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Advance Notice and Its Consequences for Workers^{*}

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March 31, 2025

Abstract

Advance Notice (AN) is a prevalent institution in most countries today. Yet, little is known about its consequences. This paper uses a 1997 reform in Sweden, which changed the length of AN from being based on the age of the worker at notice, to the firm tenure of the worker at notice, to estimate causal effects on post-layoff outcomes of workers. Using a regression discontinuity design, I find that lower AN leads to lower earnings and wages at the subsequent job, as well as increasing the time to finding a new job and raising the risk of ending up in unemployment.

Keywords:

JEL-codes:

I Introduction

Advance notice (AN) is an institution prevalent in most developed countries today. The most salient feature of it is that it allows for a longer readjustment period for laid off workers. This potentially allows for improved match quality, lower risk of ending up in unemployment, and shorter non-employment spells. On the other hand, it introduces costs for the firm. Workers who are noticed in advance that they will be laid off might reduce their work effort and spend more time searching for new jobs. It also reduces flexibility in response to stochastic shocks to the firm. Without policy intervention, no firm would offer advance notice, as they do not internalize the benefits to the worker. If the benefit to the worker exceeds the costs to the firm, this decision may be inefficient.

^{*}I thank participants at the Uppsala Labor Group for helpful comments on the direction of this paper. I would also like to thank my main supervisor, Peter Fredriksson, and my co-supervisor, Yoko Okuyama, for their excellent advice and support throughout the PhD.

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However, given that there is a mandatory notice (MN) policy in place, there are generally other ways for the firm to not have to offer AN, namely it is often the case that notices may be bypassed through individual bargaining between the employer and employee. Naturally, the employee will accept the offer only when the offer exceeds the utility of the outside option of remaining at the firm throughout the notice period, which would entail the salary payments plus any additional benefit of job search on the job. At the same time, the firm will only offer severance payments that are less than the total cost induced by remaining with the mandatory AN¹.

Despite the prevalence of different types of AN policies, the literature on the effects of such policies remain scarce. A number of papers in the early 1990s exploited the introduction of the WARN act in 1988 (see e.g. Ruhm (1992), Ruhm (1994), Burgess and Low (1992), Malik (2022)). They mainly find that receiving AN increases post-displacement earnings, reduces risk of non-employment spells, but that there is no change in average duration of non-employment, conditional on becoming non-employed. However, it is unclear to what extent these results are driven by the AN itself, and to what extent it is driven by the firms following the mandate also offering other types of aid in transitioning, such as more generous UI or skill retraining. The paper most closely related to this paper is Cederlöf et al. (2024), who study a six month extension of AN among white-collar workers in Sweden, for those who have at least ten years tenure at the firm from which they are displaced, and who are at least of age 55. For this sample of workers, they find that longer notice translates into higher post-displacement wages and lower exposure to non-employment.

This paper adds to the literature by shedding light on the consequences of advance notice for a broad set of individuals. It additionally complements the classic mass layoff literature by introducing a potentially mediating mechanism in determining post-layoff outcomes.

I find that longer notice translates into higher wages and earnings at the first new job after layoff, and it further reduces the average duration it takes to find that new job. I find no evidence of firms, in the context of this particular reform, changing their composition of hires based on the changes in advance notice. It is possible that the cost of longer notice relative to other costs when hiring are small, such that there are no economically or statistically significant effects that can be found in the data.

¹In practice, in addition to reimbursing the individual for the loss of utility from the notice, it is also the case that individual agreements will save costs for the firm by not having to find legal room for laying off the individual.

2 Setting

2.1 Setting

There had long been a debate in Sweden regarding which groups should be more protected by specific Employment Protection Legislation (EPL). In the work leading up to The Employment Act (EPA) of 1974, it was argued that it is especially important to safeguard older employees, as their labor is not as highly demanded as the younger ones (prop. 1973:129). Thus, in the implementation of the legislation, the length of advance notice was tied on the age of the worker.

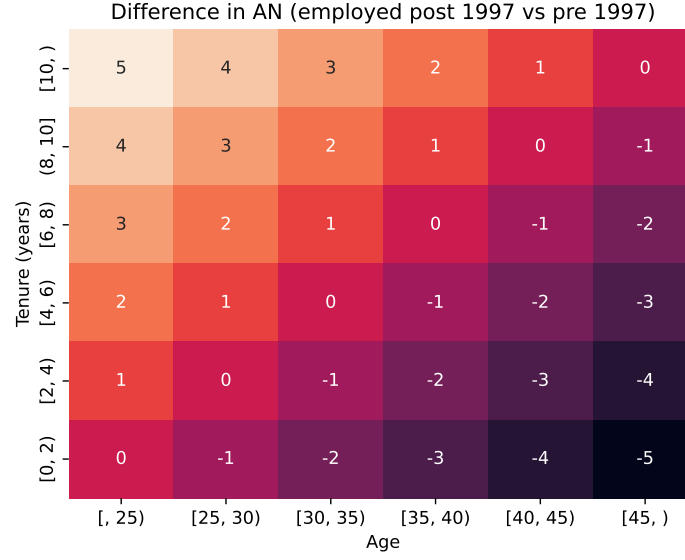
Due to the changing nature of the labor market, by the mid 1990s the reasoning in official documents had started to shift. The core issue on the labor market had transitioned from that of too little mobility to high unemployment levels. As longer notice time was argued to deter hiring, a tenure-based system was proposed (prop 1996/97:16). In the new system, the length of the mandatory advance notice was purely based on tenure at the firm, irrespective of the age of the worker. The reform was not applied retroactively, and only applied to new hires from 1 Jan 1997 and onward. The corresponding rules prior to and after the reform can be seen in Table 1.

TABLE 1.
Advance Notice Lengths Before and After 1997

| From January 1, 1997 | Before January 1, 1997 |
|----------------------------------|-----------------------------------|
| < 2 years = 1 month | < 25 years = 1 month |
| $2 \leq$ years < 4 = 2 months | $25 \leq$ years < 30 = 2 months |
| $4 \leq$ years < 6 = 3 months | $30 \leq$ years < 35 = 3 months |
| $6 \leq$ years < 8 = 4 months | $35 \leq$ years < 40 = 4 months |
| $8 \leq$ years < 10 = 5 months | $40 \leq$ years < 45 = 5 months |
| ≥ 10 years = 6 months | ≥ 45 years = 6 months |

This change in mandatory AN implies that different combinations of age and tenure will experience different changes in the length of AN. In general, newly hired older workers will become worse off from the reform, while newly hired younger workers will experience minor changes in the short term, but will be able to accrue higher AN over time. Figure 1 displays all the different combinations and the corresponding change in the number of months of mandatory AN. In line with Swedish labor market tradition, the rules may be bypassed through collective bargaining. These changes are thus to be interpreted as de jure changes, which do not necessarily map 1:1 into de facto changes.

FIGURE 1.
Change in AN



3 Data

3.1 Data

I use the universe of matched employer-employee data from 1985, to which I add registers on background variables, such as gender, age, and other demographic characteristics. The employer-employee data contains annual earnings for each employee-employer combination, as well as monthly indicators of employment status. Thus, it is possible to calculate an estimated level of monthly earnings, by dividing the annual measure with the number of months employed at the particular employer in a given year. Furthermore, using the monthly employment markers, I also calculate tenure. For the purpose of this paper, the most important measure of tenure is the firm-level tenure, since that is what determines the length of the AN. Since it is the total tenure at a given firm that determines the notice length, regardless of breaks in spells, I calculate tenure as the total number of months employed at a given firm. In addition to the employer-employee dataset capturing annual earnings and pseudo-monthly earnings, I add wages from the Wage Structure Statistics, which covers about 50% of employees on the Swedish labor market, including all public employees. For the private firms, it only contains a subset of the workers, as it consists of a stratified sample (by industry and number of employees) for all firms with less than 500 employees.

In my main sample, I restrict attention to the main employer, which is defined as the employer for which the

individual has the highest monthly earnings for a given monthly date. I further remove any observations with less than SEK 10,000 measured in 2019 prices.

3.2 Creating the Mass Layoff Sample

To create the mass layoff sample used for the analysis, I restrict the attention to individuals who experience a mass layoff at any point during the observation period. A mass layoff is defined as the share of workers at a given plant falling by at least 30% year-to-year. In order to mitigate the risk of temporary variations in the number of employees, I restrict myself to plants with at least 20 employees in the pre-layoff year².

After assigning a plant as conducting a mass layoff or not, I then use the monthly markers to define the final employment date for a given individual. The reason for assigning the mass layoff using annual variation, but displacement using the monthly markers is that heterogeneous notice times within a plant will render it difficult to define the mass layoff events using monthly variation. An additional benefit is that by using annual variation, I also follow the previous mass layoff literature.

3.3 Defining EPL-stated Notice Lengths

To calculate the EPL-stated notice lengths, I first take the total tenure for a given individual at the time of displacement, as well as their age measured in months. I then assign them to either the pre-reform system if they first showed up as employed at the given firm for the mass layoff spell before 1997, or to the post-reform system if they showed up from 1997 and onwards. Given these three variables I can then assign the number of predicted months of AN they should receive according to the EPL. One caveat with this measurement, apart from that there may be some mismeasurement in the tenure stemming from misreporting of the monthly markers from the employers, is that I measure the variables at the time of displacement and not at the time of notice, since the latter is unknown. This means that both the age and the tenure of the individuals will generally be overstated. This is something that is difficult to get around without knowing the exact individual de facto notice. However, using data from the Public Employment Service covering all layoffs with at least five employees, available from 2005 and onwards, I have validated that the predicted notice lengths are also capturing de facto notice lengths in the data, see Section A.1 in Appendix A.

²This is somewhat lower compared to the standard mass layoff literature. The reason is twofold: i) Power, ii) As I am comparing displaced workers with other displaced workers, if misclassification of layoff events is not correlated with the treatment, there will be no bias in the treatment effect. However, I also performed the analysis with varying plant sizes and the magnitude of the estimates remain stable throughout.

3.4 Descriptives

TABLE 2.
Descriptives: RD Sample

| | No Restriction | | ML 1997-2007 | | ML 1997-2007 & 24 month bw | |
|---------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | Hired < 1997 | Hired ≥ 1997 | Hired < 1997 | Hired ≥ 1997 | Hired < 1997 | Hired ≥ 1997 |
| Female | 0.393 (0.488) | 0.431 (0.495) | 0.425 (0.494) | 0.429 (0.495) | 0.403 (0.491) | 0.409 (0.492) |
| Age | 39.442 (8.631) | 37.087 (8.408) | 40.945 (8.230) | 36.522 (8.270) | 37.977 (8.402) | 37.394 (8.435) |
| Immigrant | 0.135 (0.341) | 0.249 (0.432) | 0.120 (0.325) | 0.204 (0.403) | 0.150 (0.357) | 0.169 (0.375) |
| College Degree | 0.259 (0.438) | 0.417 (0.493) | 0.283 (0.450) | 0.393 (0.488) | 0.334 (0.472) | 0.345 (0.475) |
| Firm Tenure (months) | 61.287 (61.218) | 37.939 (38.821) | 105.086 (56.310) | 27.086 (22.884) | 54.459 (33.026) | 37.362 (28.812) |
| Annual Earnings (t - 1) | 127073.081 (111071.211) | 198860.708 (192582.421) | 166877.474 (137407.108) | 161880.386 (164442.683) | 174652.025 (147763.271) | 162627.862 (147545.395) |
| Monthly Earnings (t - 1) | 18,587.749 (25,668.294) | 31,133.457 (56,526.357) | 24,812.207 (31,443.873) | 26,334.583 (63,863.859) | 25,070.798 (31,308.406) | 25,047.759 (32,075.894) |
| Wage WSS (t - 1) | 16,696.727 (7,445.216) | 28,192.384 (12,349.303) | 20,800.180 (8,173.030) | 23,293.998 (10,783.544) | 21,564.397 (8,710.085) | 21,623.246 (8,924.044) |
| Plant Size (t - 1) | 1,279.854 (4,126.518) | 398.670 (1,152.023) | 645.755 (1,446.746) | 457.459 (1,301.085) | 474.176 (1,121.449) | 548.492 (1,257.375) |
| Layoff Size | 1,028.146 (3,943.396) | 247.953 (734.984) | 455.852 (1,194.164) | 282.832 (725.075) | 303.475 (811.496) | 362.206 (869.442) |
| Private Firm | 0.748 (0.434) | 0.861 (0.346) | 0.791 (0.406) | 0.854 (0.353) | 0.854 (0.353) | 0.831 (0.374) |
| Agriculture | 0.008 (0.089) | 0.003 (0.052) | 0.008 (0.088) | 0.004 (0.062) | 0.003 (0.055) | 0.005 (0.071) |
| Construction | 0.065 (0.247) | 0.058 (0.234) | 0.042 (0.200) | 0.049 (0.216) | 0.056 (0.230) | 0.058 (0.234) |
| Education | 0.031 (0.174) | 0.045 (0.208) | 0.031 (0.173) | 0.033 (0.179) | 0.030 (0.169) | 0.031 (0.173) |
| Electricity & Water | 0.011 (0.103) | 0.007 (0.082) | 0.021 (0.143) | 0.007 (0.085) | 0.018 (0.132) | 0.014 (0.117) |
| Finance | 0.022 (0.147) | 0.029 (0.169) | 0.021 (0.143) | 0.021 (0.142) | 0.019 (0.137) | 0.023 (0.151) |
| Fishing | 0.000 (0.005) | 0.000 (0.004) | 0.000 (0.000) | 0.000 (0.000) | 0.000 (0.000) | 0.000 (0.000) |
| Healthcare | 0.115 (0.320) | 0.124 (0.330) | 0.141 (0.348) | 0.109 (0.312) | 0.109 (0.312) | 0.117 (0.321) |
| Hotels & Restaurants | 0.021 (0.142) | 0.029 (0.168) | 0.015 (0.120) | 0.027 (0.163) | 0.024 (0.153) | 0.034 (0.181) |
| Households | 0.000 (0.007) | 0.000 (0.000) | 0.000 (0.000) | 0.000 (0.000) | 0.000 (0.000) | 0.000 (0.000) |
| Intl Organizations | 0.000 (0.007) | 0.000 (0.000) | 0.000 (0.000) | 0.000 (0.000) | 0.000 (0.000) | 0.000 (0.000) |
| Manufacturing | 0.231 (0.421) | 0.179 (0.383) | 0.332 (0.471) | 0.232 (0.422) | 0.326 (0.469) | 0.287 (0.452) |
| Mining | 0.002 (0.046) | 0.001 (0.030) | 0.002 (0.039) | 0.001 (0.033) | 0.001 (0.025) | 0.003 (0.055) |
| Other Services | 0.017 (0.128) | 0.027 (0.163) | 0.017 (0.128) | 0.031 (0.174) | 0.018 (0.134) | 0.030 (0.171) |
| Public Administration & Defence | 0.042 (0.202) | 0.041 (0.199) | 0.044 (0.205) | 0.043 (0.203) | 0.027 (0.163) | 0.040 (0.195) |
| Real Estate R&D | 0.076 (0.265) | 0.269 (0.444) | 0.105 (0.307) | 0.244 (0.430) | 0.169 (0.375) | 0.188 (0.391) |
| Trade | 0.071 (0.257) | 0.097 (0.297) | 0.084 (0.278) | 0.090 (0.286) | 0.096 (0.294) | 0.086 (0.281) |
| Transport | 0.080 (0.272) | 0.084 (0.277) | 0.136 (0.342) | 0.096 (0.294) | 0.102 (0.303) | 0.077 (0.267) |
| Missing | 0.207 (0.405) | 0.005 (0.069) | 0.003 (0.052) | 0.012 (0.108) | 0.002 (0.047) | 0.007 (0.082) |
| N | 327,068 | 477,998 | 76,914 | 182,037 | 22,964 | 47,371 |

TABLE 3.
Descriptives: RD Sample by ML Year

| | 1997 | | 1998 | | 1999 | | 2000 | | 2001 | | 2002 | | 2003 | | 2004 | | 2005 | | 2006 | | 2007 | |
|---------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | Head < 1997 | Head ≥ 1997 | Head < 1997 | Head ≥ 1997 | Head < 1997 | Head ≥ 1997 | Head < 1997 | Head ≥ 1997 | Head < 1997 | Head ≥ 1997 | Head < 1997 | Head ≥ 1997 | Head < 1997 | Head ≥ 1997 | Head < 1997 | Head ≥ 1997 | Head < 1997 | Head ≥ 1997 | Head < 1997 | Head ≥ 1997 | Head < 1997 | Head ≥ 1997 |
| Age | 0.171 | 0.367 | 0.431 | 0.438 | 0.190 | 0.370 | 0.415 | 0.434 | 0.351 | 0.404 | 0.406 | 0.424 | 0.434 | 0.395 | 0.399 | 0.331 | 0.448 | 0.466 | 0.347 | 0.441 | 0.305 | 0.395 |
| Female | 0.481 | 0.481 | 0.491 | 0.495 | 0.495 | 0.495 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 |
| Age | 0.406 | 0.399 | 0.399 | 0.399 | 0.399 | 0.399 | 0.399 | 0.399 | 0.399 | 0.399 | 0.399 | 0.399 | 0.399 | 0.399 | 0.399 | 0.399 | 0.399 | 0.399 | 0.399 | 0.399 | 0.399 | 0.399 |
| Female | 0.790 | 0.805 | 0.810 | 0.810 | 0.810 | 0.810 | 0.810 | 0.810 | 0.810 | 0.810 | 0.810 | 0.810 | 0.810 | 0.810 | 0.810 | 0.810 | 0.810 | 0.810 | 0.810 | 0.810 | 0.810 | 0.810 |
| Immigrant | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 |
| Female | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 | 0.169 |
| College Degree | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 |
| Female | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 | 0.149 |
| Fin. Income (months) | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 |
| Female | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 | 0.497 |
| annual_salar_h | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 |
| Female | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 |
| monthly_salar_h | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 |
| Female | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 |
| wage_w_h | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 |
| Female | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 | 0.814 |
| Plan Size (t - 1) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Female | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Layoff Size | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Female | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Private Firm | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Female | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Agriculture | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Female | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Construction | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Female | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Education | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Female | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Electricity & Water | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Female | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Finance | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Female | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Fishing | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Female | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Healthcare | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Female | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Hôtels & Restaurants | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Female | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Households | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Female | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Inf. Industries | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Female | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Manufacturing | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Female | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Mining | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Female | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Other Services | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Female | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Public Administration & Defense | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Female | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Real Estate R.&D. | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Female | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | | | | | | |

4 Identifying the Effects of Advance Notice

4.1 Empirical Strategy

Regression Discontinuity Design

The main approach is to use an RD design, where I use hirings around the threshold of the introduction of the new legislation. The workers hired just after the reform will have different levels of mandated AN compared to those hired just before. If there is a continuous relationship in the underlying distribution of all other covariates which may be correlated with the treatment across the threshold, then we can estimate the effect of AN given that we can estimate the true parametric form of the outcome on either side of the cutoff.

$$y_i = \alpha + f_1(Hired_{t(i)} - 1997) + f_2(Hired_{t(i)} - 1997) \times \mathbb{1}[Hired_{t(i)} \geq 1997] + \beta_3 \mathbb{1}[Hired_{t(i)} \geq 1997] + \delta X_i + \varepsilon_i$$

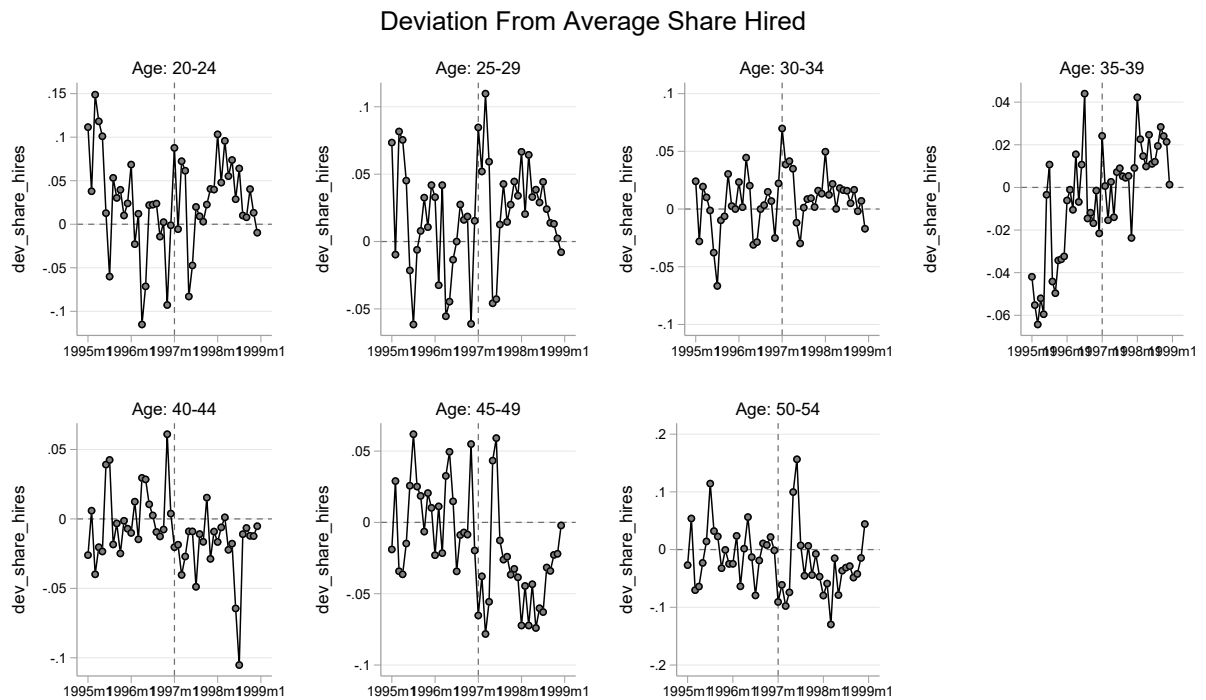
where $Hired_{t(i)}$ denotes the hiring year and month of individual i . $\mathbb{1}[\cdot]$ is an indicator function which takes on the value one if the individual is hired in 1997 or later, and zero otherwise. X_i is a vector of pre-determined covariates. In the main specification, I use a bandwidth of 24 months and control for layoff year, hiring month, as well as some demographic characteristics. I further use a linear control function on both sides of the cutoff³.

³For robustness to these assumptions, see Appendix

5 Results

Naturally, one concern about the reform of AN is that it changes the hiring incentives from the perspectives of the firms. If this causes changes in the composition of hires, it could weaken the claim that the effect identified is causal. In order to alleviate that concern, Figure ?? shows the deviation in the percentage of new hires from each age group relative to the mean between 1994 and 2000. Since the older age groups are the ones that receive lower AN from the reform, we would be worried that they would constitute a larger share of the new hires after the reform. However, that is clearly not what the figure indicates.

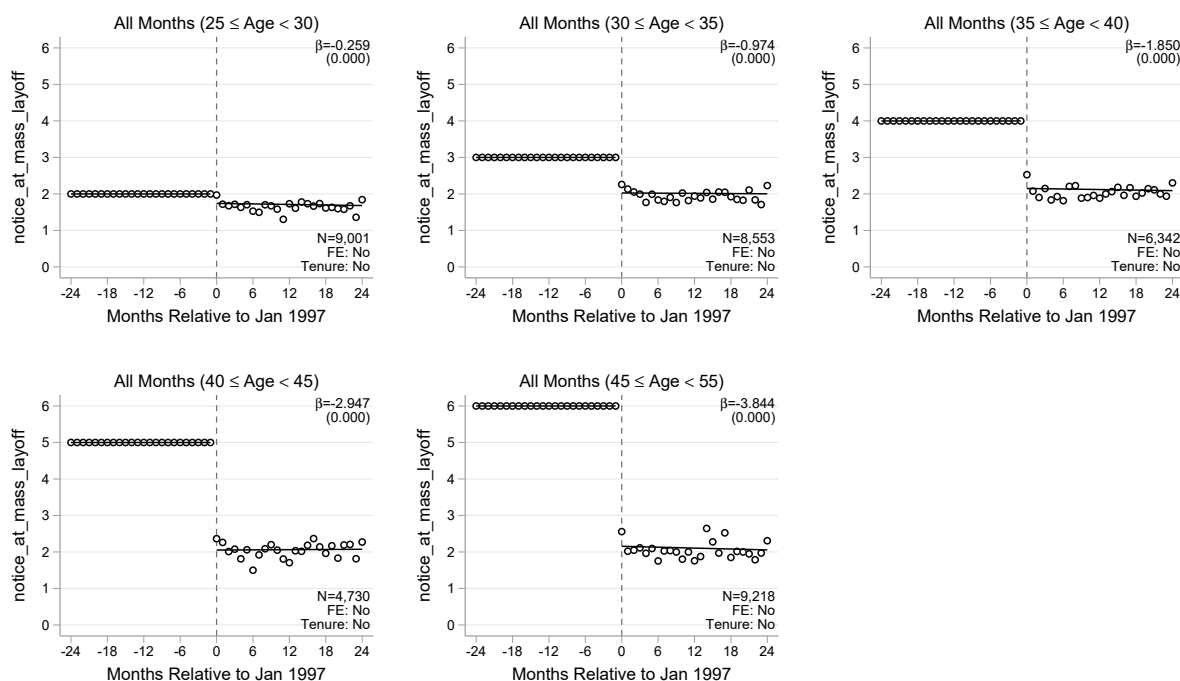
FIGURE 2.
Share Hired by Age Group



5.1 First Stage

Figure 3 shows the de jure changes in the amount of months of notice at the time of displacement, by age bracket. Everyone to the left of the cutoff at zero were hired before the reform and thus follow the age-based rules. For the individuals to the right of the cutoff, their notice length is based on the total amount of firm tenure at the time of notice. Remember that the estimated change in notice here is based on the stipulated rules, but that CBAs may agree to use other ways of determining notice lengths⁴. Given this, we can interpret the reduced form estimates as the effect of the change in the policy variable, and the IV estimates as an approximation of the change in the actual number of months of notice.

FIGURE 3.
RDD - First Stage



The figure shows the first stage estimates by age bracket, according to the EPL-stipulated rules. In that sense, it is a measure of the de jure change in AN, and not necessarily the de facto implementation. The running variable is time of hiring relative to Jan 1997, measured in months. As the figure shows, those hired before the reform date receive their AN purely based on age, while the AN lengths of those to the right of the cutoff depends on the tenure at the time of layoff.

⁴In the Appendix (**APPENDIX REFERENCE**) I use notice data from 2005 and onwards in an attempt to compare de facto notice lengths with de jure notice lengths.

5.2 Balance

FIGURE 4.
RDD - Balance

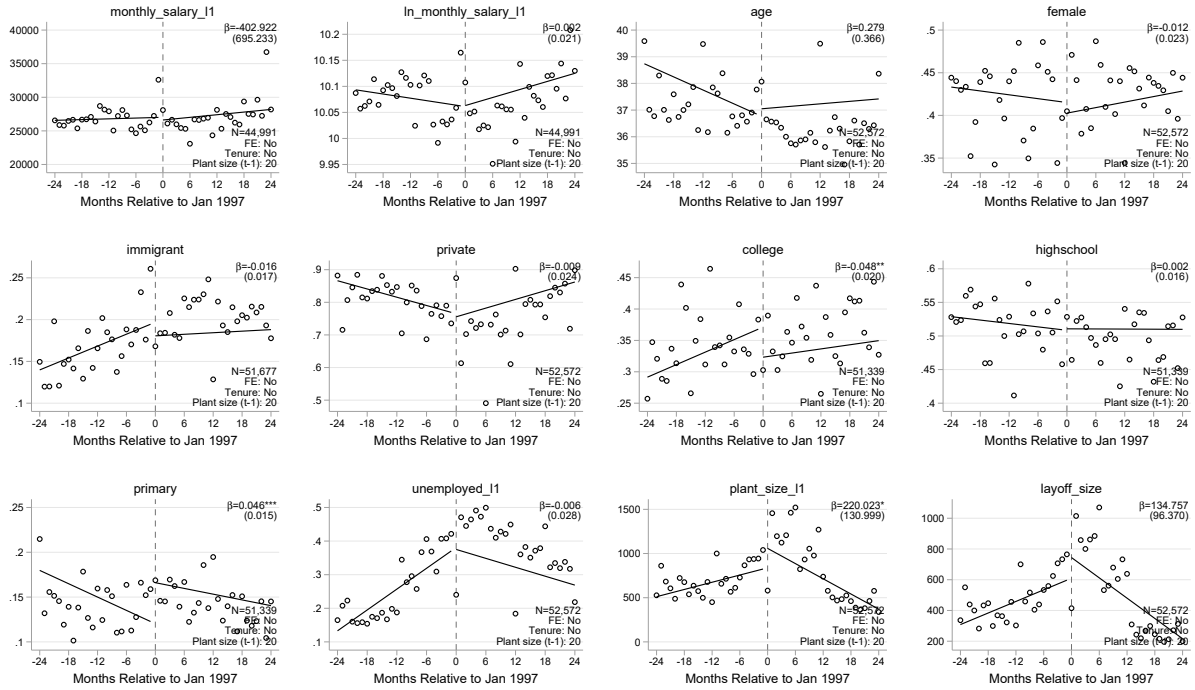
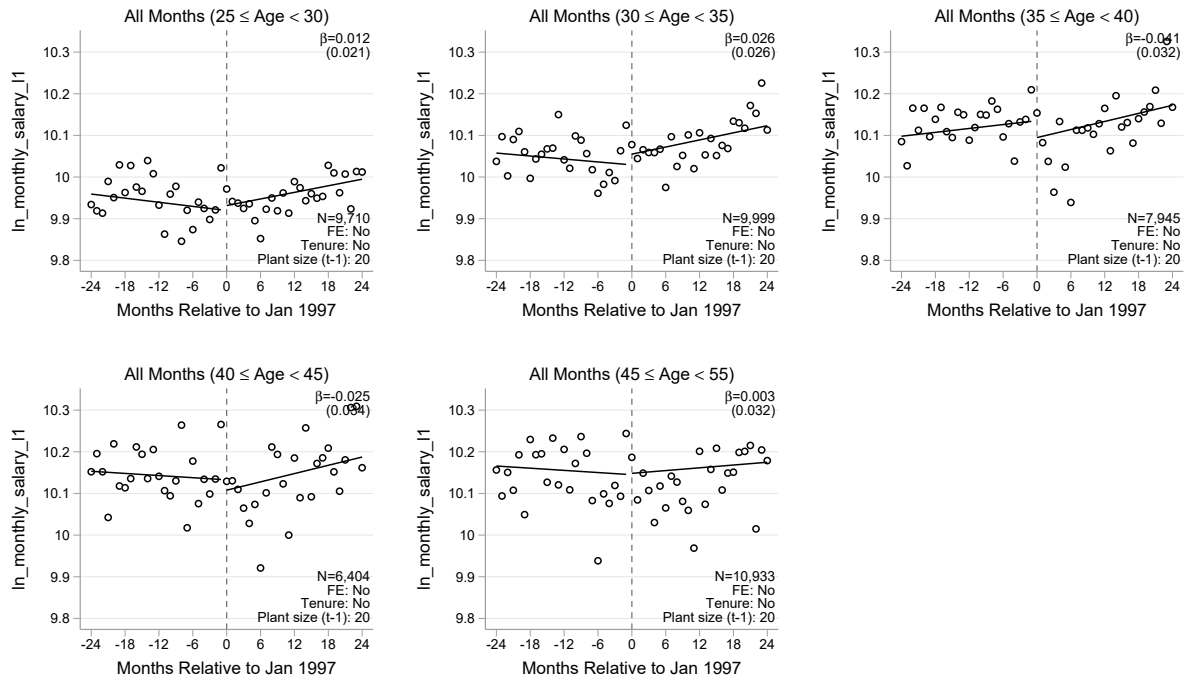


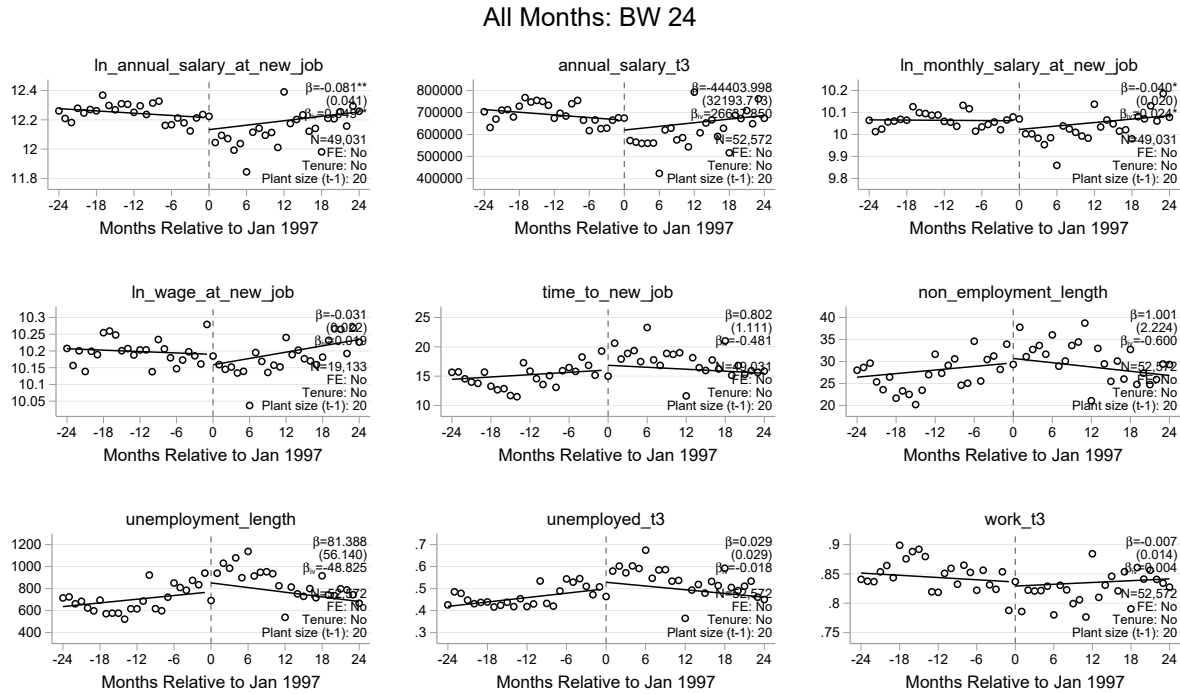
FIGURE 5.
RDD - Monthly Earnings Balance by Age



5.3 Effects on Labor Market Outcomes

Figure ?? shows the RD results for different labor market outcomes for the pooled sample. Both wages and earnings go down, while there is some indication that the non-employment length and time to new job goes up.

FIGURE 6.
RDD - Various Pooled Outcomes

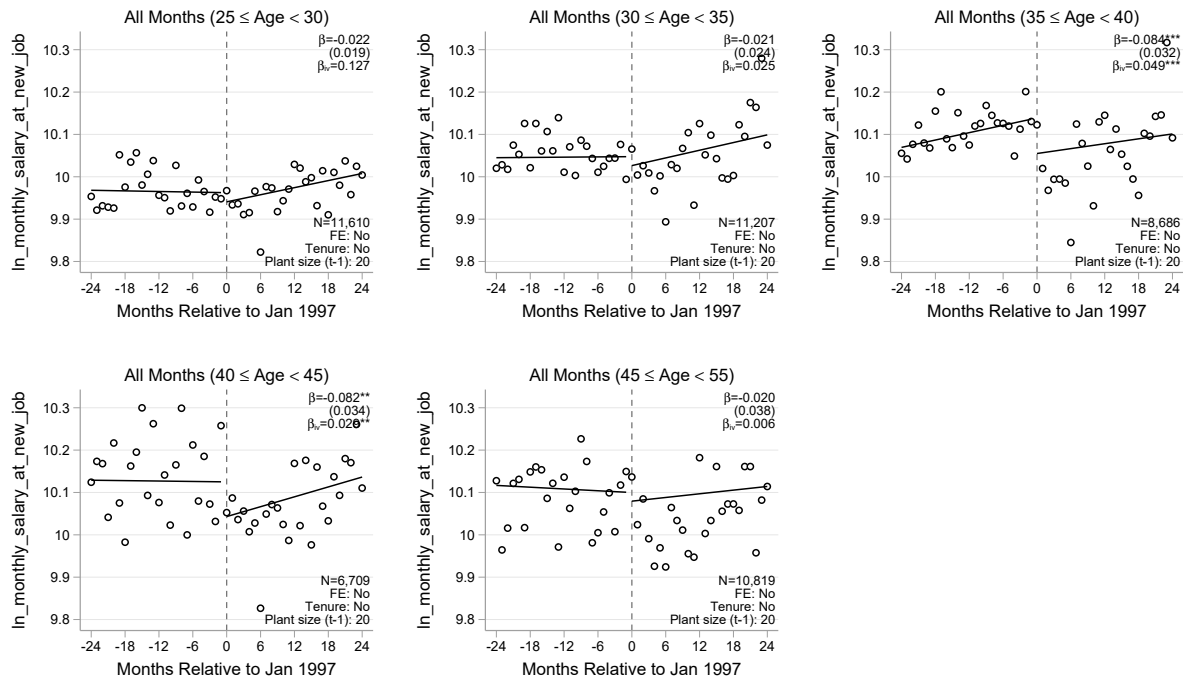


The figure shows the RD results for different labor market outcomes, including the standard errors and the IV estimates. The running variable is time of hiring relative to Jan 1997, measured in months. As the figure shows, those hired before the reform date receive their AN purely based on age, while the AN lengths of those to the right of the cutoff depends on the tenure at the time of layoff.

5.4 Effects on Wages and Earnings, by age bracket

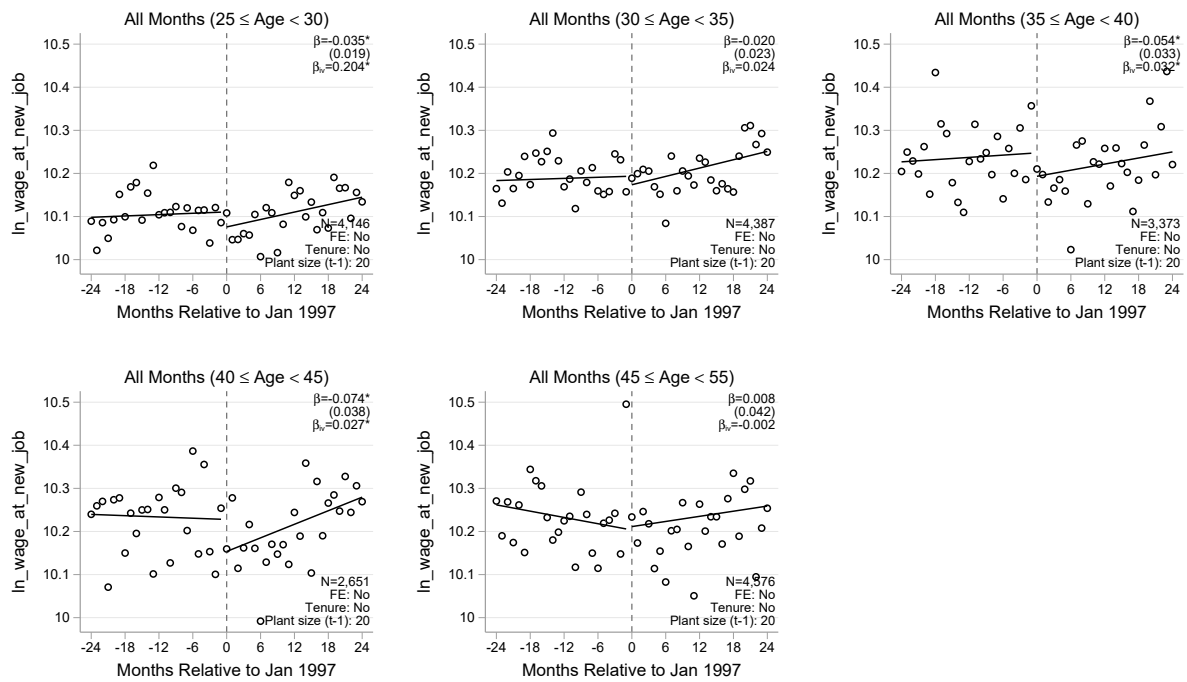
In Figure 7 and Figure 8 I run separate RD regressions by age bracket for monthly earnings and wage at the first new job after displacement.

FIGURE 7.
RDD - Monthly Earnings by Age



The figure shows the RD results for different labor market outcomes, including the standard errors and the IV estimates. The running variable is time of hiring relative to Jan 1997, measured in months. As the figure shows, those hired before the reform date receive their AN purely based on age, while the AN lengths of those to the right of the cutoff depends on the tenure at the time of layoff.

FIGURE 8.
RDD - Monthly Wages by Age



The figure shows the RD results for different labor market outcomes, including the standard errors and the IV estimates. The running variable is time of hiring relative to Jan 1997, measured in months. As the figure shows, those hired before the reform date receive their AN purely based on age, while the AN lengths of those to the right of the cutoff depends on the tenure at the time of layoff.

5.5 Effects on Employment and Unemployment, by age bracket

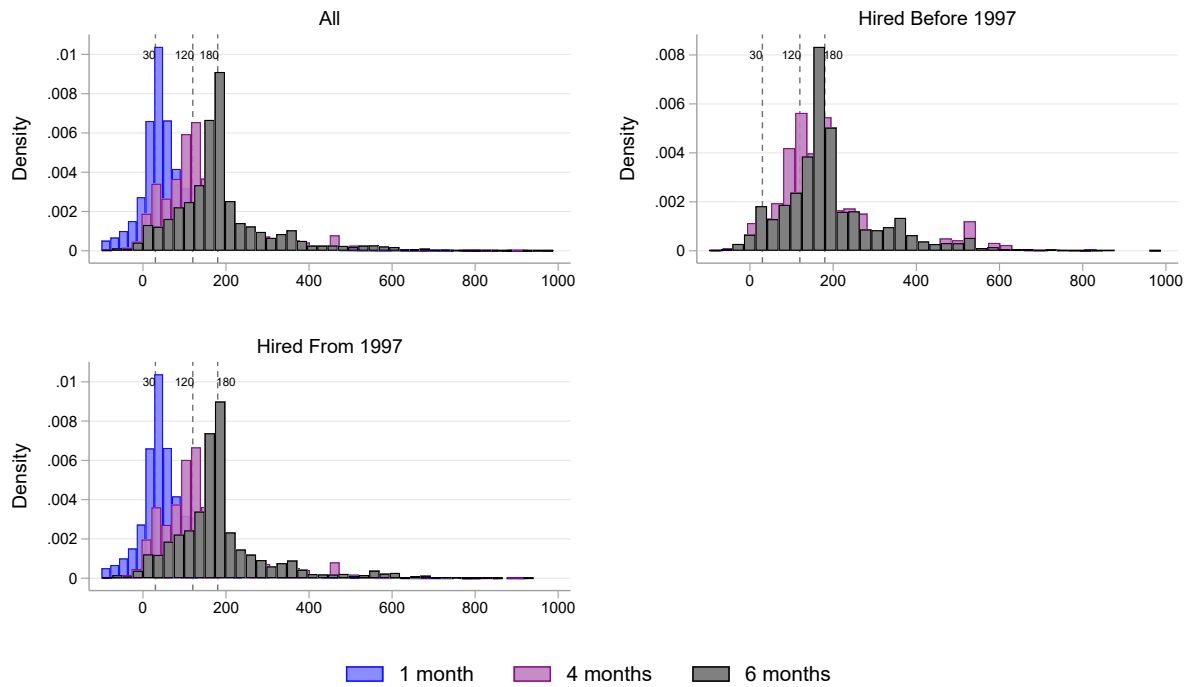
6 Conclusion

This paper has shown that decreased levels of AN leads to worse post-layoff outcomes in several dimensions. One month reduction in advance notice translates to $X\%$ reduced wages, and $X\%$ reduced earnings. At the same time, the average time spent in non-employment increases by X amount of months. Similarly, conditional on finding a new job, the time until that job is found increases by X month. Finally, it also increases the risk of ending un in unemployment.

A Appendix: Additional Robustness

A.1 Validating the First Stage

FIGURE 9.
First Stage - Validation Exercise



The figure shows the distribution of de facto notice for different levels of de jure notice. The de facto notice is calculated using PES data, where the notice period is defined as the difference between the date when the list of noticed individuals is handed in to the PES and the final employment date of each individual. The de jure notice is calculated based on the stipulated rules in the EPL and the corresponding notice time depending on the age and tenure of each individual.

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