Wage Rigidities and Old-Age Unemployment

Martin Kerndler (TU Wien), Michael Reiter (IHS Vienna, NYU Abu Dhabi, EconPol Europe)

Key Messages

- We emphasize the empirical relevance of wage rigidities on the labor market of older workers

- Wage smoothing is beneficial for firms and workers, but wage rigidities can lead to bilaterally inefficient separations

- By comparing the impact of four policy measures regarding their impact on welfare, output and government expenditures, we have identified a reasonable policy mix to counter the negative employment effects of wage rigidities

- This combines government-sponsored training for newly hired older workers, with severance pay levied on prime-age workers and older workers with longer duration of employment

- Reforms that decrease generosity of early retirement should be complemented by labor market policies that incentivize firms to keep their elderly workforce employed

- This can be achieved by increasing employment protection for long-tenured elderly workers

headed by

ifo INSTITUTE
Leibniz Institute for Economic Research
at the University of Munich

Summary

Aging populations have led many European countries to make an effort to increase the effective retirement age and keep workers longer in the labor force.

An increase in the retirement age does not necessarily lead to a rise in the employment rate of older workers, as many could remain unemployed. In fact, the declining productivity of some older workers would require a wage cut for them to remain competitive.

However, workers typically receive stable wages over their whole career, despite fluctuations in worker productivity: this 'wage smoothing' is an optimal feature of private employment contracts. The employment relation breaks up if the highest wage affordable by the firm is below the minimum wage acceptable for the worker.

Conversely, wage rigidities - restrictions on individual wage setting such as a minimum wage, or market failures – can make separations bilaterally inefficient. This happens whenever the wage adjustment necessary to ensure continued employment either violates legal constraints or does not comply with individual incentives.

How much of the empirically observed wage stability is explained by wage smoothing and how much by wage rigidities? Government intervention should focus on segments of the labor market where bilaterally inefficient separations due to wage rigidity are most likely, one of which is the labor market of older workers.

In this policy brief, we emphasize the empirical relevance of wage rigidities on the labor market of older workers. While wage smoothing is beneficial for firms and workers, wage rigidities can lead to bilaterally inefficient separations. This means that employment relations break up in situations in which continuing on a different wage would be beneficial for both parties.

By comparing the impact of four policy measures regarding their impact on welfare, output, and government expenditures we have identified a reasonable policy mix to counter the negative employment effects of wage rigidities. This combines government-sponsored training for newly hired older workers with severance pay levied on prime-age workers and older workers with longer duration of employment.

Wage rigidity reduces the effectiveness of early retirement reforms. Increasing penalties and restricting access to early retirement has significantly positive effects on employment due to fewer job separations. While overall the separation probability decreases, however, the probability for an inefficient separation actually goes up.

This efficiency loss particularly hits older workers with longer length of service. To unleash their full potential, reforms that decrease generosity of early retirement should therefore be complemented by labor market policies that incentivize firms to keep their elderly workforce employed. We recommend that restricting early retirement should go hand in hand with a selective increase in employment protection for long-tenured elderly workers.

Wage Rigidities and Old-Age Unemployment

Martin Kerndler and Michael Reiter

March 17, 2020

1 Introduction

Because of population aging, many European countries have made an effort to increase the effective retirement age, so as to keep workers longer in the labor force. However, there is a concern that an increase in the retirement age would not necessarily lead to a significantly higher employment rate of older workers, because many of them might remain unemployed. The unemployment rate of older workers is in fact higher than that of prime-age workers, which is often attributed to the phenomenon of "seniority wages". Seniority wages are a form of downward wage rigidity: the declining productivity of (some) older workers would require a wage cut for them to be competitive. For reasons that are not well understood, this wage cut does not happen, so that the jobs of older workers get separated relatively often. In this policy brief, we build on our current research, which provides a theoretical explanation for wage rigidity, shows that it is particularly relevant for older workers, and analyzes policy options to improve the efficiency of the labor market for older workers.

In traditional employment relations, workers typically receive stable wages although their employers are hit by substantial fluctuations in revenue and profits. Empirically, even very persistent changes in firm performance have very little effect on wages.[1] This can be explained by two competing narratives, which have different implications for public policy. According to the first narrative, stable wages indicate optimal *wage smoothing* between firms and workers, which should not be distorted by public policy. The second narrative sees external *wage rigidities* as the root, which makes government intervention potentially beneficial.

Wage smoothing is an optimal feature of private employment contracts. It arises because worker households are typically more risk averse than the shareholders of a firm. Optimal risk sharing between workers and firms then implies that firm profits fluctuate more than wages over time. Usually, shareholders are considered risk neutral such that they only care about expected firm profits but not their volatility. Firms are then willing to completely insure their

---

[1]This was first shown by Guiso, Pistaferri, and Schivardi (2005) in Italy and since then verified for several European countries as well as for the United States, for example by Kerndler (2019a).

workforce against income fluctuations by paying a constant (and therefore perfectly smooth) wage. In practice, there are natural limits to wage smoothing. If the firm cannot afford the contracted wage and a layoff is looming, the worker must be put on a lower wage to avoid a separation. Likewise, if the worker is no longer willing to work for the contracted wage, the wage must be raised to avoid a quit. Hence optimal wage smoothing implies a constant wage that adjusts only if this is necessary to prevent a separation. Regarding labor turnover, this means that although the wage remains constant in most periods, whenever employment at the current wage becomes unprofitable for one of the parties, the wage flexibly adjusts to ensure ongoing employment. The employment relation breaks up if and only if the highest wage affordable by the firm is below the minimum wage acceptable for the worker. In this case, there exists no wage for which employment is profitable for both parties. Under optimal wage smoothing, separations are therefore *bilaterally efficient* and there is little scope for the government to intervene in private separation decisions.[2]

Wage rigidities, by contrast, are restrictions on individual wage setting that prevent the optimal response of wages to changes in the economic environment. These constraints can arise from legal regulations or from fundamental imperfections of the economic environment, so-called *market failures*. An example for legal regulations that constrain individual wage setting are minimum wages and collective bargaining agreements. They impose wage floors that private arrangements are not allowed to undercut. This results in downwards wage rigidity among low-wage earners. But even without legal constraints, wages may be rigid due to market failures such as asymmetric information. Asymmetric information describes a situation in which one party possesses more accurate information than another party. For instance, the effort with which a worker operates in her job can only be imperfectly observed by the employer. This can lead the worker to shirk and pursue private interests during working time (moral hazard). To counter moral hazard, firms pay a wage for which the expected financial loss of a disciplinary layoff exceeds the utility gain from shirking. This endogenously imposes a wage floor below which the worker does not have sufficient incentives to behave honestly. Not only the worker may possess private information. Even when workers exert the highest effort, they do not know their actual contribution to firm revenue. This creates an informational advantage for the employer in wage negotiations, as the worker is uncertain about the size of rents that are to be split. In this case, profit-maximizing incentives of the employer may make downward wage adjustments impossible altogether.[3] With wage rigidities, separations are in general no longer

---

[2]Government intervention is warranted if private agents do not internalize the externalities they exert on other labor market participants in the search process, compare Hosios (1990).

[3]Suppose that the employer observes a decrease in revenue and that continued employment is no longer profitable at the prevailing wage. The firm informs the worker that she will be laid off unless the wage is reduced sufficiently. As long as the maximum wage that the firm is able to pay exceeds the worker's minimum acceptable wage, it is beneficial for the worker to agree on a lower wage and avoid the layoff. However, the worker cannot verify whether the firm's claim is truthful or not. If the worker accepts a proposed wage cut with positive probabil-

bilaterally efficient, because employment may break up in situations in which continuing on a different wage would be superior for both parties. This happens whenever the wage adjustment necessary to ensure continued employment either violates legal constraints or does not comply with individual incentives. In the presence of wage rigidities, government intervention in private separation decisions can improve efficiency.

How much of the empirically observed wage stability is explained by wage smoothing and how much by wage rigidities is subject of ongoing research. We consider this question very relevant for public policy, since government intervention should focus on segments of the labor market where bilaterally inefficient separations due to wage rigidity are most likely. The empirical evidence presented in Section 2 suggests that one of these segments is the labor market of older workers, where wage rigidity arises as a result of market failures. From a theoretical standpoint, the likelihood for an inefficient separation should indeed increase towards the end of working life due to the so-called *horizon effect*. If wages are rigid, workers may be overpaid in certain periods, which means that their current wage exceeds their current contribution to firm revenue. This need not lead to a layoff if the firm expects today's overpayment to be compensated by underpayment in the future (for instance because firm revenue is expected to increase). The closer the worker is to retirement age, however, the shorter is her expected remaining employment horizon and the smaller is the chance that the firm's current financial loss due to overpayment can be recouped. This way, wage rigidity particularly increases separation rates among older workers, compare Section 3.

At the same time, the horizon effect implies that older workers are less likely to find reemployment compared to younger age groups. Taken together, wage rigidities may partly explain why many countries in continental Europe still face relatively low old-age employment rates despite having reduced incentives for early retirement and having increased incentives for employers to hire elderly unemployed. We argue in Section 5 that the positive employment effects of these reforms may have been partly offset by an increase in bilaterally inefficient layoffs, and recommend the implementation of complementary labor market policies.

2   Evidence for inefficient separations of older workers

The most direct tests of the efficiency of separations stem from the Austrian labor market due to the rich and accurate information of the Austrian Social Security Database (Zweimüller et al., 2009). Below we briefly review the findings of Jäger, Schoefer, and Zweimüller (2019) and Frimmel, Horvath, Schnalzenberger, and Winter-Ebmer (2018). Both studies conclude that a

---

ity, a profit-maximizing firm has an incentive to always pretend that a wage cut is necessary to avoid a layoff, even if this is not actually the case. Therefore, the firm's claims do not contain any information, and workers should not react to them. In the Appendix of Kerndler (2019b) we formally proof these arguments by explicitly setting up and solving the wage renegotiation game between firm and worker.

substantial part of the observed separations of older workers in Austria cannot be regarded as bilaterally efficient.

Jäger et al. (2019) exploit the differential effects of the Austrian Regional Extended Benefit Program (REBP), which extended the potential duration of unemployment benefits for workers above age 50 in selected regions. The program was in place from 1988 to 1993. Unsurprisingly, the authors document a significant increase in the separation rate among workers who were eligible for this program. After the REBP was abolished, however, workers who were previously eligible but did not separate had exactly the same separation rate as workers who were never eligible. This observation does not support the notion of bilateral efficiency. If separations were bilaterally efficient, only highly productive jobs should have survived the REBP, and the post-reform separation rate should have been lower among previously eligible workers. The authors additionally present a model that differentiates between efficient and inefficient separations. A structural estimation of the model reveals that at most 13% of the separations caused by the REBP were bilaterally efficient.[4]

Another prediction of bilaterally efficient separations is that the timing of a separation should only depend on the current and future expected productivity as well as the worker's outside options (i.e., the outside option of a worker combines the non-monetary value of leisure and monetary benefits from the unemployment insurance or pension system). After controlling for these factors, wages should not have any effect on private separation decisions. Frimmel et al. (2018) analyze the age at which workers aged 57 to 65 exit their last job before retirement. They find a large variation in job exit ages between firms in the same industry and show that part of these differences can be explained by differences in the firm-specific age profile of wages. For blue collar workers, the steepness of the wage-age profile has a standard deviation of 188 euros, measured as the increase in the annual wage per life year. According to the authors' estimates, an increase in the steepness of the wage-age profile by one standard deviation, relative to the industry average, leads to a 5.5 months earlier job exit of blue collar workers on average. The corresponding number for white collar workers is 6.9 months. Since firms within the same industry are subject to the same labor market regulations, this is likely due to market failures that prevent wages to adjust downwards.

Although comparable studies for other countries are not available to date, the overwhelming evidence for inefficient separations of older workers in Austria suggests a more general validity. While not conducting a direct test, our own work with linked employer-employee data from Germany (Kerndler, 2019a) provides suggestive evidence. If separations were bilaterally efficient, the horizon effect explained above implies that wages of older workers should respond more strongly to fluctuations in firm revenue to avoid separations. For the average worker, we

---

[4]Winter-Ebmer (2003) investigates the same reform and reaches a similar conclusion. He argues that the additional separations triggered by the REBP were mainly driven by wage cost considerations of the employers rather than by low productivity of the jobs.

estimate that a permanent 10% reduction in firm revenue reduces wages of job stayers by 0.5%, which is in line with previous estimates for other countries. While there is some heterogeneity with respect to worker characteristics (most importantly between blue-collar and white-collar workers), there is no indication that wage responses are age-dependent.

More international evidence is so far limited to survey data. Bilateral efficiency implies that observed job separations should to a large extent be considered optimal by both firms and workers. If they were not, the wage should have adjusted to allow ongoing employment. Dorn and Sousa-Poza (2010) analyze data from the 1997 International Social Survey Program and find that a substantial amount of transitions to early retirement happens "not by choice" of the worker. The share is particularly high in continental Europe (Germany 50%, France 41%, Sweden 37.5%, Spain 32.5%) but also reaches 28.9% in the United Kingdom. Furthermore, the 2012 wave of the European Labour Force Survey reveals that 28% of the economically inactive persons in age 50–69 who received a pension at the day of the interview would have wished to stay longer in employment. The share exceeds 70% if job loss and/or unsuccessful job search was their main reason to retire (Eurostat, 2012). Unfortunately, it remains unclear from both surveys whether the respondents would have accepted a wage cut in order to remain employed.

3 Economic implications of wage rigidity

The above evidence suggests that bilateral efficiency fails because wages often do not adjust sufficiently to avoid separations. The findings of Frimmel et al. (2018) suggest that this wage rigidity arise mainly from market failures rather than from legal restrictions. In Kerndler (2019b), we analyze the micro- and macroeconomic implications of such market failures within a theoretical framework. To study the impact on the labor market outcomes of workers at different ages, we build a life-cycle model of the labor market in the manner of Menzio et al. (2016). Each individual lives through a life-cycle that consists of two stages: prime working age (prime-age) and late working age (old-age). After this stage, the worker reaches retirement age and has to leave the labor market. During working age, individuals are either employed or unemployed and applying to job openings (vacancies). Firms can age-discriminate in their hiring process: some vacancies are targeted to prime-age workers while others are targeted to old-age workers. Older workers have a shorter expected employment horizon due to their shorter distance from retirement age. This horizon effect implies that firms create less jobs for older workers, such that their job-finding probability is lower. At the same time, the horizon effect implies that the separation probability is higher for older workers even if separations are bilaterally efficient (Chéron et al., 2011; Menzio et al., 2016).

To analyze the differential effects of wage rigidity, we compare two versions of the model. In both versions, the wage contract is written at the beginning of the employment relation,

and firm and workers are committed to it. In the rigid-wage version, which we consider to be the benchmark scenario, the wage contract cannot depend on the realization of firm-specific productivity shocks. This assumption can be motivated by asymmetric information about firm productivity, see below. In the flexible-wage model, we assume information to be symmetric, and there are no restrictions on the wage contract. While firms and workers are committed to the wage contract, there is no commitment to actual employment, so that any party can turn down the employment relation at any time. Under wage rigidity, this can give rise to inefficient separations. In contrast, the flexible-wage contract will be written such that separations only occur if it is in the mutual interest, so that separations are always bilaterally efficient.

While our wage rigidity could arise because revenue is private knowledge of the firm (compare footnote 3), we are agnostic about the specific form of market failure that is at its core. We simply assume the presence of a market failure that renders wages independent of stochastic fluctuations in firm revenue. Wages are therefore completely unresponsive to shocks to firm-specific productivity. Alvarez and Veracierto (2001) and Boeri et al. (2017) impose wage rigidity in the same way. We think that this is a reasonable approximation to reality, since the empirical wage responses that we estimate in Kerndler (2019a) are quantitatively small even for very bad permanent shocks. In the following, we summarize the most important effects of wage rigidity on the labor market outcomes. For details, see Kerndler (2019b).

Wages and rent sharing.   If wage-setting is unrestricted, the wage desired by an unemployed job-seeker strikes a balance between two conflicting goals: a high probability of getting into employment (the job-finding probability) and high earnings during employment. A higher wage increases earnings during employment, but at the same time decreases firm profits. Firms therefore open less vacancies for highly paid jobs, which makes these jobs relatively harder to get.

If wages are rigid in the sense of not depending on firm revenue, a higher desired wage not only implies a lower probability to find such a job, but also a higher probability of layoffs afterwards. The higher the wage, the more revenue must the firm generate to remain profitable. If the firm is not profitable, the worker is laid off and returns to unemployment. This implies an inverted relation between the wage level and job security. Workers anticipate this and are willing to give up part of their wage income in favor of higher job security. As a result, workers capture a smaller share of firm revenue if wages are rigid. This observation is akin to the "informational rent" highlighted by Kennan (2010). If revenue is private knowledge of the firm, the employer captures a higher share of firm revenue compared to the case of symmetric information, in which wages respond to changes in firm revenues.

Hiring and separations. Wage rigidity increases separation probabilities. This is because employment relations break up whenever the contracted wage is not profitable for one of the parties, even if there existed an alternative wage that would prevent a separation. How does the higher separation probability affect firm's job creation? By the above arguments on rent sharing, the optimal wage is lower with wage rigidity. The lower wage implies that with rigid wages expected firm profits are higher, although matches separate more frequently. This follows from the fact that, *for any given wage level*, expected firm profit is the same with and without wage rigidity. The higher separation rate does not diminish firm profits, because the firm would not have earned any profit from these terminated jobs anyway. Since the decision to create a new job depends on the profit that the employer expects to earn in the future, this implies that rigid wages lead firms to create more vacancies, which generates higher job-finding probabilities for the workers.

Employment and age-heterogeneity. Because rigid wages increase both hiring and separation rates, the net effect of the wage rigidity on employment is a priori not clear. Calibrating the model to the Austrian economy in 2004, we find that wage rigidity reduces the aggregate employment rate by about 1.5 percentage points. The employment loss is almost twice as high among older workers above age 55. The reason is that, due to the horizon effect, the job-finding probability increases less for older workers, while the separation probability increases more. Wage rigidity therefore contributes to low old-age employment rates. Moreover, as we will elaborate in Section 5, the presence of wage rigidity hampers policies that aim at increasing old-age employment rates through decreasing outside options of older workers, such as early retirement benefits.

4 Wage rigidity and labor market policies

Since wage rigidity reduces employment rates below the efficient level, government intervention can be beneficial. During the last decades, most labor market policies have focused on the hiring margin to facilitate displaced workers to get back to employment (Card et al., 2018). In light of the above results, policy measures should also aim at reducing layoffs by either making layoffs more costly for the employer (through layoff taxes or severance pay), reducing employer's wage costs (through wage subsidies), or ensuring that employed workers remain longer productive (through training programs).

Kerndler (2019b) analyzes how each of these four measures can be used to restore the efficient levels of employment that would prevail without the wage rigidity, and compare their effects on aggregate welfare, aggregate output, and government expenditures. Correcting the employment distortions with wage subsidies turns out to be the least cost-effective measure.

While the reduced wage costs indeed lead to fewer layoffs, most subsidized employment relations would not have dissolved anyway. Layoff taxes and severance pay are therefore superior to wage subsidies because they do not impose an additional burden on taxpayers. With a layoff tax, the firm pays a fine to the government for any employer-induced separation. With severance pay, this fine is paid to the displaced worker.[5] Yet, both policies should be used with care. Anticipating high separation costs later on, employers not only reduce firing but also hiring, which can result in a net loss of employment.

Our numerical experiments suggest that, in general, severance payments should be used to undo the employment distortions of the wage rigidity, because they also reduce the costs of the rigidity in terms of welfare and output loss to almost zero. If workers were risk neutral, these losses would actually be completely eliminated. The reason is that in this case severance pay can at the same time eliminate the distortions in the hiring and the separation rate (Boeri et al., 2017). With risk averse workers, this result is still approximately true.

However, we also note that the amount of severance pay necessary to restore efficient employment can depend sensitively on the model parameters. This holds especially for workers hired during old-age, because the effects of severance pay on the hiring and on the separation rates counteract each other, as was pointed out above. The required amount of severance pay crucially depends on how much hiring wages of older workers fall after introduction of the severance payment. In the case that the hiring wage of older workers does not fall sufficiently, it can even happen that this policy destroys rather than increases employment. Since the affected group of workers is relatively small (accounting for only 3.7% of total employment), wage subsidies could serve as a more robust policy to reduce separations. Alternatively, an adequately designed government-sponsored training program may be considered. While the effectiveness of any such program will depend on its particular features, in our evaluation we mimic the design of the German WeGebAU program. This program offers external courses that improve general skills of low-skilled workers and employed workers above age 45. Imposing the cost-benefit link estimated by Dauth and Toomet (2016) in our model, we find that the program costs are more than compensated by lower expenditures on unemployment benefits.

Among the policy instruments considered in our evaluation, the welfare maximizing policy mix to counter the negative employment effects of the wage rigidity combines government-sponsored training for workers hired in old age with severance pay levied on prime-age workers and older workers with longer length of service in the firm.

---

[5]Note that Austria has a conceptually different severance pay scheme since *Abfertigung neu* was introduced in 2003. Severance pay no longer increases separation costs for the firm but instead acts like an additional wage tax that is paid by the employer in each period of employment. Rather than reducing layoffs, this may actually increase layoffs. At the same time, however, the policy change has increased the willingness of workers to quit to another firm, which has potentially made the allocation of labor more efficient (Kettemann et al., 2017).

5   Wage rigidity and pension policies

During the last two decades, countries with large public pension systems have implemented a wide range of reforms to deal with the increasing financial pressure that results from an aging population. In the reform process, pathways to early retirement were closed or made less generous. For Austrian men, for instance, before 2000 the discount for early retirement was 2% for every year of benefit claiming before age 65. This was increased in several steps to currently 5.1%. At the same time, the age threshold for early retirement was raised from age 60 to 62, and the number of necessary contribution years was increased from 35 to 40 (Knell et al., 2006).[6]

According to Staubli and Zweimüller (2013), this reform had pronounced positive effects on old age employment. Most employed workers who would otherwise have separated to early retirement instead stayed longer in their jobs. Theoretically, this is an implication of the horizon effect. As the expected retirement age of a worker increases, so does her expected employment horizon, and her separation rate decreases at any given age (Chéron et al., 2011). In our model, we observe the same attenuating effect of early retirement reforms. Additionally, the model allows us to analyze whether the remaining separations are more or less efficient compared to before the reform. We find that although the total probability for a separation has gone down, the probability for a bilaterally inefficient separation has actually gone up. Hence the detrimental effect of the wage rigidity on old-age employment is more severe after early retirement rules were tightened.

In other words, the increase in old-age employment triggered by the pension reform would have been higher in absence of wage rigidity. In our calibrated model we show that 15% of the potential gain in old-age employment is foregone by the decreasing efficiency of layoffs. The bulk of the efficiency loss (and therefore employment loss) falls on older workers with long duration of employment at their firm. To unleash their full potential, reforms that decrease generosity of early retirement should therefore be complemented by labor market policies that incentivize firms to keep long-serving elderly workers in employment. Following the arguments in Section 4, this should be accomplished by increasing the cost of employer-induced layoffs through higher severance pay. The level of severance pay that compensates the loss in employment at the same time almost completely eliminates the losses in output and welfare caused by the wage rigidity.

---

[6]The current figures refer to the *Korridorpension* which was introduced in 2005. Alternatively, the *Langzeitver-sicherungspension ("Hacklerregelung")* allows early retirement at an annual penalty of 4.2% if more than 45 contribution years have been accumulated.

6 Conclusion

In this policy brief, we have emphasized the empirical relevance of wage rigidities on the labor market of older workers. While wage smoothing is beneficial for firms and workers, wage rigidities can lead to bilaterally inefficient separations. This means that employment relations break up in situations in which continuing on a different wage would be beneficial for both parties. Older workers are likely to be among the labor market participants most affected by bilaterally inefficient separations due to a horizon effect. Since approaching retirement decreases the expected employment horizon, the willingness of firms to keep an overpaid worker employed decreases in the worker's age. The empirical findings of Frimmel et al. (2018) and Jäger et al. (2019) confirm the presence of inefficiencies in the separation margin.

Based on a calibrated model of the labor market, we have verified that wage rigidities lead to higher separation rates and lower employment. Even if the primary source of the wage rigidity may be a market failure and hence beyond the influence of policy makers, the resulting employment distortions can be undone by common labor market policies. By comparing the impact of four policy measures regarding their impact on welfare, output, and government expenditures we have identified a reasonable policy mix. This combines government-sponsored training for newly hired older workers with severance pay levied on prime-age workers and older workers with longer duration of employment.

We have further argued that wage rigidity reduces the effectiveness of early retirement reforms. Increasing penalties and restricting access to early retirement does have significantly positive effects on employment due to fewer job separations. While overall the separation probability decreases, however, the probability for an inefficient separation actually goes up. This efficiency loss particularly hits older workers with longer length of service. To unleash their full potential, reforms that decrease generosity of early retirement should therefore be complemented by labor market policies that incentivize firms to keep their elderly workforce employed. We recommend that restricting early retirement should go hand in hand with a selective increase in employment protection for long-tenured elderly workers.

References

F. Alvarez and M. Veracierto. Severance payments in an economy with frictions. *Journal of Monetary Economics*, 47(3):477–498, 2001.

T. Boeri, P. Garibaldi, and E. R. Moen. Inside severance pay. *Journal of Public Economics*, 145:211–225, 2017.

D. Card, J. Kluve, and A. Weber. What works? A meta analysis of recent active labor market program evaluations. *Journal of the European Economic Association*, 16(3):894–931, 2018.

A. Chéron, J.-O. Hairault, and F. Langot. Age-Dependent Employment Protection. *The Economic Journal*, 121:1477–1504, 2011.

C. Dauth and O. Toomet. On Government-Subsidized Training Programs for Older Workers. *Labour*, 30(4):371–392, 2016.

D. Dorn and A. Sousa-Poza. 'Voluntary' and 'involuntary' early retirement: an international analysis. *Applied Economics*, 42(4):427–438, 2010.

Eurostat. Transition from work to retirement – evaluation of the 2012 labour force survey ad hoc module. http://ec.europa.eu/eurostat/documents/1978984/6037334/Evaluation-Report-AHM-2012.pdf, 2012.

W. Frimmel, T. Horvath, M. Schnalzenberger, and R. Winter-Ebmer. Seniority wages and the role of firms in retirement. *Journal of Public Economics*, 164:19–32, 2018.

L. Guiso, L. Pistaferri, and F. Schivardi. Insurance within the Firm. *Journal of Political Economy*, 113(5):1054–1087, 2005.

A. J. Hosios. On the efficiency of matching and related models of search and unemployment. *The Review of Economic Studies*, 57(2):279–298, 1990.

S. Jäger, B. Schoefer, and J. Zweimüller. Marginal Jobs and Job Surplus: A Test of the Efficiency of Separations. NBER Working Paper No. 25492, 2019.

J. Kennan. Private Information, Wage Bargaining and Employment Fluctuations. *The Review of Economic Studies*, 77(2):633–664, 2010.

M. Kerndler. Size and persistence matter: Wage and employment insurance at the micro level. ECON WPS – Vienna University of Technology Working Papers in Economic Theory and Policy 04/2019, 2019a.

M. Kerndler. Contracting frictions and inefficient layoffs over the life-cycle. *mimeo*, Vienna University of Technology, 2019b.

A. Kettemann, F. Kramarz, and J. Zweimüller. Job Mobility and Creative Destruction: Flexicurity in the Land of Schumpeter. 2017.

M. Knell, W. Köhler-Töglhofer, and D. Prammer. Jüngste Pensionsreformen in Österreich und ihre Auswirkungen auf fiskalische Nachhaltigkeit und Pensionsleistungen. *Geldpolitik & Wirtschaft*, Q2:72–100, 2006.

G. Menzio, I. A. Telyukova, and L. Visschers. Directed search over the life cycle. *Review of Economic Dynamics*, 19:38–62, 2016.

S. Staubli and J. Zweimüller. Does raising the early retirement age increase employment of older workers? *Journal of Public Economics*, 108:17–32, 2013.

R. Winter-Ebmer. Benefit duration and unemployment entry: A quasi-experiment in Austria. *European Economic Review*, 47:259–273, 2003.

J. Zweimüller, R. Winter-Ebmer, R. Lalive, A. Kuhn, J.-P. Wuellrich, O. Ruf, and S. Büchi. Austrian Social Security Database. The Austrian Center for Labor Economics and the Analysis of the Welfare State Working Paper No. 0903, 2009.

EconPol Europe

EconPol Europe – the European network for economic and fiscal policy research – is a network of 14 policy-oriented university and non-university research institutes across 12 countries, who contribute scientific expertise to the discussion of the future design of the European Union. The network's joint interdisciplinary research covers sustainable growth and best practice, reform of EU policies and the EU budget, capital markets and the regulation of the financial sector, and governance and macroeconomic policy in the European Monetary Union.

The network was founded in spring 2017 by the ifo Institute, along with eight renowned European research institutes. A further five associate partners were added to the network in January 2019.

Our mission is to contribute our research findings to help solve the pressing economic and fiscal policy issues facing the European Union, and to anchor more deeply the idea of a united Europe within member states.

With our cross-border cooperation on fiscal and economic issues, EconPol Europe promotes growth, prosperity and social cohesion in Europe. In particular, we provide research-based contributions to the successful development of the European Economic and Monetary Union (EMU).

Our joint interdisciplinary research covers:

- Sustainable growth and best practice
- Reform of EU policies and the EU budget
- Capital markets and the regulation of the financial sector
- Governance and macroeconomic policy in the European Monetary Union

We will also transfer our research results to the relevant target groups in government, business and research, as well as to the general public.