Firing Tax vs. Severance Payment - An Unequal Comparison*

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Abstract

Empirical evidence indicates that lay-off costs consist of two elements, namely firing costs and severance payments. This paper investigates business cycle and steady state effects of firing costs and severance payments and discusses the differences. We find that severance payments imply a lower volatility of key labor market variables compared with firing costs. Persistently increasing those costs, reduces the welfare in the model economy but increases employment. The reason for the different performance is the impact on the wage and the additional stimulus caused by severance payments. The social planner therefore faces a trade-off in the design of employment protection. Furthermore, the design of lay-off costs also has strong implications for the design of other elements of employment protection.

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1 Motivation

Labor market rigidities are often blamed to be the driving force of more sclerotic labor markets in Europe than in the United States, as for instance shown by Hopenhayn and Rogerson (1993). Most of the existing literature has focused on the implications of firing costs, as e.g. Veracierto (2008) focuses on the business cycle implications, Messina and Vallanti (2006) discuss the effects on job flows, while Ljungqvist (2001) provides a survey of the effects of firing costs in different models.
However, Garibaldi and Violante (2005) show that one has to distinguish between two immanent elements of lay-off costs, namely (i) transfers from firm to worker and (ii) a tax that is paid outside the firm-worker pair. We will refer to the former as a severance payment and to the latter as a firing cost. A firing cost is a wasteful tax, i.e. a real cost, on separation which is non-Coasean. In contrast, severance payments are paid directly to the worker, increasing consumption opportunities. More precisely, from the firm's perspective there is no difference between paying a wasteful firing tax or transferring this money to the worker. However, from the worker's perspective, there is a major difference. In case of separation, the worker will receive an additional payment.
Furthermore, the authors show that within a search model with insider and outsider workers, they obtain different results from imposing a firing tax or a severance payment. Along this line, Cozzi et al. (2010) present evidence for the importance of severance payment for a set of OECD countries. They show that severance payments for instance in Italy equal 20 monthly wages, while they equal 1.2 monthly wages in the United Kingdom.
Burda (1992) uses a static time search and matching model and finds that the excess costs for firms beyond the payment received by the worker is a driving factor of the effect of such institutions on equilibrium unemployment.
Fella (2009) discusses the optimal private provision of severance pay, as well as allocational and welfare consequences of government intervention in addition to the optimal private arrangement. He finds that severance payments complement unemployment insurance and that costly separations demands positive severance pay.
However, this paper focuses on the business cycle implications of firing cost, severance payments respectively. As business cycle stabilization is a key objective of governments the appropriate design of employment protection can help in achieving this goal.
We use a Real Business Cycle (RBC, for short) search and matching model augmented by firing costs, severance payments respectively. In order to introduce those costs properly, we model separations endogenously, creating an additional decision margin for the firm.
Our analysis shows that under both specifications, qualitative effects are nearly the same. However, we find that the model economy with firing costs is much more volatile than the severance payment economy. Furthermore, the model with severance payments replicates the second moments observed for the U.S. economy fairly well. The model is able to generate a strong Beveridge curve and matches second moments reasonably well. Furthermore, we investigate the steady state implications of changing the cost parameters. We find that all reforms reduce the welfare in our model economy, but increase

employment. The main mechanisms at work are the effect on wages and the additional demand stimulus steaming from transfers to the worker.
We show that the government (or social planner) faces a trade-off in the design of employment protection. Increasing e.g. severance payments would reduce welfare but reduce unemployment. Furthermore, the design of lay-off costs creates strong spill-over effects for other elements of employment protection.
The paper is structured as follows. The next section develops the model and section 3 discusses our simulation results. Section 4 concludes.

2 Model Derivation

We now present a RBC model with search anad matching frictions. Our economy contains two agents. Households and firms. Households consume and provide labor inelastically. Firms produce output using labor as the only input. While choosing the optimal path of labor, firms face hiring and firing costs, severance payments respectively. Finally, wages are set in individualistic Nash bargaining.

2.1 The Household's Problem

We assume a discrete-time economy with an infinite living representative household who seeks to maximize its utility given by

$$U = E_0 \sum_{t=0}^{\infty} \beta^t \left[\frac{\sigma}{\sigma - 1} C_t^{\frac{\sigma-1}{\sigma}} \right], \tag{1}$$

where σ gives the degree of risk aversion. The household inelastically supplies one unit of labor, represented by the unit interval. Furthermore, household members pool there income as in Merz (1995). The household maximizes consumption subject to the budget constraint

$$C_t + T_t = \mathcal{W}_t + bu_t + \Pi_t, \tag{2}$$

where b are unemployment benefits financed by real lump sum taxes, T_t, from the government. $\mathcal{W}_t$ is labor income and Π_t are aggregate profits. The demand function is given by $C_{it} = \left(\frac{P_{it}}{P_t}\right)^{-\epsilon} C_t$, where $P_t = \int_0^1 \left[P_{it}^{\frac{\epsilon-1}{\epsilon}} di \right]^{\frac{\epsilon}{\epsilon-1}}$ is the price index.
The first-order condition is given by

$$C_t^{-\frac{1}{\sigma}} = \lambda_t, \tag{3}$$

where λ_t is the Lagrange multiplier on the budget constraint.

2.2 The Firm's Problem

We assume perfectly competitive firms that consist of a continuum of different jobs. While aggregate productivity A_t is common to all firms, the specific productivity a_{it} is idiosyncratic and every period it is drawn in advance of the production process from a time-invariant distribution with c.d.f. $F(a)$. The firm specific production function is the product of aggregate productivity, the number of jobs and the aggregate over individual jobs and can be written as

$$y_{it} = A_t n_{it} \int_{\tilde{a}_{it}} a \frac{f(a)}{1 - F(\tilde{a}_{it})} da \equiv A_t n_{it} H(\tilde{a}_{it}). \tag{4}$$

Where $\tilde{a}_{it}$ is an endogenously determined critical threshold. Then, the endogenous job destruction rate is given by $\rho^n_{it} = F(\tilde{a}_{it})$. Although their is no consensus in the literature on the proper determination of the separation margin, following Fujita et al. (2007), Fujita and Ramey (2007, 2008) and Ramey (2008) empirical evidence seems to favor endogenous separations.

Since employment decisions are subject to matching frictions, we introduce a Cobb-Douglas type matching function with constant returns to scale, i.e.

$$\Psi(u_t, v_t) = m u_t^{\mu} v_t^{1-\mu}, \tag{5}$$

u_t is the number of unemployed worker, v_t is the number of open vacancies, assumed to lie on the unit interval and $\mu \in (0, 1)$ denotes the elasticity of the matching function. The match efficiency is governed by $m > 0$. The underlying homogeneity assumption leads to the probability of a vacancy being filled $q(\theta_t) = m\theta_t^{-\mu}$, where labor market tightness is given by $\theta_t = v_t/u_t$. Connecting the results for job creation and job destruction enables us to determine the evolution of employment at firm i as

$$n_{it+1} = (1 - \rho_{it+1})(n_{it} + v_{it} q(\theta_t)). \tag{6}$$

As we will illustrate later on, the worker is paid according to his specific productivity and we follow this approach by establishing the theorem that firing costs also depend on the worker's specific productivity. Initially, we define the firing costs function for a specific worker as a linear real-valued function given by $g(a_{it}) = k a_{it}$, such that total firing costs evolve as follows

$$G(a_{it}) = k \int_0^{\tilde{a}_{it}} a \frac{f(a)}{1 - F(\tilde{a}_{it})} da, \tag{7}$$

where $k > 0$ is the share of the productivity wasted as a tax.[1] The firm maximizes the present value of real profits given by

$$\Pi_{i0} = E_0 \sum_{t=0}^{\infty} \beta^t \frac{\lambda_t}{\lambda_0} \left[A_t n_{it} H(\tilde{a}_{it}) - \mathcal{W}_{it} - c v_{it} - G(a_{it}) \right]. \tag{8}$$

Where the first term in parenthesis is revenue, the second term is the wage bill, which is given by the aggregate of individual wages

$$\mathcal{W}_{it} = n_{it} \int_{\tilde{a}_{it}} w_t(a) \frac{f(a)}{1 - F(\tilde{a}_{it})} da. \tag{9}$$

This follows from the fact that the wage is not identical for all workers, instead it depends on the idiosyncratic productivity. The third term reflects the total costs of posting a vacancy, with $c > 0$ giving real costs per vacancy. The last term gives the total firing costs. The corresponding first order conditions are given by

$$\partial n_{it} \;:\; \xi_t = -\frac{\partial \mathcal{W}_t}{\partial n_t} + A_t H(\tilde{a}_t) + E_t \beta_{t+1} (1 - \rho_{t+1}) \xi_{t+1}, \tag{10}$$

$$\partial v_{it} \;:\; \frac{c}{q(\theta_t)} = E_t \beta_{t+1} (1 - \rho_{t+1}) \xi_{t+1}, \tag{11}$$

here ξ_t is the multiplier on the evolution of employment.
The job creation condition is a combination of these two equations and is given by

$$\frac{c}{q(\theta_t)} = E_t \beta_{t+1} (1 - \rho_{t+1}) \left[A_{t+1} H(\tilde{a}_{t+1}) - \frac{\partial \mathcal{W}_{t+1}}{\partial n_{t+1}} + \frac{c}{q(\theta_{t+1})} \right]. \tag{12}$$

This condition reflects the hiring decision as a trade-off between the costs of a vacancy and the expected return. Where $1/q(\theta_t)$ is the duration of the relationship between firm and worker. The lower the probability of filling a vacancy, the longer the duration of existing contracts, because the firm is not able to replace the worker instantaneously. Subsequently, we determine the wage and the threshold for the firing costs case and the severance payment case.

2.3 The Bargaining Problem

2.3.1 Firing Costs

Due to search frictions in the labor market, the match shares and economic rent, which is splitted in individual Nash bargaining. We maximize the Nash product

$$w = argmax \Big\{ (W_t - U_t)^{\eta} (J_t - V_t + k a_t)^{1-\eta} \Big\}. \tag{13}$$

[1] One should notice that we likewise could have introduced a firing cost function that features the individual real wage as an argument. However, our approach is w.l.o.g. since the wage also depends on the idiosyncratic productivity, i.e. this is only a scaling issue.

$0 \leq \eta \leq 1$ is the relative bargaining power and due to a free entry condition the equilibrium value of V_t is zero. Consistently, the individual real wage satisfies the optimality condition

$$W_t(a_t) - U_t = \frac{\eta}{1-\eta}\left(J_t(a_t) + ka_t\right). \tag{14}$$

To obtain an explicit expression for the individual real wage we have to determine the asset value functions and substitute them into the Nash bargaining solution (14).
For the firm the asset value of the job depends on the real revenue, the real wage and if the job is not destroyed, the discounted future value. Otherwise the job is destroyed and hence the firm has to pay firing costs. In terms of a Bellman equation the asset value is given by

$$\begin{aligned} J_t(a_t) &= A_t a_t - w_t(a_t) \qquad (15)\\ &+ E_t\beta_{t+1}\left((1-\rho_{t+1})\int_{\tilde{a}_{t+1}} J_{t+1}(a)\frac{f(a)}{1-F(\tilde{a}_{t+1})}da - \rho_{t+1}ka_t\right). \end{aligned}$$

The asset value of being employed for the worker consists of the real wage, the discounted continuation value and in case of separation the value of being unemployed

$$\begin{aligned} W_t(a_t) &= w_t(a_t) + E_t\beta_{t+1}(1-\rho_{t+1})\int_{\tilde{a}_{t+1}} W_{t+1}(a)\frac{f(a)}{1-F(\tilde{a}_{t+1})}da \qquad (16)\\ &+ E_t\beta_{t+1}\rho_{t+1}U_{t+1}. \end{aligned}$$

Analogously, the asset value of a job seeker is given by

$$\begin{aligned} U_t &= b + E_t\beta_{t+1}\theta_t q(\theta_t)(1-\rho_{t+1})\int_{\tilde{a}_{t+1}} W_{t+1}\frac{f(a)}{1-F(\tilde{a}_{t+1})}da \qquad (17)\\ &+ E_t\beta_{t+1}(1-\theta_t q(\theta_t)(1-\rho_{t+1}))U_{t+1}. \end{aligned}$$

Unemployed worker receive the value of home production b, the discounted continuation value of being unemployed and if she is matched she receives the value of future employment. Some algebra then gives the expression for the individual real wage

$$w_t(a_t) = \eta\big(A_t a_t + c\theta_t + (1-\beta_{t+1}\rho_{t+1})ka_t\big) + (1-\eta)b. \tag{18}$$

The introduction of firing costs increases the individual real wage due to the change in the fall back position of the firm. Having discussed the wage setting process we sequentially want to focus on the firing decision and the corresponding threshold.
The firm will endogenously separate from a worker if and only if

$$J_t(a_t) < -ka_t, \tag{19}$$

such that the threshold can be written as

$$\tilde{a}_t = \frac{(1-\eta)b + \eta c\theta_t - \frac{c}{q(\theta_t)}}{(1-\eta)A_t + (1-\eta+(\eta-1)\beta_{t+1}\rho_{t+1})k}, \tag{20}$$

where $(1-\eta+(\eta-1)\beta_{t+1}\rho_{t+1})k > 0$ such that firing cost decrease the threshold, i.e. protect less productive worker.

2.3.2 Severance Payments

Severance payments are close to the last subsection, in which we introduced the firing costs into the bargaining problem and the asset value functions. However, now the worker's asset value function of being employed is influenced. The reason is straightforward: a severance payment is directly transferred to the worker and hence she considers this expected income in case of separation in the bargaining process. Here, we would like to emphasize that we respect the finding of Garibaldi and Violante (2005), showing that lay-off costs have two components and that - for Italy - severance payments amount to 2/3 of total lay-off costs. Therefore, we choose a more general approach to model severance payments allowing for the case that the amount of firing costs for the firm is not equal to the payment received by the worker.
Consistently, the asset value function in case of being employed now looks as follows

$$\begin{aligned} W_t(a_t) &= w_t(a_t) + E_t\beta_{t+1}(1-\rho_{t+1})\int_{\tilde{a}_{t+1}} W_{t+1}(a)\frac{f(a)}{1-F(\tilde{a}_{t+1})}da \\ &+ E_t\beta_{t+1}\rho_{t+1}\left(U_{t+1} + \tilde{k}a_t\right), \end{aligned} \tag{21}$$

such that in case of separation, the worker receives a payment of $\tilde{k}a_t$, where $\tilde{k} > 0$ is the severance payment parameter.
The other two missing asset value functions remain unchanged and therefore read as

$$\begin{aligned} J_t(a_t) &= A_t a_t - w_t(a_t) \\ &+ E_t\beta_{t+1}\left((1-\rho_{t+1})\int_{\tilde{a}_{t+1}} J_{t+1}(a)\frac{f(a)}{1-F(\tilde{a}_{t+1})}da - \rho_{t+1}(\tilde{k}+k)a_t\right), \end{aligned} \tag{22}$$

$$\begin{aligned} U_t &= b + E_t\beta_{t+1}\theta_t q(\theta_t)(1-\rho_{t+1})\int_{\tilde{a}_{t+1}} W_{t+1}\frac{f(a)}{1-F(\tilde{a}_{t+1})}da \\ &+ E_t\beta_{t+1}(1-\theta_t q(\theta_t)(1-\rho_{t+1}))U_{t+1}. \end{aligned} \tag{23}$$

Then, firm and worker solve the Nash problem

$$w = argmax\Big\{(W_t - U_t + \tilde{k}a_t)^{\eta}(J_t - V_t + (\tilde{k}+k)a_t)^{1-\eta}\Big\}, \tag{24}$$

such that the individual real wage is given by

$$w_t(a_t) = \eta\left[A_t a_t + c\theta_t\right] + (1-\eta)b + \left[\left(\eta - \eta\beta_{t+1}\rho_{t+1}\right)k + \left(2\eta - 1 - \beta_{t+1}\rho_{t+1}\right)\tilde{k}\right]a_t. \quad (25)$$

In the precedent section we concluded that firing costs increase the real wage, as workers exploit the change of the firm's fall back position. However, including severance payments tends to decrease the wage. To be precise, assume the reasonable case of symmetric bargaining, viz. $\eta = 0.5$, and abstract from firing costs ($k = 0$). Then, the wage reads as

$$w_t(a_t) = \eta\left[A_t a_t + c\theta_t\right] + (1-\eta)b - \beta_{t+1}\rho_{t+1}\tilde{k}a_t. \quad (26)$$

The introduction of severance payments decreases the individual real wage due to the change in the fall back position of the worker. Having discussed the wage setting process we sequentially want to focus on the firing decision and the corresponding threshold. The threshold for the severance payments case can then be found by solving $J_t(a_t) < -(\tilde{k} + k)a_t$,

$$\tilde{a}_t = \frac{(1-\eta)b + \eta c\theta_t - \frac{c}{q(\theta_t)}}{(1-\eta)A_t + \left(1 - \eta + (\eta - 1)\beta_{t+1}\rho_{t+1}\right)k + 2(1-\eta)\tilde{k}}, \quad (27)$$

where $\left(1 - \eta + (\eta - 1)\beta_{t+1}\rho_{t+1}\right)k + 2(1-\eta)\tilde{k} > 0$ such that severance payments also decrease the threshold. For $k = 0$ and $\tilde{k} > 0$, we obtain a model in which the entire amount of lay-off costs is distributed to the worker.
Severance payments have an addtional decreasing on the cut-off point, as they have a large effect on the worker's fall back position, which spills over into the wage and consecutively into the decision along the job destruction margin.

2.4 Model solution

Finally, we need to define the market clearing condition

$$Y_t = C_t + cv_t. \quad (28)$$

We assume an aggregate productivity shock that is AR(1), i.e.

$$A_t = A_{t-1}^{\rho_A} e^{\epsilon_{A,t}}, \quad (29)$$

where $0 < \rho_A < 1$ is the autocorrelation of the shock and $\epsilon_{A,t} \sim N(0, \sigma_A)$ is an i.i.d. error term following an univariate normal density distribution with standard deviation σ_A and $cov(A_{t-1}, \epsilon_{A,t}) = 0 \ \forall\ t$.
We calibrate the model on a quarterly basis for the United States and set parameter values according to some stylized facts and the recent literature. Risk aversion, σ, is set to the value 2 and the discount factor, β, is 0.99. The steady state separation rate, ρ, is 0.12 according to den Haan et al. (2000). The exogenous separation rate is calibrated to

be 0.068 as in den Haan et al. (2000), such that the endogenous separation rate can be computed to be $\rho^n = \frac{\rho - \rho^x}{1-\rho^x}$. Then, the critical threshold can be computed by using the inverse function, i.e. $\tilde{a} = F^{-1}(\rho^n)$. Parameters characterizing the c.d.f $F(a)$ are taken from Krause and Lubik (2007) and are set to $\mu_{LN} = 0$, and $\sigma_{LN} = 0.12$. Furthermore, the elasticity of the matching function with respect to unemployment, μ, is set to 0.7, while the steady state firm matching rate is $\bar{q} = 0.9$. Then, matches in steady state are given by $\Psi = \frac{\rho}{1-\rho} n$, where steady state employment is set to 0.9. The steady state vacancy rate can then be found and equals $v = \frac{\Psi}{q}$, which gives the steady state labor market tightness $\theta = \frac{v}{1-n}$. In addition, the match efficiency is given by $m = q\theta^{\mu}$. Vacancy posting costs are 0.05 and the unemployment benefits are 0.5. Following the discussion in Brown et al. (2009), we set $k = \tilde{k} = 0.1$, i.e. 10 % of the worker's productivity is paid as a firing tax, severance payment respectively. We assume symmetric bargaining and set $\eta = 0.5$. Finally, the shock is autocorrelated with $\rho_A = 0.9$ as usual in the literature.

3 Discussion

We will start our analysis of different lay-off costs by a discussion of the implications for business cycle fluctuations, viz. for the volatility of key variables. Then, we will proceed to analyze the effects on welfare.

3.1 Business Cycle Fluctuations

Figure 1 presents the response of our model economy to a favorable one percent productivity shock. We distinguish between three cases. First, and plotted in black, we consider the model with firing costs. Then, plotted in red, we repeat the excercise for the severance payment case, without firing costs. Finally, plotted in blue, we assume that besides severance payments, the firm has to pay a wasteful firing tax.[2]

A first graphical inspectation of the impulse response functions yields the insight that there is almost no difference between the severance payment case and the split case, i.e. the case where the firm has to pay firing costs and severance payments. Therefore, we will not further describe the split case and focus instead on the difference between firing cost and severance payment. We find that qualitatively the effects are very similar. A positive productivity shock increases the incentives for firms to post vacancies, in order to extract surpluses. Therefore, vacancies increase and job creation raises on impact. As output increases, unemployment falls, increasing labor market tightness. In order to keep more workers, firms decrease the cut-off point, which reduces the separation rate. Real wags increase as workers demand a part of the larger surplus created by the shock. However, as we have discussed in the bargaining section before, the severance payment case implies a larger reaction of wages, as the change in the fall back positions caries over to the extraction of surpluses over the cycle. This channel causes the visible differences

[2] To be precise, firing: $k = 0.1$, severance: $\tilde{k} = 0.1, k = 0$, split: $\tilde{k} = 0.07, k = 0.03$ as in Garibaldi and Violante (2005).

in the convergence process. The severance payment economy is less persistent, as the higher wage decreases incentives for firms to create new jobs. Consistently, we observe a smaller impact on job flows.
Let us consider the second moments of our simulations shown in Table 1. Data values for the United States are taken from Shimer (2005). The volatilities for key variables are presented for the three cases considered above. We find that the firing cost model is much more volatile than the severance payment model. Unemployment is almost five times as volatile in the firing cost case, which has of course strong implications for the design of unemployment benefits, i.e. automatic stabilizers in general. The response of vacancies is almost twice as large, implying that together labor market tightness is quite volatile. As discussed, the firing model implies larger adjustment, i.e. job flows, and hence a stronger adjustment and hence larger volatility of the separation rate.
Furthermore, all specifications create a strong Beveridge curve, but fail to create the negative correlation between job creation and destruction.

3.2 Welfare Implications

3.2.1 Measuring Welfare Gains

Here, I adopt the strategy used in Poilly and Sahuc (2008) and Poilly and Wesselbaum (2010). We denote the welfare in the initial steady state by

$$\mathcal{W}_0^{init} = E_0 \sum_{t=0}^{\infty} \beta^t \left[\frac{\sigma}{\sigma - 1} (C_t^{init})^{\frac{\sigma-1}{\sigma}} \right], \tag{30}$$

where C_t^{init} is the path of consumption choosed in the initial steady state. Then, welfare in the new steady state is given by

$$\mathcal{W}_0^{final} = E_0 \sum_{t=0}^{\infty} \beta^t \left[\frac{\sigma}{\sigma - 1} (C_t^{final})^{\frac{\sigma-1}{\sigma}} \right]. \tag{31}$$

Following Lucas (1987), we interpret the welfare gains as follows: The gain is given by the fraction of the consumption stream an individual should give in order to compensate for the fact that he or she has to switch from a initial steady-state to a new one.
Then, Ξ, the welfare gain in percentage points, can be found by solving

$$\mathcal{W}_0^{final} = E_0 \sum_{t=0}^{\infty} \beta^t \left[\frac{\sigma}{\sigma - 1} (C_t^{init})^{\frac{\sigma-1}{\sigma}} (1+\Xi)^{\frac{\sigma-1}{\sigma}} \right], \tag{32}$$

which is

$$\Xi = \left[\frac{\mathcal{W}_0^{final}}{\mathcal{W}_0^{init}} \right]^{\frac{\sigma}{\sigma-1}} - 1. \tag{33}$$

3.2.2 The Effects of Using Lay-off Costs

In order to understand the welfare impications of using the two different lay-off costs, we use a simple mind experiment. Assume that our economy in the severance payment specification (section 2.3.2) is in a steady state, where both lay-off costs are 0. Then, we distinguish three different cases. First, we increase the firing cost parameter (to a value of 0.1). Second, the severance payment parameter is set to 0.1, leaving the firing cost parameter unchanged. Finally, we increase both parameters simultaneously, viz. by setting both parameters to 0.05.[3]

The results for these three reforms are described in Table 2. The transmission processes are shown in Figures 2 to 4. We find that in any case, welfare is decreased.[4]

An increase in lay-off costs leads the firm to be more reluctant in firing workers. The firm therefore, reduces the cut-off point and keeps even less productive workers. This implies a drop in the separation rate and the job destruction rate. Simultaneously, the firm has less incentives to create new jobs and reduces vacancy posting. However, as visible from the transmission process, the effect working along the destruction margin dominates and hence, employment increases.

As we have discussed in the wage setting section, higher firing costs increase real wages and higher severance payments decrease real wages. Finally, output and consumption decrease, which is driven by a higher wage bill and imposed lay-off costs.

If we take a closer look on the quantitative effects from our experiment, we find that a combination of severance payment and firing cost decreases welfare by the smallest amount. However, this result is driven by lower consumption. We find that these three reforms increase employment, as they reduce the destruction flow by a larger amount than they reduce job creation. Along this line, we find that higher employment protection via increased severance payments comes with lower labor market flows and lower wages. In contrast, higher firing costs increase wages. Severance payments have an additional stabilizing effect on output (compare the drop in the firing cost case vs. the drop in the severance payment case), as the payment to the worker yields an intrinsic demand stimulus.

We can draw the following conclusion, higher lay-off costs reduce the welfare in the model economy, as higher turnover costs and a increased wage bill reduce output. In contrast, increased employment protection increases employment and reduce labor market flows.

4 Final Remarks

This paper compares two elements of lay-off costs, namely firing costs and severance payments. Firing costs are a wasteful tax paid by the firm, while severance payments are a transfer from the firm to the worker in case of separation. The paper by Garibaldi and Violante (2005) points to the importance of severance payments and shows that

[3]Jointly, they equal 0.1 and hence we can compare this reform with the first two cases.

[4]In our model, welfare is entirely driven by consumption. However, including the disutility of work is likely to leave our qualitative results unaffected, as employment increases.

they are more appropriate to model lay-off costs.
We develop a general equilibrium RBC model that allows to explicitly distinguish between severance payments and firing costs. We find that firing costs increase wages, while severance payments (at least for reasonable values of the bargaining power) decrease the wage. Besides this finding, we show that the model with firing costs shows a much higher volatility of key labor market variables as the model with severance payments, as it generates much more incentives to adjust. A combination of firing costs and severance payments is able to create te empirically observed second moments reasonably well. In addition, the model is able to generate the Beveridge curve, i.e. the negative correlation between unemployment and vacancies.
A second dimension of those two lay-off costs are the different effects steaming from using them as instruments for labor market reforms. We find that welfare is reduced in any considered case, as higher turnover costs and a increased wage bill reduce output. In addition, we find that higher employment protection increases employment and reduces labor market flows.
These insights yield a significant trade-off in the design of employment protection. Increasing e.g. severance payments would reduce welfare but reduce unemployment by almost 40 %. Furthermore, the design of lay-off costs in the system of employment protection creates strong spill-over effects for other ingredients of employment protection, e.g unemployment benefits, or other automatic stabilizers. For instance, let the government have a business cycle stabilization goal, then the severance payment is preferable in terms of generating less fluctuations in response to an exogenous shock. In addition, as unemployment fluctuates less, this implies that less workers have to use e.g. unemployment benefits, which is beneficial, as workers stay employed, firms do not have to pay adjustment costs and the government does not have to pay unemployment benefits. Based upon our findings, if the government chooses a mix of firing costs and severance payments, it should ensure that severance payments are dominant.
In summary, severance payments generate less fluctuations, reduce welfare by the smallest amount, and reduce unemployment by the largest amount. In contrast, firing cost generate more fluctuations, have stronger negative effects on welfare, and are less successfull in reducing unemployment. The main mechanisms at work are the effect on wages and the additional demand stimulus steaming from transfers to the worker.

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Tables and Figures

Table 1: Business Cycle Fluctuations.

	Data	Severance	Firing	Split
Standard Deviations				
u	0.19	0.30	0.35	0.31
v	0.20	0.17	0.19	0.18
θ	0.38	0.46	0.54	0.48
ρ	0.08	0.17	0.21	0.18
jcr	-	0.39	0.48	0.42
jdr	-	0.40	0.48	0.42
Correlations				
u, v	-0.89	-0.96	-0.96	-0.96
jcr, jdr	-0.36	0.85	0.85	0.85

Notes: Theoretical moments. Data responds to U.S. values taken from Shimer (2005). Details on the calibration can be found in the text.

Table 2: Welfare Implications.

	Firing	Severance	Severance & Firing
Welfare			
$100 * \Xi$	-8.36	-5.43	-6.19
Steady State			
Δu	-0.02	-0.38	-0.27
Δv	-0.72	-0.07	-0.43
$\Delta \Psi$	-0.33	-0.30	-0.32
Δjcr	-0.31	-0.31	-0.32
Δjdr	-0.96	-0.97	-0.99
Δw	0.002	-0.01	-0.002

Notes: All values are in percentage terms. Steady state changes are in percent of the initial steady state (where $k = \tilde{k} = 0$). The parameter governing the share of firing costs, severance payments resp. is increased from 0 to 0.1. For the latter case, where we increase k and $\tilde{k}$ simultaneously, we set both parameters to 0.05, such that they jointly equal 0.1.

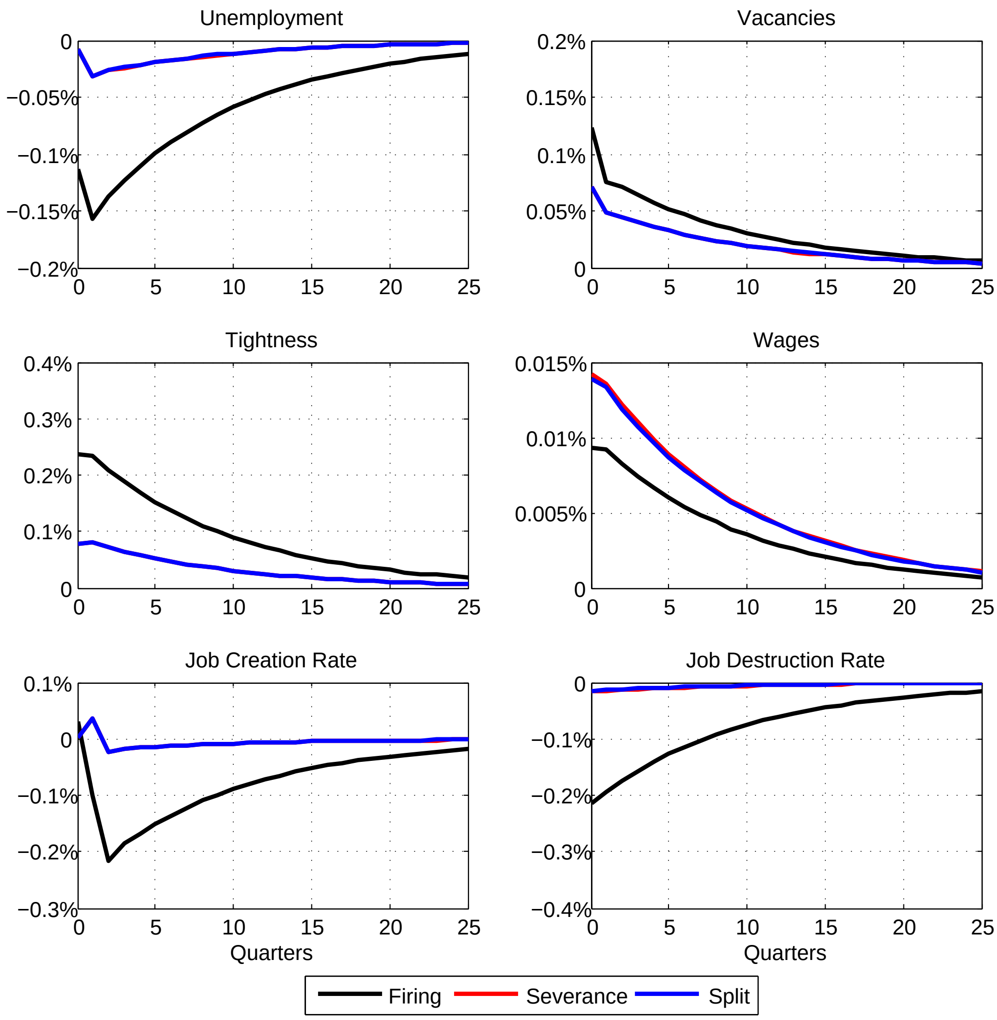

Figure 1: Firing Tax vs. Severance Payment. Horizontal axes measure quarters, vertical axes deviations from steady state.

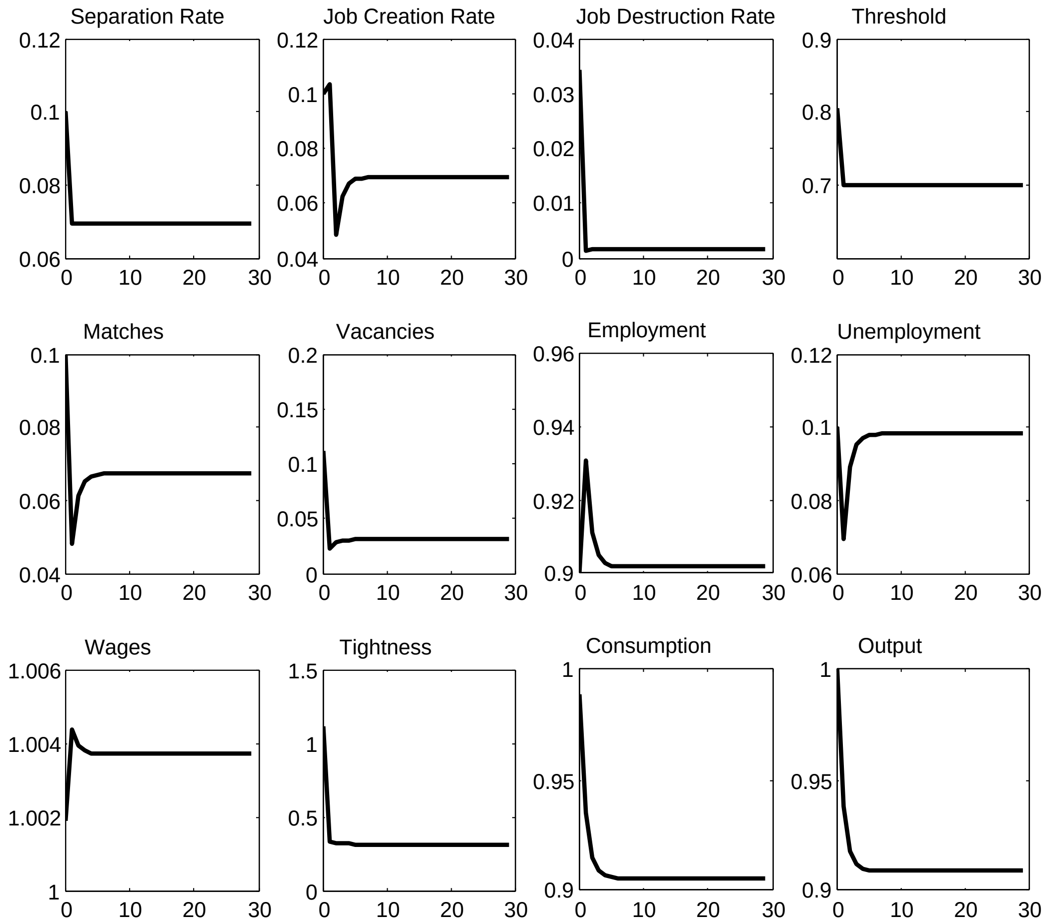

Figure 2: Increase of firing cost parameter $k = 0 \to 0.1$. Horizontal axes measure quarters, vertical axes levels.

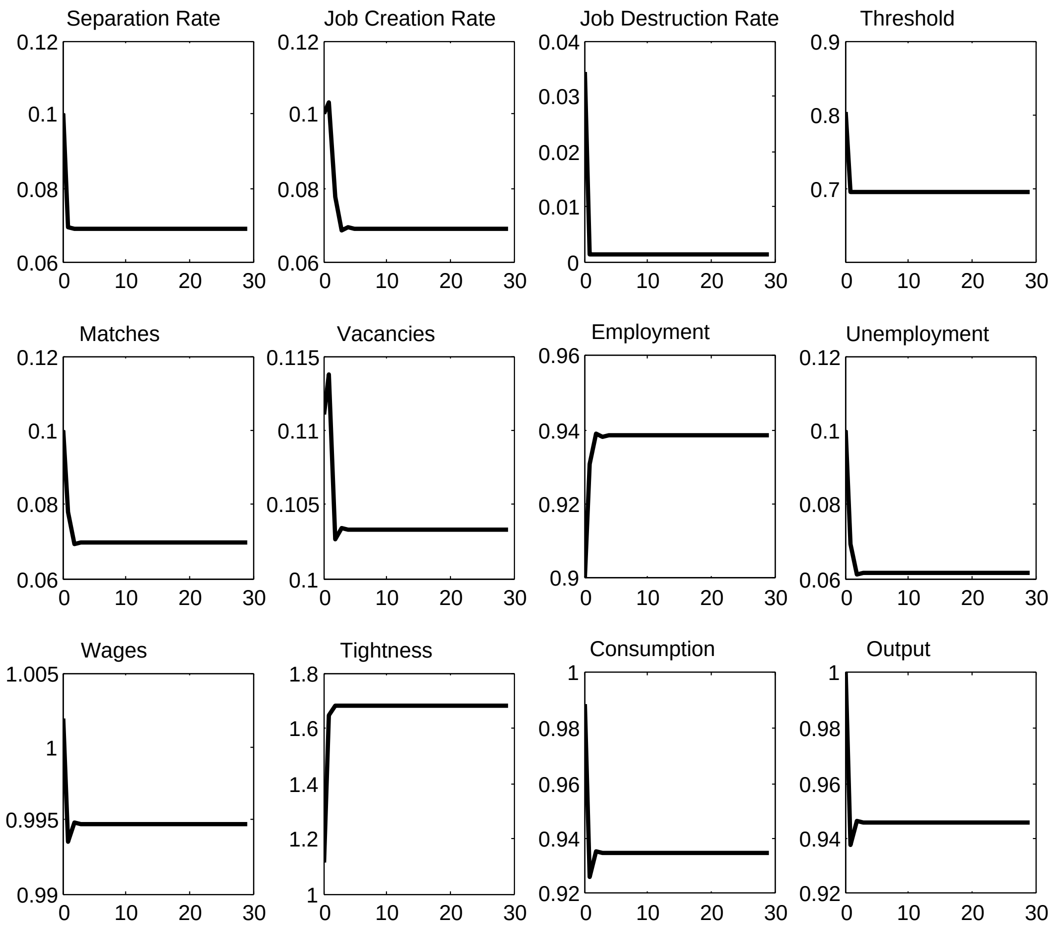

Figure 3: Increase of severance payment parameter $\tilde{k} = 0 \rightarrow 0.1$. Horizontal axes measure quarters, vertical axes levels.

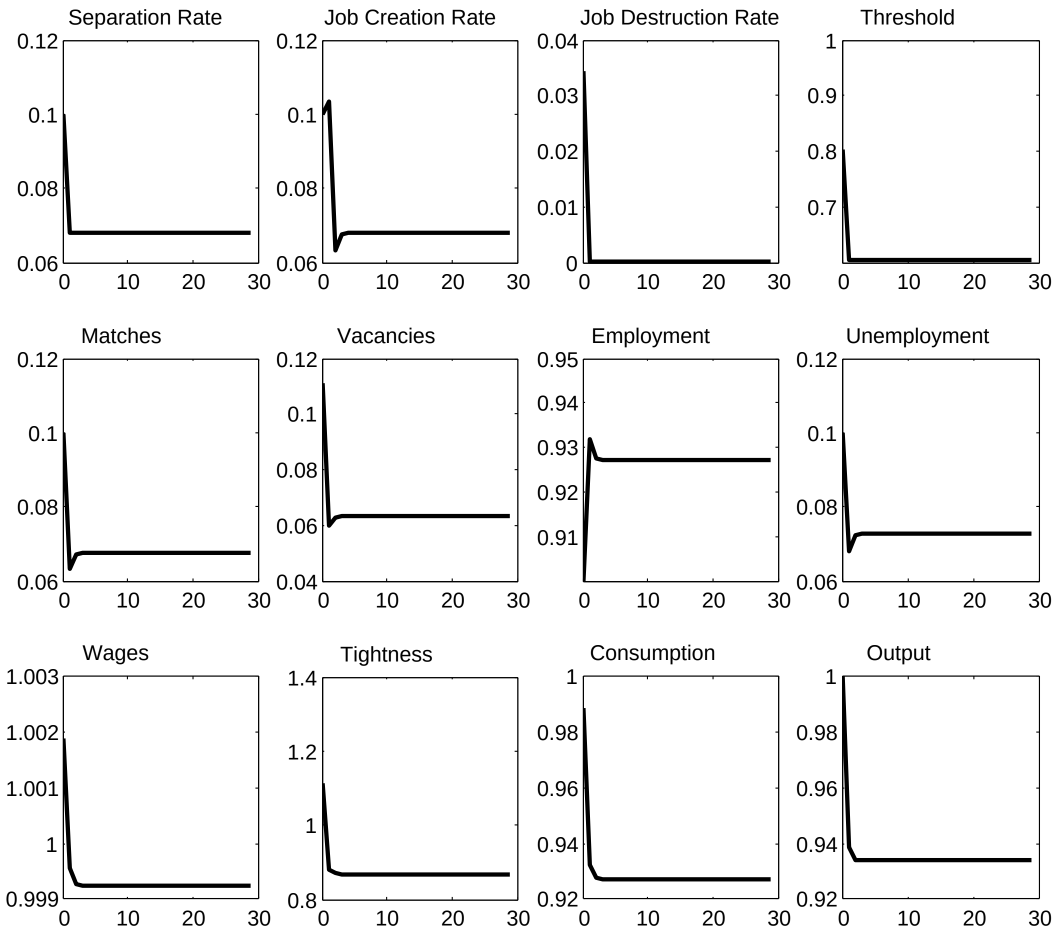

Figure 4: Increase of severance payment, $\tilde{k} = 0 \rightarrow 0.05$, and firing cost, $k = 0 \rightarrow 0.05$, parameter. Horizontal axes measure quarters, vertical axes levels.