frac{\gamma}{(1-\varphi)}\left(\frac{d\hat{J}(\eta)}{dw^r}\right);$$

$$\frac{dm_c}{dF(w)}\Rightarrow\frac{dm_c}{dw}=-\frac{dF(w)}{dw}\frac{(r+\gamma+a)}{(1-\varphi)}-\frac{\gamma}{(1-\varphi)}\left(\frac{d\hat{J}(\eta)}{dw}\right);$$

where:

$$\frac{d\hat{J}(\eta)}{d\eta}=\frac{\left[\frac{(1-\varphi)}{(r+\gamma)}\left[G(\overline{m})-G(\tilde{m})\right]+\frac{(1-\varphi)}{(r+\gamma+a)}\left[G(\tilde{m})-G(m_c(\eta))\right]\right]}{\left\{1-\frac{\gamma}{(r+\gamma)}\left[G(\overline{m})-G(\tilde{m})\right]-\frac{\gamma}{(r+\gamma+a)}\left[G(\tilde{m})-G(m_c(\eta))\right]\right\}}>0;$$

$$\frac{d\hat{J}(\eta)}{dw^r}=-\frac{d\hat{J}(\eta)}{d\eta}-\frac{\frac{dF(w)}{dw}(1-\varphi)G(m_c(\eta))}{const.}<0\left\langle \sin ce\ \frac{dF(w)}{dw}\ge 0\ \&\ \frac{d\hat{J}(\eta)}{d\eta}>0\right\rangle;$$

$$\frac{d\hat{J}(\eta)}{dF(w)}\Rightarrow\frac{d\hat{J}(\eta)}{dw}=\frac{-\frac{dF}{dw}G(m_c(\eta))}{\left\{1-\frac{\gamma}{(r+\gamma)}\left[G(\overline{m})-G(\tilde{m})\right]-\frac{\gamma}{(r+\gamma+a)}\left[G(\tilde{m})-G(m_c(\eta))\right]\right\}}<0.$$

By substitution we get:

[33] If $m>\tilde{m}\Rightarrow J(m,\eta)=\frac{(1-\varphi)(m+\eta-w^r)+\gamma\hat{J}(\eta)}{r+\gamma}$.

$$\frac{dm_c}{d\eta} < 0 \tag{a.2}$$

$$\frac{dm_c}{dw^r} = \left[\frac{-dF(w)}{dw}(r+\gamma+a)\right] + \left[1 - \frac{\gamma}{(1-\varphi)}\left(\frac{d\hat{J}(\eta)}{dw^r}\right)\right] \tag{a.3}$$

Following Kugler and Saint-Paul (2004) we can prove that the second term in equation a.3 is positive. The first term is negative and the final effect of increasing reservation wage on dismissal threshold depends on the magnitude of positive and negative effect.

$$\frac{dm_c}{dF(w)} \Rightarrow \frac{dm_c}{dw} = \left[\frac{-dF(w)}{dw}\frac{(r+\gamma+a)}{(1-\varphi)}\right] + \left[-\frac{\gamma}{(1-\varphi)}\left(\frac{d\hat{J}(\eta)}{dw}\right)\right] \tag{a.4}$$

It can be shown that a value of a job decreases by wage increase. Therefore, the second term in equation a.4 is positive. The first term is again negative and the joint effect depends on the magnitude of positive and negative effect.

Although we know that $m_c(\eta_H) < m_c(\eta_L)$, we cannot be sure about the effect of change in reservation wage and *F* on dismissal threshold of good and bad workers. If we assume that *F* doesn't rely on wage, then we can prove that dismissal threshold for good workers are more responsive to change in *w* and *F* due to discount effect (Kugler and Saint-Paul, 2004). However, the opposite effect works through dismissal costs being related to wage. If we assume that quitting rate is higher in the case of high productive (good) workers if compared to less productive workers, but on the other hand good workers are less likely to be fired (lower *r*), then the magnitude of the second term determines the effect of *w* on dismissal threshold of good and bad workers. Therefore, we might conclude that dismissal threshold of good workers on *w* and *F* is more sensitive than dismissal threshold of bad workers.

Appendix 2. Effects of firing costs on the quality of unemployed

If assuming the steady-state conditions (inflow and outflow are the same for both types of workers) the relationship between z_U and p_U can be derived as follows:

$$z_U = z\frac{\gamma + \frac{ap_U}{G_L}}{\gamma + ap_U\left(\frac{1-z}{G_H} + \frac{z}{G_L}\right)} \tag{a.5}$$

From expression a.5 we get that $\frac{dz_U}{dp_U} = \frac{\frac{a}{G_L}(>0)}{\gamma a z(1-z)\left(\frac{1}{G_L} - \frac{1}{G_H}\right)}$.

If assuming that $G_L > G_H$ then $\frac{dz_U}{dp_U} < 0$.

Following Kugler and Saint-Paul (2004) we can show that the rise in *F* (followed by increase in *w*) decreases the proportion of good workers among unemployed, that is:

$$\frac{dz_U}{dF(w)}(p_u = const.) \Rightarrow \frac{dz_U}{dw} =$$
$$-\gamma\left[\frac{g_L}{(G_L)^2}\frac{dm(\eta_L)}{dw} - \frac{g_H}{(G_H)^2}\frac{dm(\eta_H)}{dw}\right] - \frac{ap_U}{G_H G_L}\left[\frac{g_L}{G_L}\frac{dm(\eta_L)}{dw} - \frac{g_H}{G_H}\frac{dm(\eta_H)}{dw}\right]$$

If $G_L > G_H$ and $0 > \frac{dm_c(\eta_L)}{dw} > \frac{dm_c(\eta_H)}{dw}$ (Appendix 1.), then $\frac{dz_U}{dw} < 0$.

Appendix 3. Correlation matrices of the variables used in the regression

Table A1. Correlation matrix for the period 1996-1998

1996-1998															
variable	**switchers**	**age**	**gender-female**	**marital status - single**	**training in the last 3 months**	**head of house.**	**urban sett.**	**blue collar**	**other occup.**	**manufactur.**	**other indus.**	**unemp. dummy**	**res. wage**	**years of school.**	**average industry wage**
switchers	1.000														
age	-0.292	1.000													
gender-female	-0.023	-0.103	1.000												
marital status - single	0.234	-0.537	-0.082	1.000											
training in the last 3 months	0.071	-0.051	0.014	0.045	1.000										
head of household	-0.211	0.567	0.039	-0.636	-0.030	1.000									
urban settlement	0.014	0.088	0.101	-0.051	0.030	0.110	1.000								
blue collar	0.004	-0.114	-0.129	0.043	-0.076	-0.087	-0.249	1.000							
other occupation	-0.031	0.059	0.172	-0.025	0.047	0.057	0.184	-0.778	1.000						
manufacturing	-0.059	0.051	-0.130	-0.045	-0.052	0.026	-0.085	0.202	-0.132	1.000					
other industry	-0.062	0.054	-0.090	-0.008	-0.023	0.030	-0.164	0.101	-0.078	-0.282	1.000				
unemployment dummy	-0.026	0.072	0.014	0.030	-0.033	-0.033	0.020	0.051	-0.023	0.050	-0.049	1.000			
reservation wage	0.029	0.080	-0.185	-0.022	0.055	0.060	0.134	-0.246	0.089	-0.024	-0.089	0.038	1.000		
years of schooling	**0.065**	-0.053	0.055	0.037	0.081	-0.022	0.268	**-0.505**	**0.264**	-0.165	-0.166	-0.114	**0.280**	1.000	
average industry wage	**0.042**	0.004	-0.085	0.047	0.073	0.002	0.133	-0.327	0.252	-0.272	-0.013	-0.022	**0.216**	0.199	1.000

Table A2. Correlation matrix for the period 2000-2003

2000-2003																
variable	**switchers**	**age**	**gender-female**	**marital status - single**	**training in the last 3 months**	**head of house.**	**urban sett.**	**blue collar**	**other occup.**	**manufactur.**	**other indus.**	**unemp. dummy**	**local rate of unemp.**	**res. wage**	**years of school.**	**reg. adj. ind. wage**
switchers	1.000															
age	-0.338	1.000														
gender-female	-0.031	-0.106	1.000													
marital status - single	0.292	-0.600	-0.066	1.000												
training in the last 3 months	-0.025	-0.006	0.010	-0.009	1.000											
head of household	-0.268	0.589	0.069	-0.729	0.006	1.000										
urban settlement	0.040	0.054	0.024	0.018	0.011	-0.001	1.000									
blue collar	0.003	-0.117	-0.078	0.015	-0.027	-0.029	-0.244	1.000								
other occupation	-0.012	0.073	0.133	-0.023	0.020	0.055	0.151	-0.755	1.000							
manufacturing	-0.072	0.051	-0.176	-0.026	-0.004	0.014	-0.084	0.169	-0.099	1.000						
other industry	-0.031	0.026	-0.037	-0.021	-0.014	0.029	-0.131	0.074	-0.053	-0.244	1.000					
unemployment dummy	-0.205	0.084	0.014	-0.006	0.030	0.026	-0.024	-0.003	-0.001	0.033	-0.037	1.000				
local rate of unemploy.	-0.144	0.076	-0.007	-0.065	-0.002	0.039	0.015	0.016	-0.015	-0.045	0.022	0.147	1.000			
reservation wage	0.055	0.034	-0.163	0.018	0.019	-0.005	0.104	-0.228	0.084	-0.064	-0.085	-0.016	0.012	1.000		
years of schooling	**0.092**	-0.097	0.048	0.131	0.026	-0.120	0.253	**-0.486**	**0.203**	-0.130	-0.131	-0.054	-0.008	**0.272**	1.000	
regionally adj. ind. wage	**0.080**	-0.003	-0.036	0.047	0.040	-0.021	0.144	-0.297	0.237	-0.081	-0.456	0.037	0.019	**0.225**	0.216	1.000

Table A3. Correlation matrix for the period 2004-2006

2004-2006																
variable	**switchers**	**age**	**gender-female**	**marital status - single**	**training in the last 3 months**	**head of house.**	**urban sett.**	**blue collar**	**other occup.**	**manufactur.**	**other indus.**	**unemp. dummy**	**local rate of unemp.**	**res. wage**	**years of school.**	**reg. adj. ind. wage**
switchers	1.000															
age	-0.337	1.000														
gender-female	-0.032	-0.030	1.000													
marital status - single	0.225	-0.571	-0.176	1.000												
training in the last 3 months	0.017	-0.042	0.013	0.021	1.000											
head of household	-0.217	0.603	0.131	-0.722	-0.012	1.000										
urban settlement	0.009	0.046	0.060	-0.009	0.044	0.051	1.000									
blue collar	-0.033	-0.042	-0.116	-0.003	-0.073	-0.032	-0.221	1.000								
other occupation	0.003	0.019	0.121	-0.002	0.043	0.027	0.157	-0.791	1.000							
manufacturing	-0.051	0.069	-0.184	-0.031	-0.031	0.032	-0.072	0.164	-0.110	1.000						
other industry	-0.070	0.053	-0.028	-0.025	-0.016	0.026	-0.148	0.109	-0.077	-0.313	1.000					
unemployment dummy	-0.037	0.128	0.064	-0.032	-0.036	0.030	0.039	0.031	0.008	0.084	-0.115	1.000				
local rate of unemploy.	-0.061	0.057	-0.001	-0.074	-0.012	0.075	-0.006	0.053	-0.046	0.011	0.025	0.153	1.000			
reservation wage	0.088	0.023	-0.141	-0.028	0.054	0.047	0.129	-0.320	0.146	-0.034	-0.184	-0.072	-0.087	1.000		
years of schooling	**0.091**	-0.148	0.085	0.104	0.094	-0.106	0.224	**-0.500**	**0.243**	-0.149	-0.169	-0.121	-0.076	**0.352**	1.000	
regionally adj. ind. wage	**0.114**	-0.053	-0.003	0.029	0.031	-0.014	0.181	-0.332	0.253	0.097	-0.665	0.068	-0.016	**0.316**	0.270	1.000

Tables

Table 1. Summary statistics

period/ variable	1996-1998		2000-2003		2004-2006	
	entire sample	switchers	entire sample	switchers	entire sample	switchers
Individual characteristics						
age	39.48 (21.86)	30.67 (9.61)	40.94 (22.28)	31.98 (10.47)	42.79 (22.50)	32.07 (10.73)
gender – female#	.52 (.50)	.45 (.50)	.52 (.50)	.44 (.50)	.52 (.50)	.45 (.50)
marital status - single#	.23 (.42)	.46 (.50)	.24 (.43)	.48 (.50)	.25 (.43)	.51 (.50)
years of schooling	9.39 (3.98)	11.67 (2.48)	9.68 (3.87)	11.63 (2.48)	9.83 (3.78)	11.68 (2.36)
training in the last 3 months#	.01 (.11)	.03 (.18)	.01 (.08)	.01 (.11)	.01 (.08)	.02 (.12)
head of household#	.55 (.50)	.44 (.50)	.59 (.49)	.47 (.50)	.60 (.49)	.43 (.50)
urban settlement#	.52 (.50)	.59 (.49)	.48 (.50)	.50 (.50)	.44 (.50)	.46 (.50)
unemployment dummy#	.08 (.26)	.23 (.42)	.10 (.30)	.36 (.48)	.09 (.28)	.36 (.48)
Distribution by occupation						
white collar#	.11 (.32)	.12 (.33)	.12 (.33)	.12 (.32)	.12 (.33)	.11 (.31)
blue collar#	.65 (.48)	.67 (.47)	.63 (.48)	.68 (.46)	.64 (.48)	.69 (.46)
other occupation#	.24 (.43)	.21 (.41)	.25 (.43)	.20 (.40)	.24 (.42)	.20 (.40)
Distribution by industry						
services#	.44 (.50)	.57 (.49)	.46 (.50)	.55 (.50)	.46 (.50)	.55 (.50)
manufacturing#	.34 (.47)	.34 (.47)	.35 (.48)	.32 (.47)	.35 (.48)	.32 (.47)
other industry#	.21 (.41)	.09 (.28)	.18 (.39)	.11 (.32)	.19 (.39)	.12 (.32)
General economic conditions						
local rate of unemployment	n.a. (n.a.)	n.a. (n.a.)	.16 (.06)	.16 (.06)	.13 (.06)	.14 (.06)
reservation wage	1995.88 (1201.48)	1928.33 (1008.53)	2852.81 (1702.61)	2636.95 (1636.35)	3295.41 (1907.06)	3014.09 (1770.96)
average industry wage	2313.25 (501.51)	2285.42 (484.59)	3362.43 (797.49)	3308.44 (721.51)	4054.39 (891.65)	4030.01 (824.84)
regionally adjusted industry wage	n.a. (n.a.)	n.a. (n.a.)	2861.90 (795.81)	2925.66 (633.01)	3344.58 (898.79)	3436.16 (690.16)

Note: Standard deviation is in parentheses.
Data are represented as mean values or as share (for dummy variables - #) in the associated sample.
Source: Author's calculation based on Croatian Labour Force Survey for the period 1996-2006.

Table 2. Summary statistics among successful switchers for different types of job-seekers

period/ variable	1996-1998		2000-2003		2004-2006	
	emp	**unp/inct**	**emp**	**unp/inct**	**emp**	**unp/inct**
Individual characteristics						
age	33.95 (9.11)	27.19 (8.88)	34.42 (10.09)	29.60 (10.28)	35.19 (10.55)	28.97 (9.99)
gender – female#	.43 (.50)	.46 (.50)	.38 (.49)	.51 (.50)	.39 (.49)	.51 (.50)
marital status - single#	.31 (.46)	.61 (.49)	.36 (.48)	.59 (.49)	.39 (.49)	.62 (.49)
years of schooling	11.79 (2.48)	11.53 (2.47)	11.60 (2.49)	11.67 (2.47)	11.59 (2.45)	11.76 (2.28)
training in the last 3 months#	.04 (.19)	.03 (.17)	.01 (.10)	.02 (.13)	.01 (.11)	.02 (.13)
head of household#	.58 (.49)	.30 (.46)	.58 (.49)	.37 (.48)	.55 (.50)	.32 (.46)
urban settlement#	.63 (.48)	.55 (.50)	.50 (.50)	.49 (.50)	.47 (.50)	.44 (.50)
unemployment dummy#	n.a. (n.a.)	.47 (.50)	n.a. (n.a.)	.71 (.45)	n.a. (n.a.)	.73 (.45)
Distribution by occupation						
white collar#	.14 (.35)	.11 (.31)	.12 (.33)	.11 (.31)	.12 (.33)	.10 (.30)
blue collar#	.63 (.48)	.70 (.46)	.68 (.47)	.69 (.46)	.69 (.46)	.68 (.46)
other occupation#	.23 (.42)	.19 (.39)	.20 (.40)	.20 (.40)	.19 (.39)	.22 (.41)
Distribution by industry						
services#	.59 (.49)	.55 (.50)	.54 (.50)	.56 (.50)	.55 (.50)	.55 (.50)
manufacturing#	.33 (.47)	.35 (.48)	.34 (.47)	.31 (.46)	.31 (.46)	.33 (.47)
other industry#	.08 (.27)	.10 (.30)	.10 (.30)	.13 (.33)	.11 (.32)	.12 (.33)
General economic conditions						
local rate of unemployment	n.a. (n.a.)	n.a. (n.a.)	.15 (.05)	.16 (.06)	.13 (.05)	.14 (.06)
res. wage - emp	2045.10 (1143.85)	n.a. (n.a.)	2876.08 (1904.72)	n.a. (n.a.)	3348.86 (2095.01)	n.a. (n.a.)
res. wage – unp/inct	n.a. (n.a.)	1803.40 (822.29)	n.a. (n.a.)	2403.85 (1281.54)	n.a. (n.a.)	2687.00 (1304.75)
average industry wage	2247.12 (468.44)	2326.48 (498.26)	3302.81 (714.33)	3313.94 (728.55)	4040.62 (808.78)	4019.44 (840.64)
regionally adjusted industry wage	n.a. (n.a.)	n.a. (n.a.)	2943.43 (612.73)	2908.35 (651.83)	3446.12 (683.89)	3426.25 (696.40)

Note: Standard deviation is in parentheses.
Data are represented as mean values or as share (for dummy variables - #) in the associated sample.
Source: Author's calculation based on Croatian Labour Force Survey for the period 1996-2009.

Table 3. Marginal effects of different variables on the probability of switch to employment for different types of job-seekers
(after probit estimation)

period/variable	1996-1998		2000-2003		2004-2006	
	emp	unp/inct	emp	unp/inct	emp	unp/inct
Individual characteristics						
age	-.004***	-.025***	-.005***	-.017***	-.005***	-.025***
	(.001)	(.002)	(.000)	(.001)	(.001)	(.001)
gender – female#	-.037***	-.074***	-.069***	-.030**	-.045***	-.053***
	(.014)	(.026)	(.012)	(.014)	(.015)	(.019)
marital status - single#	.024	.121***	-.003	.114***	.016	.052*
	(.020)	(.034)	(.018)	(.021)	(.022)	(.027)
training in the last 3 months#	.124***	.296***	-.089*	-.098**	-.104**	.146*
	(.049)	(.090)	(.047)	(.044)	(.046)	(.087)
head of household#	-.028	.047	-.009	-.015	.028	.018
	(.018)	(.034)	(.018)	(.020)	(.021)	(.027)
urban settlement#	.035**	-.026	-.016	-.009	.023	-.026
	(.014)	(.024)	(.013)	(.013)	(.026)	(.017)
Distribution by occupation						
blue collar#	-.001	-.167***	.055***	-.083***	.036	-.179***
	(.023)	(.043)	(.021)	(.026)	(.026)	(.036)
other occupation#	-.036	-.128***	.009	-.085***	-.018	-.106***
	(.023)	(.046)	(.023)	(.026)	(.028)	(.034)
Distribution by industry						
manufacturing#	-.070***	-.037	-.077***	-.062***	-.064***	-.028
	(.014)	(.026)	(.013)	(.015)	(.016)	(.019)
other industry#	-.110***	.020	-.141***	.072***	-.139***	.018
	(.018)	(.042)	(.016)	(.024)	(.018)	(.028)
General economic conditions						
local rate of unemployment	n.a.	n.a.	-.413***	-.857***	-.406***	-.394***
	(n.a.)	(n.a.)	(.105)	(.112)	(.128)	(.152)
year dummy# (1)[a]	-.040**	.078**	.066***	-.044**	.024	-.057***
	(.018)	(.036)	(.018)	(.018)	(.017)	(.021)
year dummy# (2)[b]	-.051***	-.007	.050***	.019	.041**	-.040*
	(.015)	(.029)	(.017)	(.018)	(.018)	(.021)
year dummy# (3)[c]	n.a.	n.a.	.033*	.052***	n.a.	n.a.
	(n.a.)	(n.a.)	(.017)	(.020)	(n.a.)	(n.a.)
reservation wage - emp	.088***	n.a.	.158***	n.a.	.166***	n.a.
	(.015)	(n.a.)	(.015)	(n.a.)	(.020)	(n.a.)
reservation wage – unp/inct	n.a.	-.264***	n.a.	-.107***	n.a.	-.093***
	(n.a.)	(.036)	(n.a.)	(.021)	(n.a.)	(.035)
y = Pr(switch to employment) (predict)	.251	.450	.321	.329	.332	.363
Number of observations	4549	2304	6498	5994	4650	4108
Log likelihood	-2499.85	-1196.93	-3933.51	-3171.48	-2853.36	-2051.50
Pseudo R^2	0.041	0.248	0.044	0.188	0.042	0.255

Note: * p < 0,1; ** p < 0,05; *** p < 0,01. Standard errors are in parentheses.
emp – employed job-seeker; *unp/inct* – unemployed/inactive job-seeker.
- dy/dx is for a discrete change of the dummy variable from 0 to 1.
a - 1997 for the first pool; 2001 for the second pool; and 2005 for the third pool.
b - 1998 for the first pool; 2002 for the second pool; and 2006 for the third pool.
c - 2003 for the second pool.
Source: Author's calculation based on Croatian Labour Force Survey for the period 1996-2006.

Table 4. Marginal effects of different variables on the probability of switch to employment for different types of job-seekers
(after ivprobit estimation)

period/variable	1996-1998		2000-2003		2004-2006	
	emp	unp/inct	emp	unp/inct	emp	unp/inct
Individual characteristics						
age	-.004***	-.016***	-.005***	-.014***	-.005***	-.020***
	(.001)	(.002)	(.001)	(.001)	(.001)	(.002)
gender – female#	-.066***	.090***	-.093***	.061***	-.088***	.046**
	(.020)	(.028)	(.016)	(.018)	(.020)	(.022)
marital status - single#	.024	.089***	.008	.118***	.004	.073***
	(.020)	(.030)	(.018)	(.020)	(.022)	(.025)
training in the last 3 months#	.150***	.236***	-.076	-.099**	-.091*	.096
	(.050)	(.077)	(.043)	(.042)	(.048)	(.081)
head of household#	-.026	-.030	-.008	-.013	.043**	.008
	(.018)	(.030)	(.018)	(.019)	(.021)	(.025)
urban settlement#	.045***	-.027	-.012	-.030**	.030**	-.035**
	(.015)	(.021)	(.013)	(.013)	(.015)	(.016)
Distribution by occupation						
blue collar#	-.069*	.082*	-.023	.085***	-.091*	.060
	(.041)	(.047)	(.042)	(.032)	(.052)	(.046)
other occupation#	-.074***	.005	-.032	.001	-.087**	.009
	(.028)	(.044)	(.029)	(.029)	(.034)	(.040)
Distribution by industry						
manufacturing#	-.072***	-.024	-.084***	-.035**	-.076***	.000
	(.014)	(.022)	(.013)	(.015)	(.016)	(.019)
other industry#	-.124***	.024	-.164***	.102***	-.179***	.098***
	(.019)	(.037)	(.018)	(.022)	(.021)	(.028)
General economic conditions						
local rate of unemployment	n.a.	n.a.	-.448***	-.593***	-.501***	.116
	(n.a.)	(n.a.)	(.106)	(.119)	(.130)	(.160)
year dummy# (1)[a]	-.051***	.152***	.063***	-.026	.022	-.029
	(.018)	(.029)	(.018)	(.018)	(.017)	(.020)
year dummy# (2)[b]	-.064***	.113***	.048***	.033*	.037**	.004
	(.016)	(.026)	(.017)	(.017)	(.017)	(.021)
year dummy# (3)[c]	n.a.	n.a.	.031*	.069***	n.a.	n.a.
	(n.a.)	(n.a.)	(.017)	(.019)	(n.a.)	(n.a.)
reservation wage - emp	-.066	n.a.	-.004	n.a.	-.087	n.a.
	(.076)	(n.a.)	(.074)	(n.a.)	(.088)	(n.a.)
reservation wage – unp/inct	n.a.	.685***	n.a.	.606***	n.a.	.837***
	(n.a.)	(.098)	(n.a.)	(.095)	(n.a.)	(.124)
y = Probability of positive outcome (predict, p)	.255	.466	.324	.361	.337	.385
Number of observations	4545	2286	6498	5994	4650	4108
Log likelihood	-4720.81	-2052.04	-6928.84	-4746.35	-4520.14	-1716.53
Wald test of exogeneity (Prob > chi2)	0.039	0.000	0.026	0.000	0.004	0.000

Note: * p < 0,1; ** p < 0,05; *** p < 0,01. Standard errors are in parentheses.
emp – employed job-seeker; *unp/inct* – unemployed/inactive job-seeker.
- dy/dx is for a discrete change of the dummy variable from 0 to 1.
a - 1997 for the first pool; 2001 for the second pool; and 2005 for the third pool.
b - 1998 for the first pool; 2002 for the second pool; and 2006 for the third pool.
c - 2003 for the second pool.
Source: Author's calculation based on Croatian Labour Force Survey for the period 1996-2006.

Table 5. Elasticity estimates based on the means of the data[34]

period/variable	1996-1998	1999-2003	2004-2006
reservation wage w.r.t. unemployment benefits	0.177 (0.398)	0.174 (0.467)	0.174 (0.483)
hazard rate w.r.t. unemployment benefits	-0.671	-0.493	-0.465
Number of observations	542	1671	1069

Note: Figures in brackets show the change in reservation wages with respect to unemployment benefits in monetary terms.

Source: Author's calculation based on Croatian Labour Force Survey for the period 1996-2006.

[34] We get similar results if, instead of the average wage (x), we employ average wage in the respective industry (x') (NACE classification). In this case elasticites of the reservation wage with respect to unemployment benefits are somewhat smaller (ranging from 0.126 to 0.131), while elasticities of the *hazard rate* with respect to unemployment benefits are somewhat higher (ranging from -0.557 to -0.817). Yet, this does not change our main conclusions.