Online Appendix of:

Labor Supply Responses and Adjustment Frictions: A Tax-Free Year in Iceland

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A Overview of the Icelandic Income Tax System

Up until and throughout 1987, income taxes in Iceland were collected with a one-year lag. That is, the tax payments made throughout every year were based on the income earned in the year before. In practice, early each year, an income tax return was filed for the income earned the previous year, including other components such as deductions to be made, assets and liabilities for the calculation of wealth taxes, etc. The outstanding tax liability was then computed based on this information. Throughout the year, taxes were then paid in ten equal payments on the first day of each month of the calendar year, except January and July. At the beginning of the year, and before taxes had been computed, taxpayers paid a fixed share (decided by the Directorate of Internal Revenue, DIR) of their payments in the preceding year. Once the tax returns had been compiled and the correct tax payment had been computed, the difference between the outstanding tax liability and the tax installment payments already made was divided equally between the remaining months of the year to find the monthly payment. After the reform, taxes on income earned in year t were collected during year t through "withholding at source". That is, employers deducted taxes from their employees' paycheck and remitted them to the government.

Although this system had some advantages, such as easing the work of the tax authorities in taking into account a range of tax deductions and allowances to arrive at the correct tax liability, it had obvious drawbacks, for both taxpayers and the collectors of tax revenue. Taxpayers with variable or cyclical income, such as those employed in the fishing sector or in agriculture, faced a countercyclical variation in their tax burden relative to their current income. From the perspective of the government and the municipalities, this system could be a handicap, as their revenues were misaligned with, e.g. the price level of their current expenses.

Income taxes in Iceland are levied at two levels: a national tax and a local municipal tax. As described in Section 2, during 1987, all taxes on labor income at both levels were set to zero. The tax schedule prior to the reform consisted of three national-level brackets and a municipal tax. In addition, there were a few small and lump-sum income taxes, such as the health insurance contribution, cemetery charge, church tax and contribution to the construction fund for the elderly. All taxable income—both labor and capital income—was taxed equally and in the same way at the na-

tional and municipal levels.[1] Before arriving at the tax base, multiple deductions could be made. As these deductions differed substantially between the national and municipal levels, the tax base for the two levels was different. The components that were deductible at both levels included fringe benefits; travel allowances; purchases of tools, machines and instruments; mandatory savings; child support; and education-related costs. At the national level there were various other deductions such as a special fisher's deduction, deductions for each day spent at sea, special deductions for the costs of starting a family ("wedding deduction"), interest expenses, pension savings, union membership fees, charitable gifts, etc. Moreover, in exchange for a subset of these options for deduction, the tax law offered taxpayers the option to instead deduct a fixed 10% from the national-level tax base, an option many exploited. While including both labor and capital income as the national-level tax base, pension and social security benefits were not part of the municipal tax base but were included in the national-level tax base. To summarize, the tax base at the municipal level tended to be higher than that at the national level. Because of those features, the progressive income tax schedule consisted of four brackets, consisting of three national-level brackets and a municipal tax. In addition, each worker had a personal tax allowance, both at the municipal and national levels, deducted from the computed tax payments. At the national level, this amount was fixed and was the same for everyone, but the municipal allowance depended on marital status and the number of children. The allowance at both levels was deducted from the outstanding tax liability.

Since 1978, Iceland has had an individual tax system, such that married and cohabiting individuals have been taxed as single units, not jointly. Therefore, each spouse files his/her own tax return, and has a separate tax allowance and deductions. However, the tax system has some joint aspects that were incorporated into the tax system with the aim of lowering the tax burden of two-adult households with a single earner and households with low-income secondary earners. First, married and cohabiting individuals were allowed to transfer to their spouses both their personal tax allowance and tax deductions that remained unaccounted for after their own income taxes had been paid in full.[2] Second, married or cohabiting workers whose spouses were out of the labor force or with a very low income could increase the amount taxed in the first bracket by up to half of what remained after their spouses' income was fully accounted for.

B The Tax Reform and the Timeline of Events

On January 1, 1988, Iceland took up a withholding-based pay-as-you-earn income tax system. Prior to the reform, income taxes were collected with a one-year lag. That is, as depicted in Figure 1, the tax liability and tax payments due every month in year t were computed based on income in year $t-1$. This system was similar to that in place in most Western countries prior to adopting the modern pay-as-you-earn tax systems.[3] When the tax reform was announced on December 6, 1986, it was

[1] A separate taxation of labor and capital income was introduced in 1997.

[2] Following the reform, however, the share of the personal tax allowance that was transferable between spouses was reduced from 100% to 80%.

[3] The US transitioned to a withholding-based PAYE system in 1943, when the Current Tax Payment Act was passed, and the UK reformed its system in 1944 after trials in 1940/41. Sweden passed a law establishing a PAYE system in 1945

also announced that during the transition year of 1987, labor income would not be taxed. As Figure 1 depicts, this implies that while people were paying taxes every year, including in 1987 when they paid taxes based on their income earned the year before, all income earned in 1987 was tax free. Therefore, the reform did not influence the government's budget, as the tax revenue flows were uninterrupted, and nor did it generate a cash-flow effect on workers.[4] However, as all marginal income earned in 1987 was tax free, the reform generated a strong incentive for intertemporal substitution: work more during the tax-free year and less in other years.

On December 6, 1986, the Finance Minister announced a tax reform to take place in January 1988 when a system where taxes were collected with a one-year lag would be replaced with a pay-as-you-earn withholding tax system. An important part in understanding the implications of the tax-free year is understanding how and when the Icelandic population learned about this change. As evidence on when the population learned about the reform, Figure 2 plots the monthly count of the number of newspapers mentioning a withholding-based or pay-as-you-earn tax system between January 1980 and December 1988, i.e. almost seven years before the announcement.

When the reform was announced, and for a long time before, there was a broad political consensus that tax reform was needed. The first records of a pay-as-you-earn system being discussed in the Icelandic Parliament date back to the mid-1960s (Olgeirsson, 2013). Neighboring countries, such as Norway, Sweden, the US, the UK and Ireland, had already introduced such a system in the 1940s and 1950s. Icelandic politicians, as well as the labor unions, publicly highlighted the defects of the existing system and the benefits of introducing a withholding-based system. However, discussions and attempts in 1978 and 1981 were unsuccessful, mainly because adopting a withholding-based tax system using the existing tax code was technically complicated or infeasible due to the structure of the tax system, which had a range of deductions and transfers that would complicate the calculations and likely lead to large differences between the income tax withheld during the year and the tax payable at the end of the year (Olgeirsson, 2013).

In the fall of 1986, the Ministry of Finance began preparing a tax reform. In November, the Finance Minister formed a committee to work on a proposal revising the income tax system. Around the same time, in late November and early December 1986, national-level union bargaining on general employee rights and minimum wages was in progress. Traditionally, the bargaining often effectively takes a form of tripartite negotiations, with the government usually having an input at later stages to close the contracts.

On December 6, 1986, new collective agreements were signed and the Finance Minister announced the tax reform, which was the government's input to a settlement. The pay-as-you-earn tax system was scheduled to be implemented on January 1, 1988. The Finance Minister ordered the aforementioned tax-reform committee to prioritize proposing simplifying changes to the income tax system

that was implemented two years later. Similarly, Norway passed a law in 1952 but the reform took place in 1957 and Ireland passed a law in 1959 with a reform the following year. More recently, Switzerland transitioned to a PAYE system in 1999–2003. France is the last holdout of the Western countries, but a reform is currently underway.

[4]The modern income tax system was established in 1877. The tax laws, specifying progressive taxes collected with a lag, were passed four years after Iceland's constitution was proclaimed and the country was granted home rule, after having been part of Denmark until 1874. When giving a tax-free year in 1987, the government was essentially giving up one year's tax revenue, which will be evident that it was lost by examining the Treasury's position on "Judgment Day".

that would be necessary for an implementation of a withholding-based tax system. To avoid a heavy tax burden and "double taxation" during the transition to the new system, i.e. that workers would pay taxes on both income earned in 1986 and 1987 using their 1987 income, it was decided that all labor income earned in 1987 would be exempt from taxes.[5] Naturally, the reform received much media attention in the following days and weeks. Newspapers printed headlines such as "*A Tax-Free Year*" and "*Pay-as-you-earn tax system in 1988 – all income in 1987 tax-free*". Politicians and union leaders emphasized the opportunity that this reform provided, and in an interview, the chairman of one of the largest labor unions was quoted as saying "*Now it is time for everyone outside the labor market to enter, and for all workers to earn tax-free income. There is work for everyone that wants to work.*"[6]

Based on the proposals set forth by the tax-reform committee, four parliamentary bills were prepared in the first weeks of 1987. These served the purpose of paving the way and preparing the transition to a pay-as-you-earn tax system, either directly or indirectly by simplifying parts of the tax system necessary for the transition. A specific law was passed specifying that labor income earned in 1987 should not be taxed, and a law on the timing of the transition taking place on January 1, 1988, as had been scheduled when the reform was first announced. During March 16–18, 1987, all bills necessary for the new tax system were passed by the Parliament and signed into law.

While the general rule was that all labor income in 1987 should be exempt from taxes, some attempts were made to prevent an abuse of the reform. The documents and explanations associated with the law explicitly expressed a very positive view and encouragement of the legislature towards workers, exploiting the opportunity that the reform provided to increase their disposable income in 1987 by increasing their labor supply by any or all means. However, a clear aim was that any abuse of the reform by entrepreneurs or firm owners should be prevented. The law therefore specified two exceptions to the general rule. First, increased earnings in 1987 that were not due to more work or changes in employment arrangements, such as promotion, but rather reflecting transfers of income from other years should be taxed as usual. Second, inflation-adjusted increases in earnings of self-employed workers and business owners exceeding 25% should be taxed as usual. Studying the records, however, I find that these measures seem to have played only a limited de facto role.[7]

C Tax Bracket DD: Bracket Persistence and Mean Reversion

There is an extensive literature estimating the elasticity of taxable income (see e.g. Saez et al., 2012, for a recent survey). In particular, dating back to a seminal study by Feldstein (1995), much work has

[5] Although policy makers are likely to want to make some adjustments to tax payments during a transition, a tax-free year was not the only option. There are two options for such adjustments: forgive outstanding (or some) tax liabilities in the transition period, or collect no (or lower) taxes on income earned during the transition period. When the US established a withholding-based tax system in 1943, the adjustment took the form of the forgiveness of most outstanding tax liabilities. According to the Current Tax Payment Act of 1943, 75% of the 1942 tax liability was canceled with the remainder being due in two equal payments on March 15, 1944 and March 15, 1945 (Paul, 1954).

[6] See *Morgunblaðið*, December 7, 1986.

[7] Based on administrative tax records, there were only 255 cases where individuals had excess income taxed on these grounds. One potential implication of these clauses, as well as an interpretation of the fact of so few cases of income being taxed as transferred income, is that self-employed workers and business owners cluster (or bunch) at their permitted income growth of 25%. When studying this possibility, I find limited evidence of bunching, indicating that these conditions were in most cases not strictly binding.

been carried out studying tax reforms in the US in the 1980s and 1990s.

A particular feature of these reforms is that they generated decreases in tax rates at the top of the income distribution. The fact that much of the variation exploited is centered at the top of the income distribution has spurred much discussion on possible consequences for the estimated elasticities (Saez et al., 2012). Three problems have been highlighted. First, as highlighted in Gruber and Saez (2002), if the income distribution is continually widening, e.g. due to factors such as skill-biased technical change and globalization, it may be difficult to disentangle the long-term effects of tax changes from these trends, particularly at the top of the income distribution. Second, as income is often the main driver of marginal tax rates, and income has both permanent and transitory components, a positive transitory income shock in the pre-reform year will tend to result in lower income in the years following, therefore biasing elasticity estimates downward. Third, studies using tax return data, particularly from the US, often have little information about taxpayers other than that about their income and taxes, which makes it difficult to control for differences in the characteristics of taxpayers at the top vs. those at lower levels in the income distribution.

Compared with this literature, the natural experiment provided by the tax-free year has several advantages that allow me to overcome these biases. First, the tax-free year affected taxes across the entire income distribution. Furthermore, most of the analysis is concerned with short-term responses to a temporary tax cut. Therefore, this alleviates the concerns related to long-term trends such as the evolution of inequality. Second, the variation generated by the tax-free year is not as closely linked to levels of labor earnings as the variation exploited in the aforementioned studies. Owing to multiple tax deductions and tax credits, there was a substantial overlap in the earnings distributions across tax brackets. Third, my data have very detailed information about taxpayer characteristics, as well as their earnings, deductions and tax payments, allowing me to control for a rich set of covariates in the regressions.

Even with these advantages, a potential bias might potentially arise because of temporary mean-reverting income shocks. For example, some people in a high tax bracket in the previous year are there because of an income shock that reverts to the mean in the current year, generating a downward bias in the earnings elasticity. Although I find that individual tax bracket positions tend to be persistent, as documented in Figure A.1, and our analysis of the pre-reform years finds no evidence of false positives, as documented in Figure 4, I have performed additional analysis along several dimensions to assess the robustness of the results to these concerns.

I now document the results from two informative exercises. First, I perform a prediction exercise, where I predict workers' tax brackets (treatment status) using a rich set of individual characteristics, with the aim of constructing more stable treatment and control groups. For each year, the prediction is based on an estimation of a multinomial logit model where the outcome variable is a categorical variable for the tax brackets. This is an out-of-sample prediction, in the sense that the outcomes for the year predicted are excluded but information from all other pre-reform years is included. The set of right-hand-side predictors includes indicator variables for tax brackets in the past three years and individual characteristics including dummies for age, gender, marital status and the number of children, and a dummy for living in the capital area, which are also included in interaction with the

tax brackets. The model also includes a full set of dummies for the previous year's percentile in the income distribution. As documented in Figure 3b, the tax bracket thresholds correspond to roughly similar quantiles of the income distribution over time. Including dummies for the previous year's percentile in the income distribution in the model proxies for, e.g. distance from the tax bracket thresholds, across which temporary shocks might push individual workers. In every year, I assign workers to tax brackets based on the predicted probabilities from this estimation, provided that the bracket position is predicted with at least 50% probability.[8] The pseudo R^2 from the multinomial model estimates are in the range of 0.40–0.45, depending on the year, compared with about 0.30–0.35 when only the previous year's tax bracket is included. Second, I have also performed an estimation where we define workers' treatment status based only on those who stay in the same bracket for the three consecutive years prior to 1987, while excluding others.

Figure A.13 plots coefficient estimates from a dynamic reduced-form estimation where the treatment status is based on the predicted tax bracket. Similar to the main specification (Figure 4), the pre-reform coefficients are not statistically significant, implying parallel trends. Table A.13 presents estimates of the elasticity of labor earnings, where the treatment status is assigned using the same procedure. The elasticity estimates, as well as the reduced-form estimates, are roughly similar to those estimated under the main specification and, if anything, only marginally larger. These results are also robust to using more or fewer lags of the tax bracket position in the prediction exercise. Table A.14 report the effects on labor earnings using a specification where treatment status is based only on those who remain in the same bracket for the three consecutive years prior to 1987. The results are broadly similar to the main specification.

D Permanent Tax Changes, Expectations and Long-Term Effects

An important question to ask is whether the permanent reform in 1988 affects my estimates of the responses to the tax-free year in 1987. If workers were responding to a tax reform in 1987 that they perceived to be permanent rather than temporary, the estimates of the Frisch elasticity in this paper will be attenuated as they incorporate an income effect arising from the permanent change in taxes that is likely to be nonnegligible. There are two arguments for why there may be limited effects of the permanent reform spilling over to my estimates. First, while the tax-free year was announced in December 1986, which resulted from a change in tax collection, no announcement was made on changes to the tax schedule under the new tax collection system. As described in Section 2, that process went on during the first few months of 1987 and the bill spelling out the new tax law was passed by Parliament in late March 1987. By then, workers had been aware of the much-advertised tax-free year for several months. Second, relative to the simple and salient nature of the tax-free year, many of the implications of the new tax code for marginal tax rates were much less clear. In particular, an important part of the tax reform was the removal of tax deductions, which affected the tax base and therefore the marginal tax rates. For most taxpayers, assessing how changes in tax deductions and allowances would affect their marginal tax rates was likely to have been a complicated task.

[8] The results are robust to requiring higher levels of prediction accuracy.

To statistically evaluate this question, I perform several robustness tests. First, I evaluate the sensitivity of the estimates to controlling for the difference in tax rates between 1986 and 1988. If individuals are sophisticated and well informed about how their tax rates would be influenced by the permanent reform, those with greater permanent changes are likely to respond less to the 1987 tax-free year. As Table A.15 documents, our estimates of the elasticity of earnings and weeks worked are very robust to these controls, when controlling for both changes in marginal and average tax rates. This result is perhaps somewhat expected in that, as documented by Appendix Figures A.2, A.3 and A.4, across the groups there was very little change in the average tax rates between 1986 and 1988. Next, I restrict the focus to the upper- and lower-middle brackets. As workers in these brackets saw limited changes in their marginal tax rates between 1986 and 1988, with the 1986 upper-middle bracket tax rate corresponding to the flat rate in 1988, they should be minimally influenced by the permanent reform. This yields an earnings elasticity estimate of between 0.325 and 0.386, which is similar to what is reported for the upper-middle bracket in Table A.5, as well as being broadly consistent with the main estimates.

E Life-Cycle Research Design: Aggregate Earnings Responses

The life-cycle research design described in Section 5 complements the tax-bracket research design described in Section 4 by allowing for identifying extensive margin labor supply responses. More generally, by including the extensive margin, the life-cycle research design allows for estimating the labor supply responses of the whole population. In this section I use this method to estimate aggregate labor supply responses, including both the intensive and extensive margin.

Results. As described in the main text, the research design builds on pairwise cohort-by-cohort differences. It therefore naturally produces separate elasticity estimates by cohort. Figure A.8 plots the elasticity of labor earnings for each cohort by their age in 1987. Across the prime ages, the elasticity is stable at levels between 0.4 and 0.5, which is slightly larger but broadly consistent with the earnings elasticity estimates presented in Section 4. For the older cohorts—those around or at retirement age—the figure displays slightly larger elasticities.[9] The groups that stand out are the youngest cohorts—between the ages of 18 and 30 years—who have the largest elasticities, as high as 2 among the youngest cohorts. Although the elasticity is largest only for the few youngest cohorts, this has an important implication for the aggregate elasticity. The population aged 18–30 years corresponds to about 22% of the population, thus pulling up the average elasticity. Furthermore, as documented in Section 5, this difference in earnings elasticity by age is reflecting to a large extent differences in extensive margin responses, which are driven by young cohorts and cohorts close to retirement age.

Table A.16 presents estimates of the average labor supply elasticity in the population using this method. The table is organized such that the bottom row reports the first-stage estimates, the middle row reports the reduced-form estimates and the top row reports the final elasticity estimates. The top row of column (1) reports an elasticity estimate of 0.654, which is highly significant at the 1% level.

[9] While workers receive pensions and are eligible for old-age benefits from age 67 years, it is common to retire later and some choose to retire earlier, e.g. at the time when their spouse reaches the statutory retirement age.

In column (2) the regressions include individual fixed effects to capture any time-invariant cross-sectional heterogeneity, which only marginally affects the estimates. Columns (3) and (4) report the average responses in terms of weeks worked, implying a semi-elasticity of about three additional weeks.

F Collective Labor Supply Model with Home Production

Consider a family consisting of a married couple, where m indexes the husband and f the wife and their children (if any). Adults allocate their working time between two activities. First, they can sell their labor on the market and earn a fixed wage, w. Labor income is then used to buy a market consumption good, c. Second, they allocate time to producing goods and services at home, such as taking care of their children or making food only consumed by the family. The latter incorporates the insight from Becker (1965) that a significant proportion of the time spent away from work is home production.

The preferences of each spouse $i \in \{m, f\}$ are described with a quasi-linear utility function in consumption and working time:

$$u_i = c_i + y_i - \frac{\eta}{1+\eta}(n_i + h_i)^{\frac{1+\eta}{\eta}} \tag{1}$$

where c_i is spouse i's consumption of the market good, y_i is spouse i's consumption of the home-produced good, n_i is spouse i's market hours, and h_i are hours allocated to home duties. The parameter η governs the curvature of the disutility of work.

The spouse i's budget constraint is:

$$c_i \leqslant (1 - \tau_i) w_i n_i + z_i + s_i \tag{2}$$

where τ_i is spouse i's marginal tax rate, z_i is spouse i's unearned income, and s_i are the net transfers received by spouse i.

The couple engages collectively in home production, where home-produced goods and services are assumed a public good within the household. The domestic good is produced according to Cobb–Douglas production technology

$$Y(h_m, h_f) = (\kappa_m h_m)^{\alpha_m} (\kappa_f h_f)^{\alpha_f}, \qquad \alpha_m + \alpha_f \leqslant 1 \tag{3}$$

where $\kappa_i h_i$ is the effective labor input of each spouse. I assume that the home-produced good is a public good within the household. Therefore:

$$y_m = y_f = Y(h_m, h_f) \tag{4}$$

Following the literature on collective labor supply (see, e.g. Chiappori, 1988; Apps and Rees, 1988), I assume that family decisions lead to Pareto optimal allocations. Each spouse has his/her individual preferences and maximization problem, but the couples agree to maximize a collective

family utility function, which is the weighted sum of the individual utility functions.[10] Furthermore, I assume full commitment, so that married couples stay married, and the weighting parameter μ in the family welfare function is exogenous and constant. The family's decision problem is to maximize the following collective family utility function:

$$u(c_m, c_f, y_m, y_f, n_m, n_f, h_m, h_f) = \mu u_m(c_m, y_m, n_m, h_m) + (1-\mu)u_f(c_f, y_f, n_f, h_f) \tag{5}$$

subject to (3), (4) and the family's budget constraint.

The solution to the model provides a labor supply function for husbands and wives:

$$n_i = ((1-\tau_i)w_i)^{\eta} - \frac{\kappa_i h_i}{\kappa_j}\left(\frac{\alpha}{\mu(1-\tau_i)w_i}\right)^{\frac{1}{1-\alpha}}, \quad i,j \in \{m,f\}, j \neq i \tag{6}$$

F.1 Own-Wage and Cross-Wage Labor Supply Elasticities

Using this simple framework, I ask two questions and obtain predictions from the model which I then explore using the data. First, how do husbands and wives respond to changes in their wage rate or, equivalently, their marginal tax rate? Computing own-wage elasticity of labor supply, $\varepsilon_{n_i,w_i} = \frac{\partial n_i}{\partial w_i}\frac{w_i}{n_i}$, yields

$$\varepsilon_{n_i,w_i} = \eta + \left(\eta + \frac{1}{1-\alpha_i}\right)\frac{h_i}{n_i} \tag{7}$$

The elasticity consists of two components. First, in an individualistic model without home production, the labor supply elasticity corresponds to the constant preference parameter η. Second, given home production, the labor supply elasticity has a second component. As an increase in the market wage (or a decrease in taxes) increases the opportunity cost of home production, workers will substitute hours from home production to market work. Equation (7) provides the first prediction of the model: for couples engaging in home production, individuals' own-wage elasticity is stronger the more important is their labor input for home production and the more specialized they are in home production. This explains why labor supply elasticities may differ across couples. If women engage in relatively more home production, e.g. due to a comparative advantage or bargaining power in the household, they will have a larger labor supply elasticity due to substitutability between time spent on home production and market work.

The second question is how husbands and wives respond to changes in their spouse's wage, or the marginal tax rate. Computing the cross-wage elasticity of labor supply, $\varepsilon_{n_i,w_{-i}} = \frac{\partial n_i}{\partial w_{-i}}\frac{w_{-i}}{n_i}$, yields

$$\varepsilon_{n_i,w_{-i}} = -\frac{1}{\alpha_i}\frac{h_i}{n_i} \tag{8}$$

The cross-elasticity is negative and depends on relative hours allocated to home vs. market work

[10] This simple framework only illustrates the spousal cross-response arising from substitutability in home production, but not that from complementarities in leisure time. Allowing for such complementarities would generate an opposing force, and the overall cross-response would be the combination of the two. Given my results imply negative cross-elasticities in most cases, the results can be interpreted as the force of substitutability in home production dominating the complementarity of leisure.

and the output elasticity in home production. From the perspective of the individual, if the spouse's wage increases, the spouse's opportunity cost of time allocated to home production, relative to market work, also increases. As the members of the couple are perfect substitutes in home production, a change in the spouse's wage induces a change in the couple's relative opportunity costs of market work. Therefore, in response to an increase in their spouse's wage, individuals will allocate more time to home production and less to market work. Equation (7) provides the second prediction of the model: within couples engaging in home production, the cross-wage elasticity is larger (in absolute value) the more time is spent on home production but the lower the elasticity of their input in home production.

Evidence based on time-use surveys indicates that women allocate more time than men to chores within the household (Aguiar et al., 2013). It is also reasonable to assume, at least in households with small children, that females' output elasticity in home production is larger than that for men.[11] Based on that, the model implies that households with more children, where both spouses take part in home production but women play the leading role, married women will have a larger own-wage elasticity than their husbands. However, the cross-elasticity may be stronger (more negative) for married men than for married women if relatively more time input is needed from them to substitute for their wives' time.

G Measures of Labor Market Flexibility Across Countries

Guided by a general definition, we can divide labor market flexibility into micro-level flexibility and institutional- or macro-level, flexibility. The former refers to worker flows between labor market states, job flows and working time flexibility, while the latter refers to labor regulations and wage flexibility.

Following this categorization, I collected several measures of labor market flexibility for a set of OECD countries, including Iceland, Switzerland and the US. Figure A.11 presents four subfigures that display the general pattern in this international comparison. As shown, Iceland has a flexible labor market, much more so than Switzerland and other countries in continental Europe, and one that is closer to the US labor market. In addition, Figure A.11 demonstrates that these measures, while different, are correlated.

First, Figure A.11a depicts monthly flow probabilities into and out of unemployment. According to this "fluidity" measure of labor market flexibility, the US stands out as having the most fluid labor market, followed by Iceland. In fact, as shown, worker flows in Iceland are two to three times larger than in Switzerland. Hobijn and Sahin (2009) document similar differences for job flows. In addition, the monthly job-finding rate in Iceland is 30.5% compared with 56.3% in the US and 13.4% in Switzerland. Second, Figure A.11b presents statistics on the cyclicality of hours per worker and their relative contribution to the cyclical variation in total hours. If workers have the flexibility to adjust their hours and the intensive margin is operative, we would expect hours per worker to move

[11] Bredemeier and Juessen (2013) construct a model of family labor supply with a Cobb–Douglas home production function. When calibrating their model, they set the female output elasticity in home production to 0.7 and the elasticity for men to 0.3.

with the business cycle and to explain a significant share of changes in total hours. As Figure A.11b reveals, this is true in Iceland and in the US, but to a much lesser extent in Switzerland. In Iceland and the US, the cyclical components of hours per worker are highly correlated with the cyclical component of total hours, with correlations of 0.86 and 0.84, respectively. Similarly, in Iceland, the ratio of the standard deviation in hours to the standard deviation in employment is 0.83. This implies that hours per worker explain about 45% of the cyclical variation in total hours, which is more than twice as much as in Switzerland. Indeed, Rogerson and Shimer (2011) note that "An extreme example is Switzerland, where [...] most of the cyclical movement in total hours is accounted for by movements between non-participation and employment at a fixed number of hours per worker." Third, Figure A.11c details wage flexibility. The figure plots the coefficient on the unemployment rate gap from a regression of the growth of real labor compensation on a constant, the unemployment rate gap (the difference between unemployment and NAIRU), a long moving average of labor productivity growth, and lagged real labor compensation growth. According to this measure, among the OECD countries, real wage flexibility is highest in Iceland. Fourth, Figure A.11d plots two different measures of institutional flexibility. On the y-axis, it plots the replacement rate of unemployment benefits of workers' previous earnings in the first year of unemployment. On the x-axis, it plots the average of the indices in the *OECD Indicators of Employment Protection*, where a higher index implies stricter employment protection. The replacement rate in Iceland is around the country average, while employment protection in Iceland is less than in most other European countries. Unsurprisingly, the US stands out on both dimensions as having a more flexible institutional framework.

H Supplementary Figures

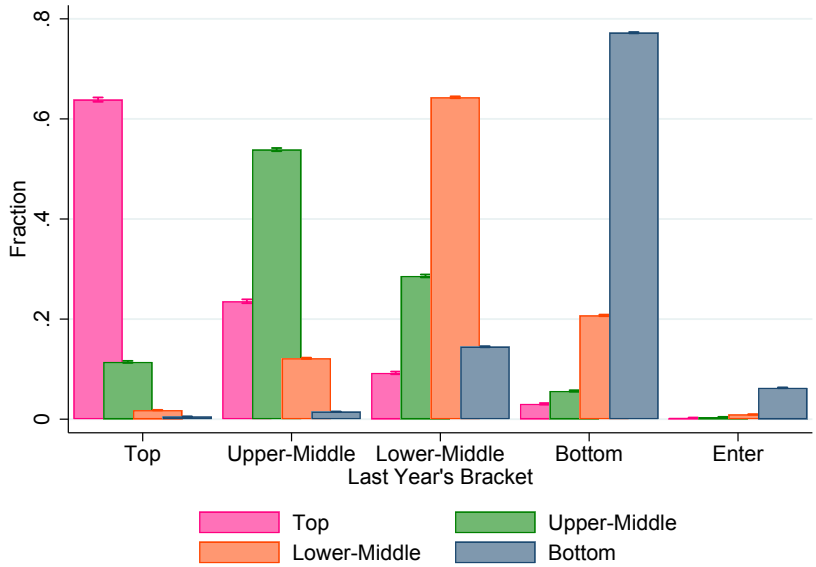
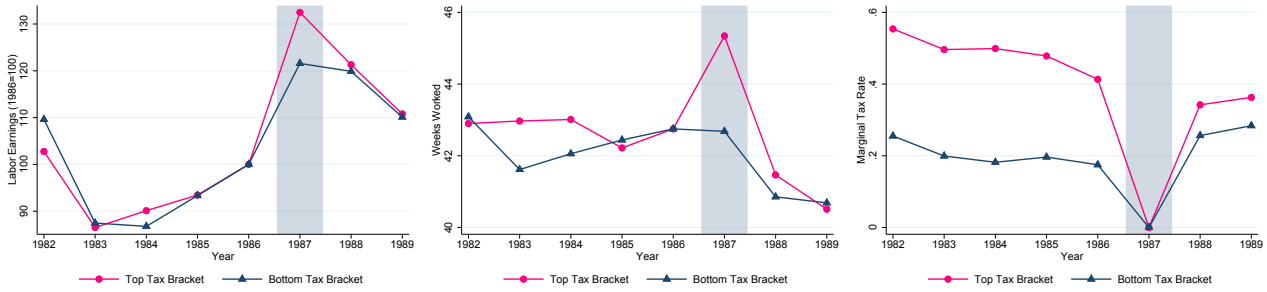


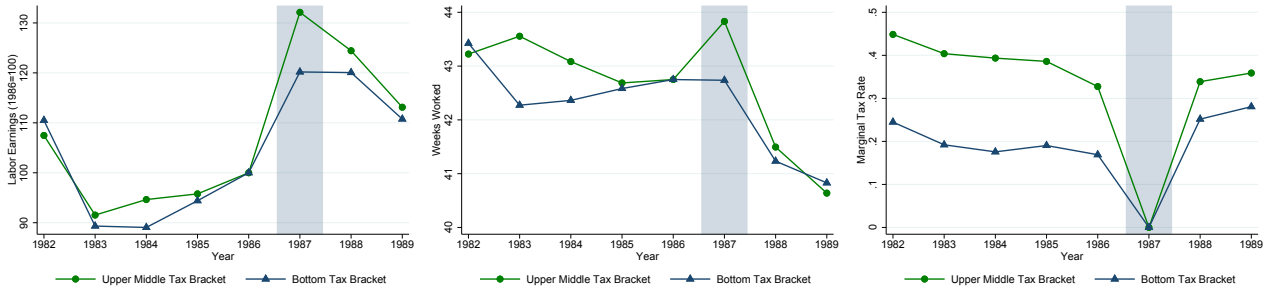
Figure A.1: Transitions between tax brackets, 1982–1986

Notes: The figure plots the average transition rate between tax bracket during the pre-reform period, 1982-1986. That is, every year I compute the rate of transition from a given tax bracket to all other brackets and the rate of stays within the same bracket. I then compute averages of the resulting transition matrix and plot in the figure.



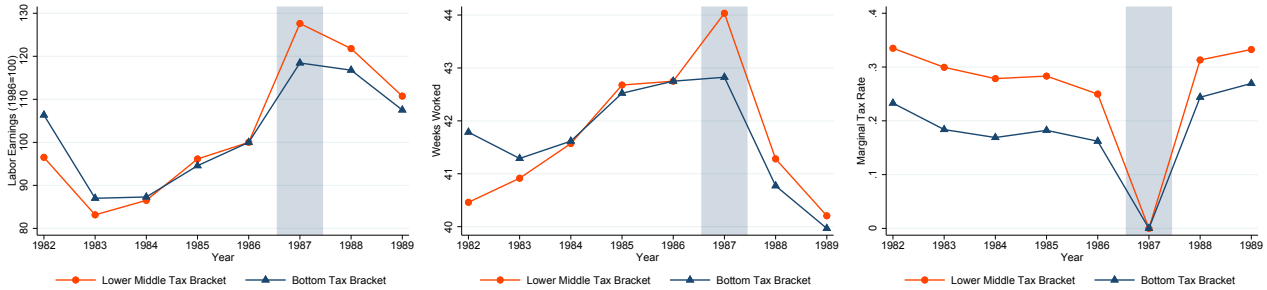
(a) Labor earnings (reduced form) (b) Weeks worked (reduced form) (c) Marginal tax rates (first stage)

Figure A.2: Graphical evidence: Top tax bracket



(a) Labor earnings (reduced form) (b) Weeks worked (reduced form) (c) Marginal tax rates (first stage)

Figure A.3: Graphical evidence: Upper-middle tax bracket



(a) Labor earnings (reduced form) (b) Weeks worked (reduced form) (c) Marginal tax rates (first stage)

Figure A.4: Graphical Evidence: Lower-Middle Tax Bracket

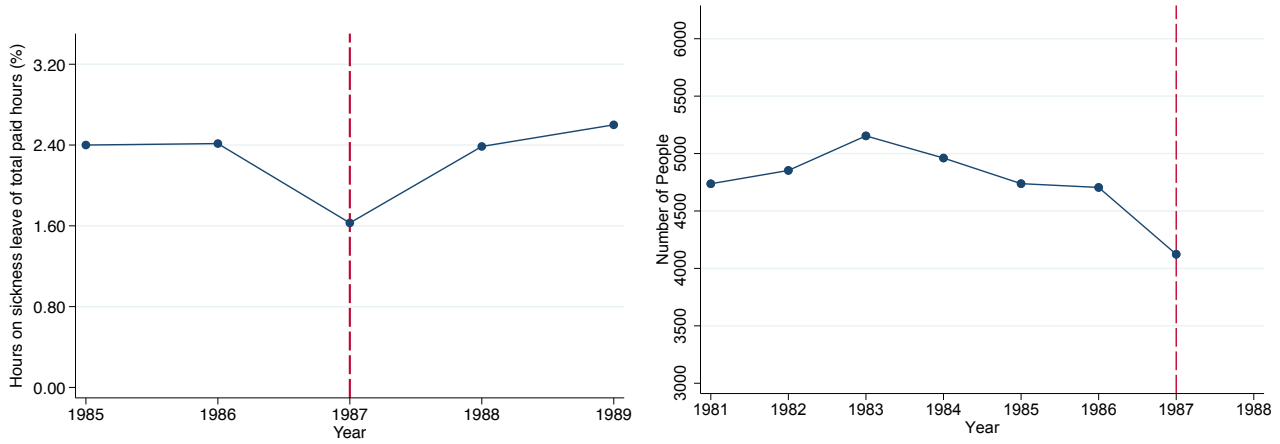
Notes: The figure provides the evolution of average (a) labor earnings, (b) weeks worked, and (c) marginal tax rates by tax bracket, where the tax bracket status in year t is defined according to the tax bracket in $t-1$. Labor earnings are in real terms, normalized to 100 in 1986. Weeks worked are the averages of total weeks worked by individuals, i.e. in all jobs, normalized to the bottom-bracket average in 1986. In each graph, using the method of DiNardo et al. (1996), I nonparametrically reweigh the distribution of age (partitioned into 10-year bins) and pretreatment characteristics (marital status, number of children, three-level education) of individuals in the bottom tax bracket group to match the distribution of individuals in the top tax bracket. In each panel, the difference between the slopes of the two series in 1987 gives a difference-in-differences estimate, while a comparison in other years provides placebo tests of the natural experiment. The graphs for labor earnings and weeks worked imply the reduced-form effects of the tax-free year on these measures of labor supply. Correspondingly, the difference in a series of marginal tax rates provides an estimate of the first stage.

(a) Employment (b) Unemployment

(c) GDP growth (d) Population growth

Figure A.5: Employment, unemployment, GDP growth, and population growth

Notes: Panel (a) plots the employment rate, measured by Statistics Iceland as the ratio of total man-years (full-time equivalent workers) to the working age population. Panel (b) plots the unemployment rate, as registered at the Directorate of Labor. Panel (c) plots the yearly growth rate in real GDP, measured by Statistics Iceland. Panel (d) plots the yearly population growth rate.



(a) Sick leave, in hours of work (b) Recipients of sickness benefits

Figure A.6: Sick leave from work and recipients of sickness benefits

Notes: Panel (a) plots the number of hours of sickness leave as a share of total paid hours (in %), based on survey data collected by the Wage Research Committee (*Kjararannsóknanefnd*). The numbers are sample averages. Panel (b) plots the number of people (tax filers) receiving sickness benefits in the given year. These benefits were reported in tax returns until 1987 and were deductible from taxes. From 1988 onwards, under the withholding tax system, these were no longer reported.

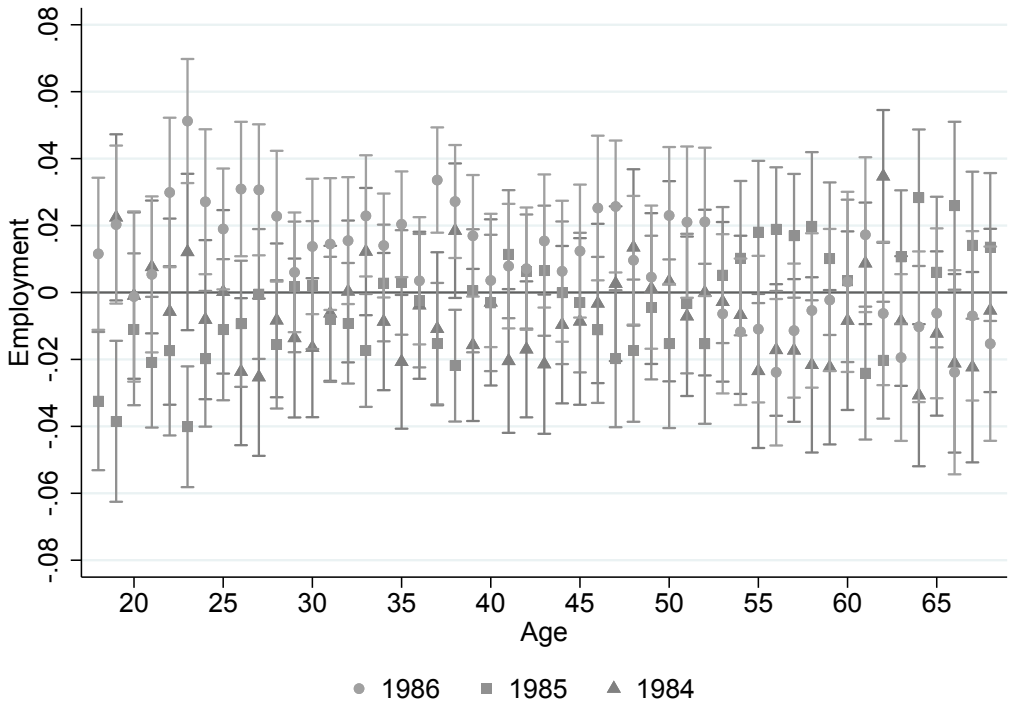


Figure A.7: Employment semi-elasticity (extensive margin) by age — Placebo tests

Notes: The figure plots estimates of equation (3), i.e. a reduced-form estimate using the life-cycle DD, by cohort where the outcome variable is employment. The figure plots estimates for three placebo tax-free years: 1986, 1985, and 1984.

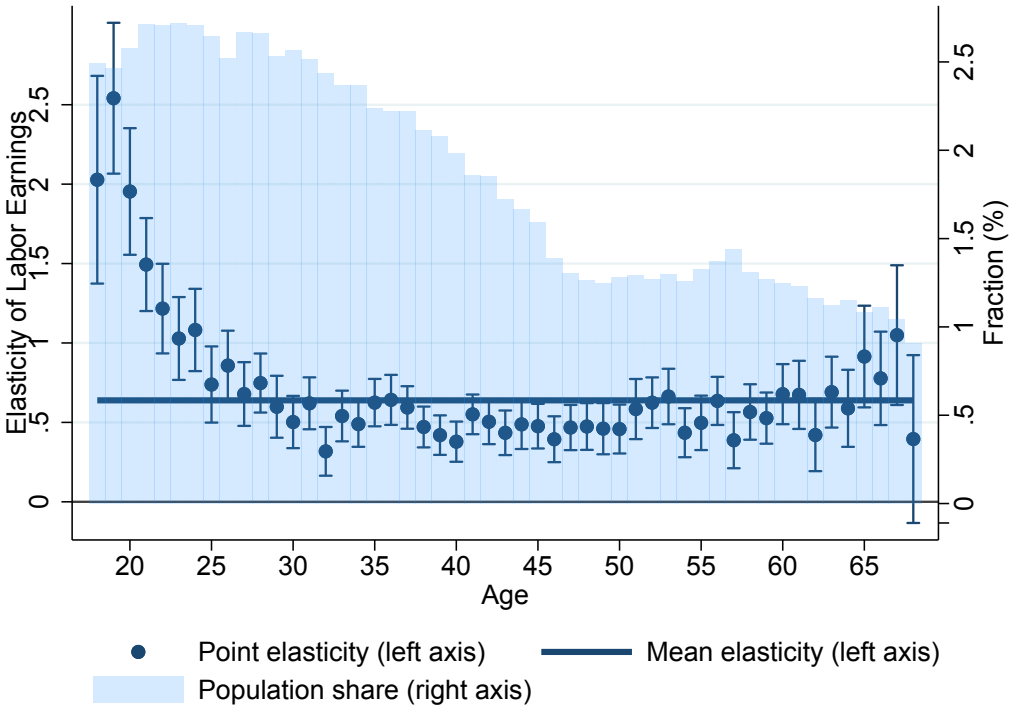


Figure A.8: Elasticity of labor earnings by age

Notes: The figure plots the elasticity of labor earnings for each cohort of age 18–68 years in 1987. Each point on the graph is a separate estimate from equation (4), where the dependent variable is the logarithm of labor earnings and the treatment group is the age denoted on the x-axis in 1987. The vertical bars plot the 95% confidence intervals. The horizontal line plots the average elasticity, as reported in Table A.16. The shaded area (bars) is the population distribution, where each bar corresponds to the share of the working age population (in %).

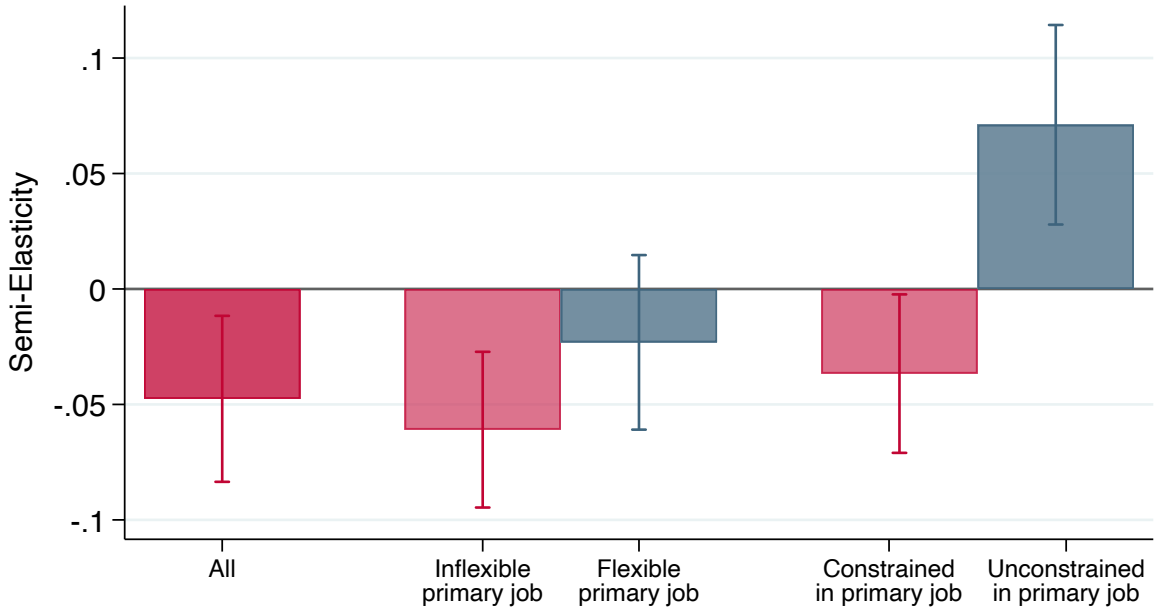


Figure A.9: Primary-job change

Notes: The figure presents the estimated effect on primary-job change. The figure presents results from a 2SLS estimation of equation (2), where the dependent variable is an indicator that equals one if the primary job is different from the primary job in the previous year, and zero otherwise. The pre-reform mean of this dependent variable is 0.232. Controls are gender, age, education, marital status, whether living in the capital area or not, and the number of children aged 0–18 years. The figure shows 95% confidence intervals based on robust standard errors clustered by individual. *"Inflexible primary job"* is an indicator of holding a primary job in an occupation with below-median "temporal flexibility", as measured in Section 6.1, otherwise zero. *"Constrained in primary job"* is an indicator for working 52 weeks in the primary job in the prior year, otherwise zero.

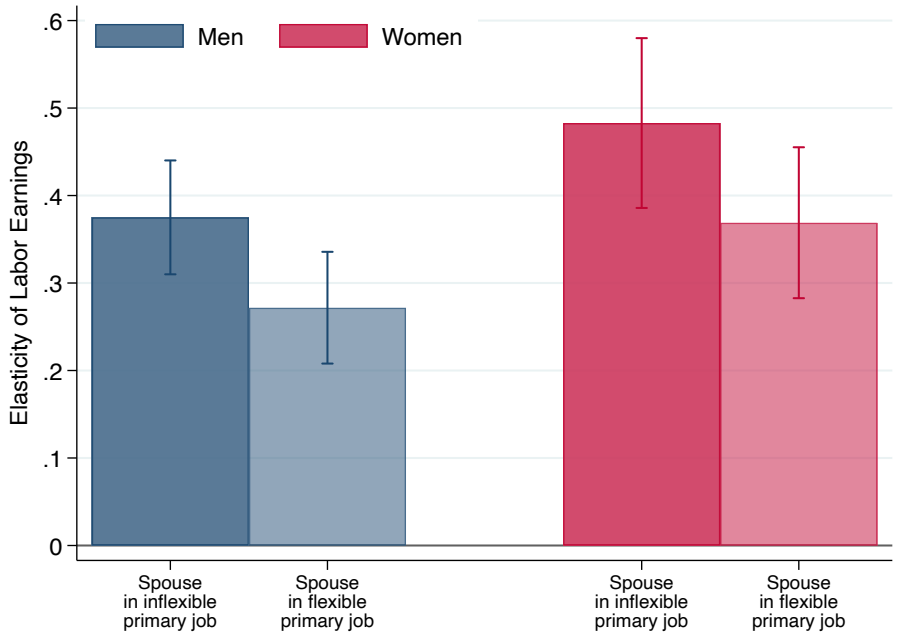
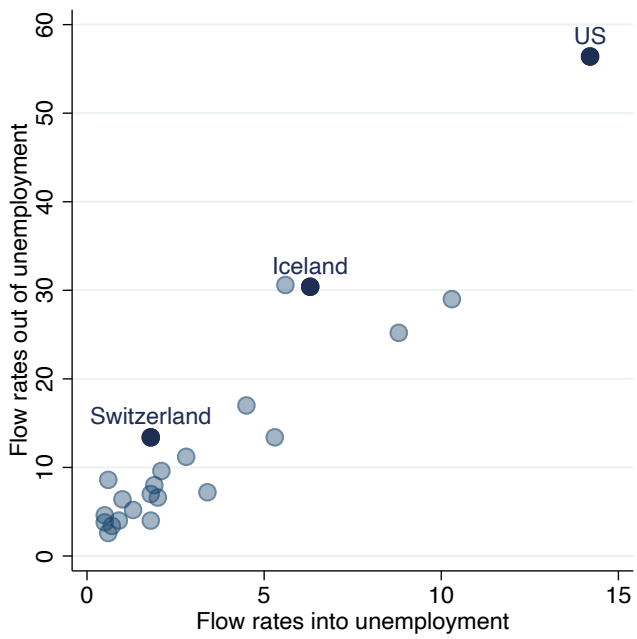
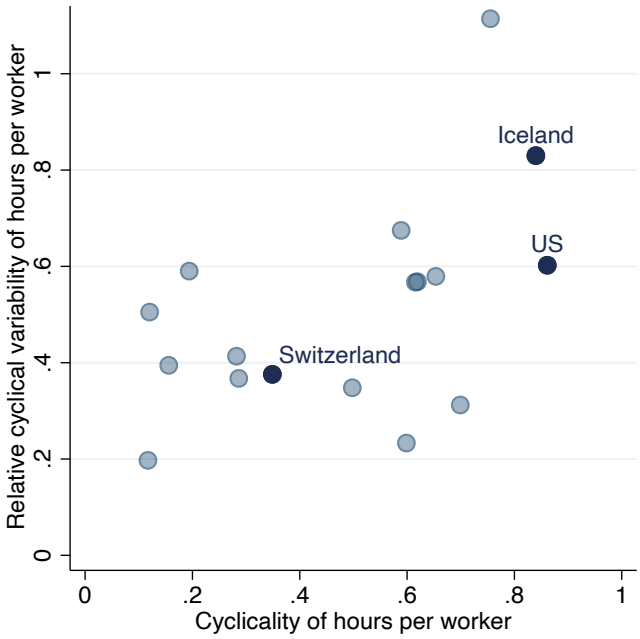


Figure A.10: Elasticity by spouse's job flexibility

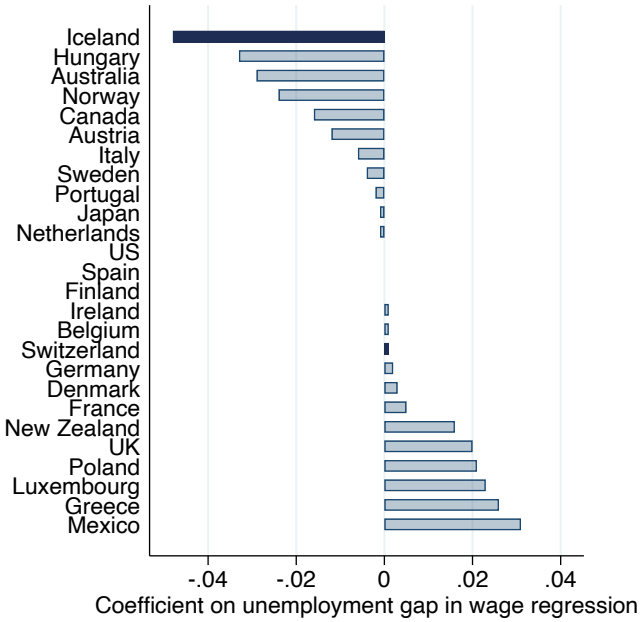
Notes: The figure presents estimates of labor earnings elasticities for men and women by their spouse's job flexibility. More precisely, the figure splits the sample by whether a worker holds an inflexible primary job, defined as occupations with below-median temporal flexibility according to equation (5). The regression controls for age, number of children, education, and whether living in the capital area or not. The figure shows 95% confidence intervals based on clustered robust standard errors.



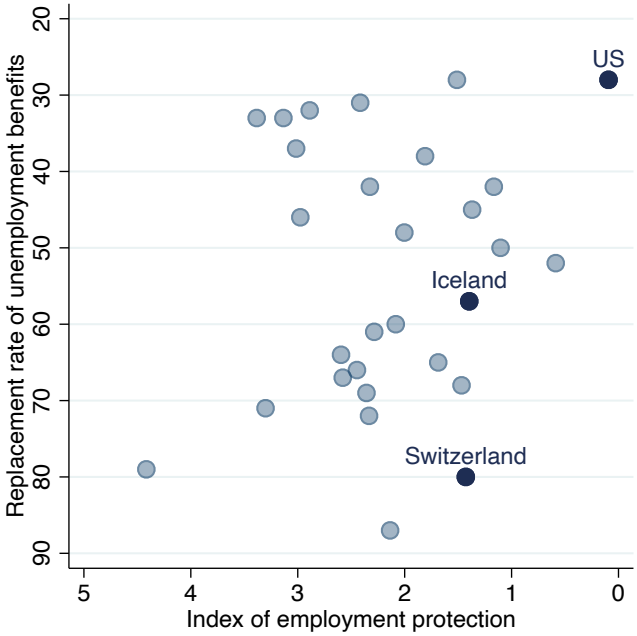
(a) Flexibility of employment



(b) Flexibility of working hours



(c) Wage flexibility



(d) Flexibility of institutions

Figure A.11: Measures of labor market flexibility across OECD countries

Notes: Panel (a) plots on the x-axis the flow probabilities into unemployment (U) from employment (E) and nonemployment (N), and on the y-axis the flow probabilities out of unemployment for a selection of OECD countries. Measures of worker flows are from Hobijn and Sahin (2007, 2009) using harmonized OECD data. Panel (b) plots on the x-axis the relative standard deviation of hours per worker to the standard deviation of employment. On the y-axis, the figure plots the correlation between total hours and hours per workers. Total hours worked, th, are defined (in logarithmic terms) as $th = h + n$, where h is the average number of hours worked per worker, and n is the number of people employed (both divided by the size of the labor force). The time series are detrended using the Hodrick–Prescott (HP) filter so that th, h, and n reflect the cyclical components. Measures of cyclicality of hours for Iceland are from Sigurdsson (2011) and from Rogerson and Shimer (2011) for other countries using data from the OECD database. Panel (c) plots as a measure of wage flexibility the coefficient on the unemployment rate gap from a regression of the growth of real labor compensation on a constant, the unemployment rate gap (difference between unemployment and NAIRU), a long moving average of labor productivity growth, and lagged real labor compensation growth. See OECD (2011) for details. Panel (d) plots on the y-axis the replacement rate of unemployment benefits of workers' previous earnings in the first year of unemployment, as of 2007. The x-axis plots the average across indices in the OECD *Indicators of Employment Protection* in 2007, where a higher index implies stricter employment protection. Both axes in panel (d) are reversed so that moving out along the axis implies more flexibility.

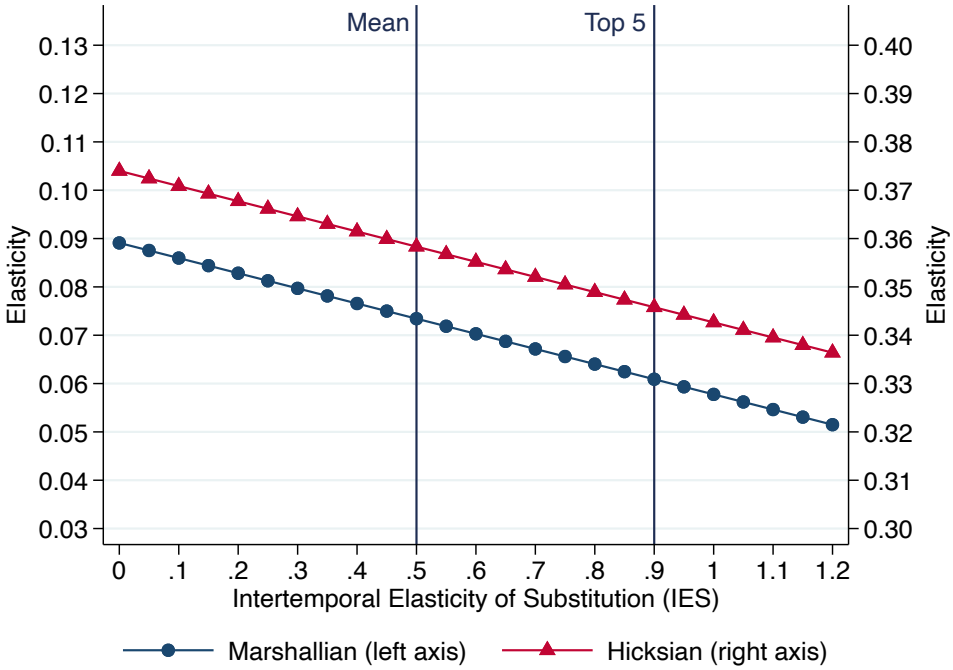
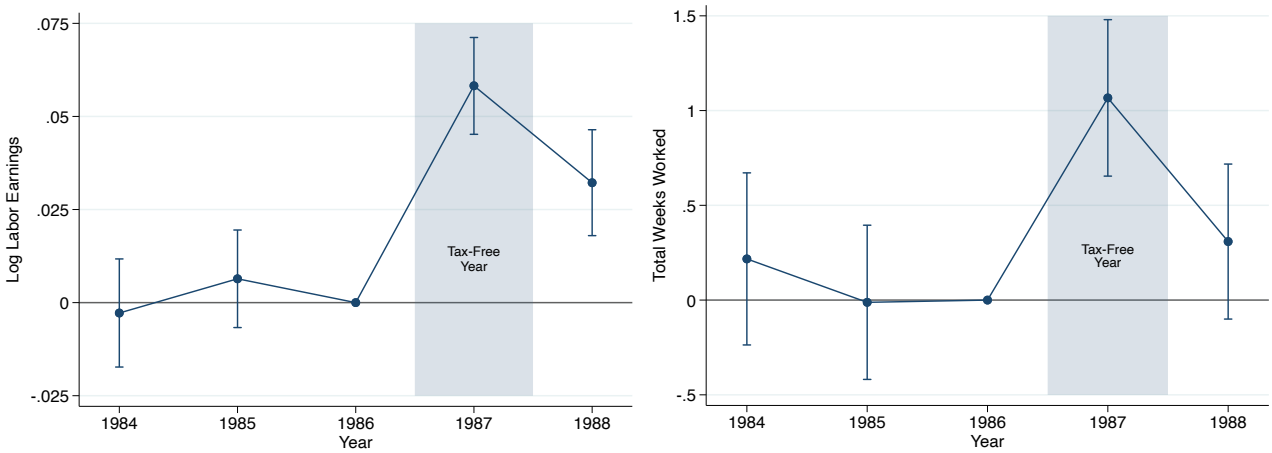


Figure A.12: Implied Hicksian-, Marshallian- and intertemporal substitution elasticity (IES)

Notes: The figure reports values of the Hicksian elasticity, Marshallian elasticity and intertemporal elasticity of substitution consistent with my estimate of intensive margin Frisch elasticity of 0.374. The calculations assume the marginal propensity to earn (MPE) out of wealth, ε_{A}, is 0.11, which is based on estimates from Imbens et al. (2001) for lottery winners (see the main text for a discussion). The ratio of wealth to labor income, $\frac{A}{wh}$, of 2.59 is the median ratio in 1986, calculated using individual tax records. The vertical line "*Mean*" denotes the average of 2,735 estimates of the EIS reported in 169 empirical studies summarized in the meta-analysis in Havránek (2015). Vertical line "*Top 5*" marks the average estimate across 33 studies published in the top-five general interest journals.



(a) Reduced form: Log labor earnings

(b) Reduced form: Total weeks worked

Figure A.13: Predicted tax brackets: Dynamic difference-in-difference

Notes: The figures present estimates from a dynamic DD version of equation (1), estimated in the following regression

$$y_{it} = bracket_{i,t-1} + \delta_t + \eta_t \cdot B_{i,t-1} \times \delta_t + \boldsymbol{X}'_{it}\gamma + \mu_{it},$$

where the outcome variable in panel (a) is log labor earnings and in panel (b) total weeks worked. These plot the coefficients η_t, where $B_{i,t-1} \times \delta_{t=1986}$ is normalized to zero, and the tax bracket position is predicted using three lags of tax-bracket position along with other characteristics, as described in the text. Standard errors are clustered at the individual level and the vertical bars plot the 95% confidence intervals.

I Supplementary Tables

Table A.1: Effect of Tax-Free Year on Earnings and Weeks Worked: Employees vs. Self-Employed

	Log labor earnings				Weeks worked			
	Wage earners		Self-employed		Wage earners		Self-employed	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2SLS DD ($\frac{dy}{d\log(1-\tau)}$)	0.373***	0.406***	0.484***	0.521***	2.337***	5.563***	10.127***	8.700***
	(0.027)	(0.036)	(0.057)	(0.074)	(0.787)	(1.076)	(2.180)	(2.623)
Reduced form (dy)	0.076***	0.078***	0.103***	0.106***	0.480***	1.062***	2.161***	1.772***
	(0.005)	(0.007)	(0.012)	(0.015)	(0.161)	(0.204)	(0.464)	(0.532)
First stage ($d\log(1-\tau)$)	0.205***	0.191***	0.213***	0.204***	0.205***	0.191***	0.213***	0.204***
	(0.001)	(0.001)	(0.003)	(0.003)	(0.001)	(0.001)	(0.003)	(0.003)
Mean of outcome variable	—	—	—	—	46.62	46.62	58.61	58.61
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Matching	No	Yes	No	Yes	No	Yes	No	Yes
Observations	448,592	448,232	78,363	78,226	441,961	441,602	78,477	78,339

Notes: The table presents results from difference-in-differences (DD) regressions, where each row and column entry corresponds to one regression estimate. Columns (1)–(2) and (5)–(6) report estimates for wage earners and columns (3)–(4) and (7)–(8) report estimates for the sample of business owners and workers with income from self-employment. The top row presents results from a 2SLS estimation of equation (2), where the dependent variable (y) is defined in the top panel and the net-of-tax rate ($\log(1-\tau)$) is instrumented with an interaction between indicators of treatment status and tax-free year. The middle row presents results from a reduced-form DD estimation of equation (1), where the outcome variable is defined in the top panel. The bottom row presents results from a first-stage DD estimation of equation (1), where the outcome variable is the logarithm of one minus the marginal tax rate. Controls are gender, age, education, marital status, whether living in the capital area or not, and the number of children aged 0–18 years. "Matching" refers to weighted regressions after coarsened exact matching on age and pretreatment marital status, the number of children, and education. Robust standard errors clustered by individual are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table A.2: Elasticity of Total Weeks Worked

	(1)	(2)	(3)
2SLS DD ($\frac{d\log y}{d\log(1-\tau)}$)	0.093***	0.090***	0.168***
	(0.026)	(0.026)	(0.035)
Reduced form ($d\log y$)	0.019***	0.019***	0.032***
	(0.005)	(0.005)	(0.007)
First stage ($d\log(1-\tau)$)	0.207***	0.208***	0.193***
	(0.001)	(0.001)	(0.001)
Controls	Yes	Yes	Yes
Occupation fixed effects	No	Yes	No
Sector fixed effects	No	Yes	No
Matching	No	No	Yes
Observations	515,232	515,232	514,737

Notes: The table presents results from difference-in-differences (DD) regressions, where each row and column entry corresponds to one regression estimate. The top row presents results from a 2SLS estimation of equation (2), where the dependent variable is the logarithm of total number of weeks worked and the net-of-tax rate is instrumented with an interaction between indicators of treatment status and tax-free year. The middle row presents results from a reduced-form DD estimation of equation (1), where the outcome variable is the logarithm of total number of weeks worked. The bottom row presents results from a first-stage DD estimation of equation (1), where the outcome variable is the logarithm of one minus the marginal tax rate. Controls are gender, age, education, marital status, whether living in the capital area or not, and the number of children aged 0–18 years. Occupation and sector fixed effects are group dummies for occupation and sector groups. "Matching" refers to weighted regressions after coarsened exact matching on age and pretreatment marital status, the number of children, and education. Robust standard errors clustered by individual are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table A.3: Effect on Earnings and Employment-Related Income

Wages and salaries	93.7%
Fringe benefits, travel allowances, etc.	2.6%
Drivers' payments	0.7%
Gifts from employer	0.1%
Pension payment from employer	0.3%
Bonuses, sales commission, etc.	0.7%
Board remuneration	2.0%
Sum	100%

Notes: The table presents results from a 2SLS estimation of equation (2), where the dependent variable is that stated in each row, in 1981$. Estimates are presented as the share of total employment-related income. Each regression controls for gender, age, education, marital status, whether living in the capital area or not, and the number of children aged 0–18 years.

Table A.4: Effect of Tax-Free Year on Capital Income

	(1)	(2)	(3)
2SLS DD ($\frac{dy}{d\log(1-\tau)}$)	310***	291***	272**
	(118)	(109)	(131)
Reduced form (dy)	64***	61***	53**
	(24)	(23)	(25)
First stage ($d\log(1-\tau)$)	0.207***	0.208***	0.193***
	(0.001)	(0.001)	(0.001)
Mean of outcome variable	72.34	72.34	72.34
Share of treatment effect on labor earnings	0.021	0.021	0.018
Controls	No	Yes	Yes
Occupation fixed effects	No	Yes	No
Sector fixed effects	No	Yes	No
Matching	No	No	Yes
Observations	530,900	530,900	530,900

Notes: The table presents results from difference-in-differences (DD) regressions, where each row and column entry corresponds to one regression estimate. The top row presents results from a 2SLS estimation of equation (2), where the dependent variable is real taxable capital income in 1981$ and the net-of-tax rate is instrumented with an interaction between indicators of treatment status and tax-free year. The middle row presents results from a reduced-form DD estimation of equation (1), where the outcome variable is real taxable capital income in 1981$. The bottom row presents results from a first-stage DD estimation of equation (1), where the outcome variable is the logarithm of one minus the marginal tax rate. Controls are gender, age, education, marital status, whether living in the capital area or not, and the number of children aged 0–18 years. Occupation and sector fixed effects are group dummies for occupation and sector groups. "Matching" refers to weighted regressions after coarsened exact matching on age and pretreatment marital status, the number of children, and education. "Share of treatment effect on labor earnings" refers to the ratio of the top row to a similar estimate of real labor earnings in 1981$. Robust standard errors clustered by individual are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table A.5: Effect of Tax-Free Year on Labor Earnings by Tax Brackets

	Lower-Middle		Upper-Middle		Top	
	(1)	(2)	(3)	(4)	(5)	(6)
2SLS DD ($\frac{d\log y}{d\log(1-\tau)}$)	0.484***	0.539***	0.286***	0.304***	0.236***	0.200***
	(0.037)	(0.042)	(0.020)	(0.029)	(0.016)	(0.033)
Reduced form ($d\log y$)	0.069***	0.072***	0.083***	0.084***	0.111***	0.087***
	(0.005)	(0.005)	(0.006)	(0.008)	(0.007)	(0.014)
First stage ($d\log(1-\tau)$)	0.142***	0.133***	0.293***	0.272***	0.467***	0.434***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Matching	No	Yes	No	Yes	No	Yes
Observations	368,645	368,402	202,600	202,030	146,702	143,676

Notes: The table presents results from difference-in-differences (DD) regressions, where each row and column entry corresponds to one regression estimate. The top row presents results from a 2SLS estimation of equation (2), where the dependent variable is the logarithm of labor earnings and the net-of-tax rate is instrumented with an interaction between indicators of treatment status and tax-free year. The middle row presents results from a reduced-form DD estimation of equation (1), where the outcome variable is the logarithm of labor earnings. The bottom row presents results from a first-stage DD estimation of equation (1), where the outcome variable is the logarithm of one minus the marginal tax rate. Controls are gender, age, education, marital status, whether living in the capital area or not, and the number of children aged 0–18 years. Occupation and sector fixed effects are group dummies for occupation and sector groups. "Matching" refers to weighted regressions after coarsened exact matching on age and pretreatment marital status, the number of children, and education. Robust standard errors clustered by individual are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table A.6: Effect of Tax-Free Year on Weeks Worked by Tax Brackets

	Lower-Middle		Upper-Middle		Top	
	(1)	(2)	(3)	(4)	(5)	(6)
2SLS DD ($\frac{dy}{d\log(1-\tau)}$)	6.973***	9.437***	0.693	1.671	4.932***	5.571***
	(1.208)	(1.678)	(0.720)	(0.886)	(0.644)	(0.725)
Reduced form (dy)	0.987***	1.203***	0.203	0.465	2.301***	2.513***
	(0.170)	(0.213)	(0.211)	(0.247)	(0.300)	(0.326)
First stage ($d\log(1-\tau)$)	0.142***	0.133***	0.293***	0.272***	0.467***	0.434***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Mean dependent variable	45.99	45.99	47.85	47.85	47.09	47.09
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Matching	No	Yes	No	Yes	No	Yes
Observations	363,770	363,542	200,099	199,943	145,205	145,028

Notes: The table presents results from difference-in-differences (DD) regressions, where each row and column entry corresponds to one regression estimate. The top row presents results from a 2SLS estimation of equation (2), where the dependent variable is total number of weeks worked and the net-of-tax rate is instrumented with an interaction between indicators of treatment status and tax-free year. The middle row presents results from a reduced-form DD estimation of equation (1), where the outcome variable is the logarithm of labor earnings. The bottom row presents results from a first-stage DD estimation of equation (1), where the outcome variable is the logarithm of one minus the marginal tax rate. Controls are gender, age, education, marital status, whether living in the capital area or not, and the number of children aged 0–18 years. Occupation and sector fixed effects are group dummies for occupation and sector groups. "Matching" refers to weighted regressions after coarsened exact matching on age and pretreatment marital status, the number of children, and education. Robust standard errors clustered by individual are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table A.7: Tax Bracket DD: Labor Earnings – Top and Upper-Middle vs. Lower-Middle Brackets

	(1)	(2)	(3)
2SLS DD ($\frac{d\log y}{d\log(1-\tau)}$)	0.232***	0.289***	0.233***
	(0.029)	(0.029)	(0.034)
Reduced form ($d\log y$)	0.037***	0.046***	0.034***
	(0.005)	(0.004)	(0.005)
First stage ($d\log(1-\tau)$)	0.160***	0.158***	0.147***
	(0.001)	(0.001)	(0.001)
Controls	Yes	Yes	Yes
Occupation fixed effects	No	Yes	No
Sector fixed effects	No	Yes	No
Matching	No	No	Yes
Observations	431,459	431,459	430,911

Notes: The table presents results from difference-in-differences (DD) regressions, where each row and column entry corresponds to one regression estimate. The top row presents results from a 2SLS estimation of equation (2), where the dependent variable is the logarithm of labor earnings and the net-of-tax rate is instrumented with an interaction between indicators of treatment status and tax-free year. The middle row presents results from a reduced-form DD estimation of equation (1), where the outcome variable is the logarithm of labor earnings. The bottom row presents results from a first-stage DD estimation of equation (1), where the outcome variable is the logarithm of one minus the marginal tax rate. Controls are gender, age, education, marital status, whether living in the capital area or not, and the number of children aged 0–18 years. Occupation and sector fixed effects are group dummies for occupation and sector groups. "Matching" refers to weighted regressions after coarsened exact matching on age and pretreatment marital status, the number of children, and education. Robust standard errors clustered by individual are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table A.8: Tax Bracket DD: Weeks Worked, Top and Upper-Middle vs. Lower-Middle Brackets

	(1)	(2)	(3)
2SLS DD ($\frac{dy}{d\log(1-\tau)}$)	3.100***	4.246***	3.268***
	(1.137)	(1.133)	(1.410)
Reduced form (dy)	0.497***	0.675***	0.482***
	(0.182)	(0.180)	(0.208)
First stage ($d\log(1-\tau)$)	0.160***	0.158***	0.147***
	(0.001)	(0.001)	(0.001)
Mean of outcome variable	49.79	49.79	49.79
Controls	Yes	Yes	Yes
Occupation fixed effects	No	Yes	No
Sector fixed effects	No	Yes	No
Matching	No	No	Yes
Observations	520,438	520,438	425,579

Notes: The table presents results from difference-in-differences (DD) regressions, where each row and column entry corresponds to one regression estimate. The top row presents results from a 2SLS estimation of equation (2), where the dependent variable is total number of weeks worked and the net-of-tax rate is instrumented with an interaction between indicators of treatment status and tax-free year. The middle row presents results from a reduced-form DD estimation of equation (1), where the outcome variable is the total number of weeks worked. The bottom row presents results from a first-stage DD estimation of equation (1), where the outcome variable is the logarithm of one minus the marginal tax rate. Controls are gender, age, education, marital status, whether living in the capital area or not, and the number of children aged 0–18 years. Occupation and sector fixed effects are group dummies for occupation and sector groups. "Matching" refers to weighted regressions after coarsened exact matching on age and pretreatment marital status, the number of children, and education. Robust standard errors clustered by individual are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table A.9: Effects of the Tax-Free Year on Extensive Margin — Robustness

	All		No Fishing Sector		No Tradable Sector	
	(1)	(2)	(3)	(4)	(5)	(6)
2SLS DD ($\frac{dy}{d\log(1-\tau)}$)	0.069***	0.058***	0.072***	0.060***	0.096***	0.066***
	(0.014)	(0.014)	(0.015)	(0.015)	(0.015)	(0.015)
Reduced form (dy)	0.008***	0.006***	0.008***	0.006***	0.010***	0.008***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)
First stage ($d\log(1-\tau)$)	0.110***	0.110***	0.105***	0.106***	0.111***	0.115***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Mean dependent variable	0.672	0.672	0.659	0.659	0.707	0.707
Match-strata fixed effects	Yes	No	Yes	No	Yes	No
Individual fixed effects	No	Yes	No	Yes	No	Yes
Number of matched observations	576,571	576,571	548,347	548,347	447,559	447,559

Notes: The table presents results from life-cycle difference regressions, where each row and column entry corresponds to one regression estimate. "*No Fishing Sector*" excludes all firms and workers employed in the fishing sector, including both fishing and fish-processing. "*No Tradable Sector*" excludes all firms and workers employed in the tradable sector. The top row presents results from a 2SLS estimation of equation (4), where the dependent variable (y) is employment and the net-of-tax rate ($\log(1-\tau)$) is instrumented with an interaction between indicators of treatment status and tax-free year. The middle row presents reduced form estimates based on equation (3). The bottom row presents first-stage regression estimates based on equation (3), where the outcome variable is the logarithm of one minus the average tax rate in columns. "Match-strata fixed effects" refers to group fixed effects, where each group is a cell used in coarsened exact matching on age, gender and pretreatment marital status, the number of children, education, location indicator and percentile of income. The number of matched observations corresponds to observations for the treatment group. Robust standard errors clustered at the match-strata level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table A.10: Heterogeneous Labor Supply Responses by Flexibility of Employment Arrangement

	Temporal flexibility		Constrained in in primary job		Hours flexibility	
	Low (1)	High (2)	Yes (3)	No (4)	Low (5)	High (6)
	A. Labor Earnings					
2SLS DD estimate	0.371***	0.451***	0.315***	0.520***	0.412***	0.500***
	(0.031)	(0.036)	(0.031)	(0.037)	(0.037)	(0.044)
	B. Weeks Worked					
2SLS DD estimate	6.198***	5.191***	2.511***	7.744***	6.243***	8.580***
	(1.016)	(1.214)	(1.007)	(1.234)	(1.240)	(1.474)
Mean weeks pre-reform	51.64	45.09	53.29	44.25	48.26	47.72

Notes: The table presents results from a 2SLS estimation of equation (2), where each row and column entry corresponds to one regression estimate. The dependent variable is indicated above each panel. Estimates by subgroups are obtained by interacting group indicators with the log of net-of-tax rate and the instrument in regression (2). *Temporal flexibility* splits the sample by a measure of relative variability in weeks worked within an occupation; see the main text for details. "Low" flexibility refers to workers below median of the distribution over the job flexibility measure and "High" refers those above median. *"Constrained in primary job"* is an indicator that equals one (*"Yes"*) if working 52 weeks in the primary job prior to the tax-free year, and zero (*"No"*) for those working 51 weeks or less. *Hours flexibility* splits the sample by occupations based on the share of workers with fixed-salary contracts, where "Low" share refers to occupation with a fixed-salary share below median of the distribution and "High" share refers to occupations above median. All regressions are weighted after coarsened exact matching on age and pretreatment marital status, the number of children, and education. Robust standard errors clustered at the match-strata level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table A.11: Cross-Elasticities of Earned Income: Husbands and Wives

	All		Children age 0–6		Age (years)		Constrained in primary job	
	(1)	(2)	0 (3)	⩾ 1 (4)	60 < (5)	⩾ 60 (6)	Yes (7)	No (8)
	Husbands							
Cross-elasticity	-0.172***	-0.150***	-0.121***	-0.206***	-0.193***	-0.044	-0.199***	-0.088*
	(0.022)	(0.022)	(0.037)	(0.028)	(0.024)	(0.051)	(0.053)	(0.045)
IHS(spouse income)	–	-0.015***	–	–	–	–	–	–
	–	(0.001)	–	–	–	–	–	–
Observations	223,919	223,919	223,919		223,919		223,919	
	Wives							
Cross-elasticity	0.025	0.014	0.042	0.006	0.014	0.082	-0.184	0.208*
	(0.054)	(0.053)	(0.080)	(0.065)	(0.059)	(0.103)	(0.112)	(0.109)
IHS(spouse income)	–	0.032***	–	–	–	–	–	–
	–	(0.009)	–	–	–	–	–	–
Observations	102,283	102,283	102,283		102,283		102,283	

Notes: The table presents estimates of the earnings responses of married and cohabiting individuals to their spouse's net-of-tax rate. These cross-elasticities are estimated using the 2SLS estimation of the following modification of equation (2):

$$y_{it} = bracket_{i,t-1} + \delta_t + \varepsilon^{own} \cdot \log(1-\tau_{it}) + bracket^{spouse}_{i,t-1} + \varepsilon^{cross} \cdot \log(1-\tau^{spouse}_{it}) + \boldsymbol{X}'_{it}\gamma + \nu_{it}$$

where the dependent variable is the logarithm of the individual's labor earnings and the two endogenous variables, the individual's log net-of-tax rate and his spouse's log net-of-tax rate, are instrumented with an interaction between indicators of treatment status and the tax-free year for the individual and his spouse separately. The coefficient ε^{cross} identifies the cross-elasticity. Estimates by subgroups are obtained by interacting group indicators with the log of the net-of-tax rate of the individual and spouse as well as the respective instrumental variables. *"Constrained in primary job"* is an indicator that equals one (*"Yes"*) if working 52 weeks in a primary job pre-reform. All regressions control for age, education, whether living in the capital area or not, and the number of children aged 0–18 years. Column (2) includes the inverse hyperbolic sine (IHS) function of spouse's income, instead of in logs, to account for the possibility of the spouse's income being zero. Robust standard errors clustered by individual are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table A.12: Summary Statistics for the Icelandic Working-Age Population and Subsamples

	Population (1)	Working population (2)	Self-employed (3)
Demographics			
Age	37.67	36.97	42.80
Female (%)	46.33	47.31	15.18
Married (%)	57.45	57.51	70.70
Number of children	0.76	0.78	1.01
Capital area (%)	56.45	55.50	43.94
Junior college (%)	35.86	36.94	42.23
University degree (%)	9.71	9.79	13.34
Income and Working Time			
Wage earnings ($)	10,807	11,728	13,888
Capital income ($)	91	86	121
Other income ($)	477	357	341
Weeks worked (all jobs)	37.96	41.20	58.43
Tax Rates and Brackets			
Marginal tax rate (in %)	17.82	19.00	23.34
Average tax rate (in %)	10.21	10.89	13.84
Municipal tax rate (in %)	10.27	10.27	10.26
Number of individuals	162,804	150,013	18,220

Notes: Table entries are means for the group defined in the column header in 1986. Column 1 includes the population of all tax filers aged 16–70. Column 2 includes individuals with nonzero labor earnings. Column 3 includes the subpopulation working in self-employment, either as a primary or secondary job. The number of children is those aged 0–18 years. Capital area is the share living in Reykjavik and the surrounding area. Monetary values are in real 1981 US dollars. Capital income is taxable capital income.

Table A.13: Effect of Tax-Free Year on Labor Earnings: Predicted Tax Bracket

	(1)	(2)	(3)
2SLS DD ($\frac{d\log y}{d\log(1-\tau)}$)	0.397***	0.401***	0.393***
	(0.027)	(0.027)	(0.026)
Reduced form ($d\log y$)	0.081***	0.081***	0.078***
	(0.005)	(0.005)	(0.006)
First stage ($d\log(1-\tau)$)	0.206***	0.205***	0.203***
	(0.001)	(0.001)	(0.001)
Controls	Yes	Yes	Yes
Occupation fixed effects	No	Yes	No
Sector fixed effects	No	Yes	No
Matching	No	No	Yes
Observations	311,736	310,982	311,673

Notes: The table presents results from difference-in-differences (DD) regressions, where each row and column entry corresponds to one regression estimate. Treatment status is assigned based on the predicted tax bracket in a given year; see the text for details. The top row presents results from a 2SLS estimation of equation (2), where the dependent variable is the logarithm of labor earnings and the net-of-tax rate is instrumented with an interaction between indicators of treatment status and tax-free year. The middle row presents results from a reduced-form DD estimation of equation (1), where the outcome variable is the logarithm of labor earnings. The bottom row presents results from a first-stage DD estimation of equation (1), where the outcome variable is the logarithm of one minus the marginal tax rate. Controls are gender, age, education, marital status, whether living in the capital area or not, and the number of children aged 0–18 years. Occupation and sector fixed effects are group dummies for occupation and sector groups. "Matching" refers to weighted regressions after coarsened exact matching on age and pretreatment marital status, the number of children, and education. Robust standard errors clustered by individual are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table A.14: Effect of Tax-Free Year on Labor Earnings: Continuous Bracket Position

	(1)	(2)	(3)
2SLS DD ($\frac{d\log y}{d\log(1-\tau)}$)	0.331***	0.273***	0.356***
	(0.025)	(0.025)	(0.029)
Reduced form ($d\log y$)	0.112***	0.093***	0.117***
	(0.008)	(0.008)	(0.009)
First stage ($d\log(1-\tau)$)	0.338***	0.341***	0.329***
	(0.001)	(0.001)	(0.001)
Controls	Yes	Yes	Yes
Occupation fixed effects	No	Yes	No
Sector fixed effects	No	Yes	No
Matching	No	No	Yes
Observations	115,997	115,997	115,870

Notes: The table presents results from difference-in-differences (DD) regressions, where each row and column entry corresponds to one regression estimate. Treatment status is assigned to workers who remain in the same tax bracket for the three consecutive years prior to 1987, while excluding others. The top row presents results from a 2SLS estimation of equation (2), where the dependent variable is the logarithm of labor earnings and the net-of-tax rate is instrumented with an interaction between indicators of treatment status and tax-free year. The middle row presents results from a reduced-form DD estimation of equation (1), where the outcome variable is the logarithm of labor earnings. The bottom row presents results from a first-stage DD estimation of equation (1), where the outcome variable is the logarithm of one minus the marginal tax rate. Controls are gender, age, education, marital status, whether living in the capital area or not, and the number of children aged 0–18 years. Occupation and sector fixed effects are group dummies for occupation and sector groups. "Matching" refers to weighted regressions after coarsened exact matching on age and pretreatment marital status, the number of children, and education. Robust standard errors clustered by individual are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table A.15: Tax Bracket DD: Labor Earnings, Controls for 1988 Tax Rates

	(1)	(2)	(3)	(4)
2SLS DD ($\frac{d\log y}{d\log(1-\tau)}$)	0.374***	0.373***	0.307***	0.378***
	(0.024)	(0.022)	(0.023)	(0.022)
$\tau_{1986} - \tau_{1988}$	No	Yes	No	Yes
$\tau_{1986}^{average} - \tau_{1988}^{average}$	No	No	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Observations	526,955	526,955	526,955	526,955

Notes: The table presents results from a 2SLS estimation of equation (2), where the dependent variable is the logarithm of labor earnings and the net-of-tax rate is instrumented with an interaction between indicators of treatment status and tax-free year. The difference between marginal tax rates in 1986 and 1988 is denoted by $\tau_{1986} - \tau_{1988}$. The difference between average tax rates in 1986 and 1988 is denoted by $\tau_{1986}^{average} - \tau_{1988}^{average}$. Controls are gender, age, education, marital status, whether living in the capital area or not, and the number of children aged 0–18 years. Occupation and sector fixed effects are group dummies for occupation and sector groups. Robust standard errors clustered by individual are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table A.16: Effects of the Tax-Free Year on Extensive Margin and Aggregate Labor Supply

	Log labor earnings		Weeks worked		Employment	
	(1)	(2)	(3)	(4)	(5)	(6)
2SLS DD ($\frac{dy}{d\log(1-\tau)}$)	0.658***	0.639***	3.036***	2.469***	0.068***	0.058***
	(0.017)	(0.016)	(0.346)	(0.325)	(0.013)	(0.014)
Reduced form (dy)	0.150***	0.143***	0.672***	0.555***	0.008***	0.006***
	(0.003)	(0.003)	(0.077)	(0.073)	(0.001)	(0.001)
First stage ($d\log(1-\tau)$)	0.208***	0.209***	0.221***	0.224***	0.110***	0.110***
	(0.002)	(0.002)	(0.003)	(0.003)	(0.001)	(0.001)
Mean dependent variable	—	—	38.37	38.37	0.672	0.672
Match-strata fixed effects	Yes	No	Yes	No	Yes	No
Individual fixed effects	No	Yes	No	Yes	Yes	No
Number of matched observations	537,240	537,240	532,664	532,664	587,332	586,321

Notes: The table presents results from difference-in-differences (DD) regressions, where each row and column entry corresponds to one regression estimate. The top row presents results from a 2SLS estimation of equation (4), where the dependent variable (y) is defined in the top panel and the net-of-tax rate ($\log(1-\tau)$) is instrumented with an interaction between indicators of treatment status and tax-free year. The middle row presents results from a reduced-form DD estimation of equation (3), where the outcome variable is defined in the top panel. The bottom row presents results from a first-stage DD estimation of equation (3), where the outcome variable is the logarithm of one minus the marginal tax rate in columns (1)–(4) and one minus the average tax rate in columns (5)–(6). "Match-strata fixed effects" refers to group fixed effects, where each group is a cell used in coarsened exact matching on age, gender and pretreatment marital status, the number of children, education, location indicator and percentile of income. The number of matched observations corresponds to observations for the treatment group. Robust standard errors clustered at the match-strata level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table A.17: Details and Sources for Figure 9

Study	Label	Group	Variation	Notes
Intensive margin – Figure 9a				
Martinez, Saez, and Siegenthaler (2021)	MMS 20	Population	Taxes	Table 2, column (2)
Looney and Singhal (2006)	LS 06	Population	Taxes	Table 5, column (3). SIPP and NBER tax panel.
Saez (2003)	Saez 03	Population	Taxes	Table 5, column (3). Elasticity of wage income.
Bianchi, Gudmundsson, and Zoega (2001)	BGZ 01	Population	Taxes	Based on Table 6 and own calculations. See footnote in Section 7.1 for details.
Martinez, Saez, and Siegenthaler (2021)	MMS 20	Prime-age men	Taxes	Appendix Table A2, column (2).
French (2004)	French 04	Prime-age men	Wages	Table 3 (median of estimates). PSID, Men.
Pistaferri (2003)	Pistaferri 03	Prime-age men	Wages	Table 2. Men aged 26–59.
Ham and Reilly (2002)	HR 02	Prime-age men	Wages	Table 1, column (4). PSID, men of age 23–60.
Lee (2001)	Lee 01	Prime-age men	Wages	Table 2. PSID, men aged 25–60.
Angrist (1991)	Angrist 01	Prime-age men	Wages	Table 2. PSID, men of age 21–64.
Altug and Miller (1990)	AM 90	Prime-age men	Wages	See Keane (2011) for calculation of elasticity. PSID, Household-heads of age 25–46.
Altonji (1986)	Altonji 86a	Prime-age men	Wages	Table 2, column (7). PSID, men aged 25–60.
Altonji (1986)	Altonji 86b	Prime-age men	Wages	Table 4, column (3). PSID, men aged 25–60.
Browning, Deaton, and Irish (1985)	BDI 85	Prime-age men	Wages	See Keane (2011) for calculation of elasticity.
MaCurdy (1981)	MaCurdy 81	Prime-age men	Wages	Table 1, column (1). PSID, men of age 25–46.
Angrist, Caldwell, and Hall (2020)	ACH 17	Uber drivers	Wages	Table 5, column (1).
Giné et al. (2017)	GMV 17	Boat owners	Wages	Table 6, column (3).
Saia (2017)	Saia 17	Pizza deliverers	Wages	Table A1.
Goldberg (2016)	Goldberg 16	Agricultural workers	Wages	Table 4, column (1). Standard errors calculated as elasticity is calculated by author.
Farber (2015)	Farber 15	Taxi drivers	Wages	Table 6.
Stafford (2015)	Stafford 15	Lobster hunters	Wages	Table 2.
Fehr and Goette (2007)	FG 07	Bicycle messengers	Wages	Table 3 and text. Average of two estimates.
Oettinger (1999)	Oettinger 99	Baseball stadium vendors	Wages	Table 6, column (5).
Extensive margin – Figure 9b				
Martinez, Saez, and Siegenthaler (2021)	MMS 18	Population	Taxes	Table 2, column (1).
Carrington (1996)	Carrington 96	Population	Wages	Calculated based on estimates in Table 2. See Chetty et al. (2013) for details.
Manoli and Weber (2016)	MW 16	Retirement-age	Pension	Table 3. Average across estimates within 12 months from threshold.
Brown (2013)	Brown 13	Retirement-age	Pension	Table 4, column (4).
Gruber and Wise (1999)	GW 99	Retirement-age	Taxes	Calculated using data reported in Table 1. See Chetty et al. (2013) for details.

Notes: Estimates refer to the authors' main, representative, or preferred specification. Confidence intervals either based on reported standard errors or computed using the delta method estimates in MaCurdy (1983) of 6.25, as reported in Keane (2011), and negative elasticities in Camerer, Babcock, Loewenstein, and Thaler (1997), are excluded for visual purposes.

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