

THE EFFECT OF PENSION TAX REDUCTIONS ON LABOR SUPPLY

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PREMINARY AND INCOMPLETE

This study quantifies the effects of Russia's 1964 and 1970 pension law amendments on old-age labor supply. The amendments gradually reduced the tax rate of employed pensioners from 84 to 50, to 25 and finally to 0 percent. The roll-out of the amendments facilitates the estimation of the effect of reducing pension taxes on labor supply in several ways. First, this study exploits that the tax rate was reduced to 25% in eastern regions and to 50% in western regions within a differences-in-differences framework. This study finds that the pension tax rate from 50 to 25 percent results in a 29 percent increase in old-age employment rates five years after the amendment. Second, this study exploits that only old-age pensions were eligible for a tax reduction in a differences-in-differences framework. Reducing the pension tax rates across the country resulted in a 70 percent increase in employment rates five years after the amendment.

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Most OECD countries have recently been active in changing their pension systems. In 21 OECD countries the focus has been on changes related to the financial sustainability of their pension system (OECD 2014). Public pension expenditure is large; in 2011, it constituted 18 percent of total government expenditures in OECD countries. The increase in the number of people in retirement relative to the size of the working age population and an increase in the number of years spent in retirement are the main factors considered to threaten the financial sustainability and solvency of pension systems.² As a result, a number of countries have implemented various work incentives for individuals near the retirement age (OECD 2014).³ One such work incentive is the reduction of the tax on pensions for a working pensioner.

It remains unknown whether reducing tax on pensions can incentivize an older individual to stay in or re-enter the labor force. The existing literature examines the effect of the elimination of the earnings test – a tax on pensions when a pensioner earns above a certain amount. Because the eliminations were national, most of the existing literature compares younger to older age groups before and after the eliminations, which poses a problem for causal inference if the behavior of one group is not a good control for the other.⁴ As a result, their findings only apply to the narrow age-group that was designated as the treatment group. Also, each study measures only the adjustment from one particular point in the tax rate distribution to the other. Studies on the United States, Canada and the United Kingdom have found a positive effect on hours

² There were four times as many working age people per person over age 65 and over in OECD countries in 2014. It is projected that there will be only one to two times as many working age people per person over age 65.

³ All these pension reforms happened between 2012 and 2014. In Canada, the benefits of delaying retirement after age 65 were increased, and it is now possible to combine work and pension benefit receipt from the mandatory public pension. In the Netherlands, workers retiring before age 65 now receive a reduced pension benefit. In Sweden, in 2014, increased the earned income tax credit for workers over 65.

⁴ Baker and Benjamin (1999) examine the elimination of the earnings test in Canada, where the test was gradually eliminated in one region, and shortly afterwards was eliminated in other regions. The estimates are difficult to interpret, because there is only one pre-year where the elimination already started in the treatment group, the elimination progressively occurred over several years in one region, and was followed by the rest of Canada shortly afterwards.

worked, but no effect on labor force participation as a result of the reduction of the tax rate on pensions (Gruber and Orszag 2003, Song and Manchester 2007, Engelhardt 2014, Haider and Loughran 2008, Disney and Smith 2002, Baker and Benjamin 1999).

It remains unknown whether the literature's findings of an increase in hours worked and no change in the labor force participation is solely a response to a decrease in the tax rate. In most cases, the earnings test is actuarially fair, where individuals recoup their pension taxes by receiving higher pension payments once they retire. Thus, the earnings test is not a real tax on pension benefits, and may have an effect on behavior either due to misinformation (Liebman and Luttmer 2015) or due to uncertainty of future length of life. As a result, quantifying the elimination of the earnings test does not simply measure the effect of a tax reduction, and may understate the labor supply effect. This may explain the lack of a labor force participation response, but the presence of the hours worked response.

This study exploits two pension tax amendments in Russia in 1964 and 1970 to evaluate the effect of reducing the tax rate on pensions on old-age employment rates. Similar to eliminations of the earnings test in OECD countries, this amendment was intended to encourage older individuals to work longer. Studying the Russian pension reform is beneficial, because it presents the largest pension tax reduction previously studied. Before the amendments, older individuals who chose to work while being eligible for a pension faced a high tax on their pensions, where the average tax on pensions was 84 percent. Pensioners could receive a 15 ruble pension per month representing 31.6 percent of the average pension in 1963, if their monthly salary did not exceed 100 rubles representing 110 percent of the average monthly salary in 1963. If their salary exceeded 100 rubles, they did not receive a pension. To perform this analysis, I

create a unique data-set characterizing employment behavior among pensioners and the characteristics of pensioners and regions from the archives in Moscow.

Different from the earnings tests in the countries that were previously studied, the one in Russia did not result in a higher pension after a pensioner stopped working. That is, the tax on pensions in Russia was not actuarially fair, and thus acted as a true tax on pensions. Studying the effect of the reduction of the tax on pensions in the Russian context is beneficial, because it allows me to estimate the full effect of taxing pensions on labor supply. Additionally, the simplicity of the law and the thorough knowledge of individuals about the details of the law is a benefit to studying this context, because it is reasonable to expect the adjustment in employment rates would be due to the change in tax rates and not due to some misinformation about the law. The pensioners found out quickly about the new amendments and the rules of the change in the tax rates were printed in major newspapers.

The amendments were only applicable to one group of pensioners and provided differential reductions in pension taxes by region, which allows for cleaner causal identification relative to previous studies that focused on policies that were implemented nationally and applied to everyone. The reductions in pension taxes were only applicable to old-age pensioners – men who are age 60 and above and women age 55 and above. All other types of pensioners, such as invalidity pensioners, experienced no change in their pension taxes.

My research design uses the geographic variation in the reduction in the tax rate on pensions as well as the applicability of the amendment to only one type of pension. Exploiting the differential reduction of pension tax rates by region, I employ a generalized differences-in-differences framework, where I use the regions with the greatest tax reduction as the treatment group and the regions with the lowest tax reduction as a control group. First, I study the effects

of the 1964 amendment which reduced the tax rate on pensions to 25% in 25 oblasts (similar to states; I call these the eastern regions), and to 50% in the remaining 48 oblasts (I call these the western regions). Thus, the eastern regions are my treatment, while the western regions are my control group. Second, I study the effects of the 1970 amendment which reduced the tax on pensions to zero in all oblasts. Thus, eastern regions experienced a decline in the tax rate from 25% to 0%, while the western regions experienced a decline in the tax rate from 50% to 0%. Thus, the eastern regions are my control, while the western regions are my treatment group. Next, I exploit that both amendments only applied to old-age pensions, while the pension tax rates for other types of pensions (invalidity) did not change. I employ a generalized differences-in-differences framework, where I use the old-age pensioners as the treatment group and other types of pensioners as the control group.

My results show that both pension tax reduction amendments are associated with an immediate and sustained increase in old-age employment rates. Employment rates rose overall by 27 percent in the year when the 1964 amendment happened: they rose by 35 percent in the eastern regions, and by 22 percent in the western regions. Five years after the amendment, employment rates rose overall by 70 percent: 103 percent in the eastern regions, and 56 percent in the western regions. Next, I compare the differential increases in employment rates in the eastern relative to the western regions. Using the 1964 amendment to estimate the effect of moving the tax rate on pensions from 50 to 25 percent: employment rates rise by 10 percent in the first year, and by 29 percent five years after the amendment. Using the 1970 amendment to estimate the effect of moving the tax rate from 25 to 0 percent: employment rates rise by 6 percent in the first year, and by 7 percent five years after the amendment.

I. Russian Pension Benefits

Starting from 1956, the Soviet government passed a unified law that provided government pensions for most workers (Zabozlaev 1962). Prior to this, there were numerous rulings of pension amounts for different types of workers. The new law substantially increased the size of pensions and the number of individuals eligible for them. This law mandated several types of pension benefits and specified the amounts that could be received based on previous earnings. There were three types of work-related pensions that were provided: old-age pensions, invalidity pensions, and pensions for length of service. This law also specified how much of their pensions individuals could keep if they continued working, where old-age pensioners could keep the least amount of their pensions if they continued working.⁵

A. *Pension Types Descriptions: Old-age and Invalidity Pensions*

The old-age pension was the largest category of pensions, where 50 percent of work-related pensions were old-age in 1963. Women could start receiving this pension at the age of 55 if they worked no less than 20 years, while men could start receiving it at the age of 60 if they worked no less than 25 years. Pensions were calculated based on salary, where the pension either equaled the average over the last 12 months of work, or the average for continuous 5 years of work over the last 10 years. Individuals with higher salaries received a smaller share of their salary as a pension. The average old-age monthly pension received in 1963 was 47.4 rubles, which was about 52.1 percent ($47.4/90.3$) of the average monthly wage in 1963.⁶ The maximum monthly pension a person could receive was equal to 132 percent of the average monthly salary

⁵ Please find a more detailed description of pension types in Appendix A.

⁶ This is not the same as the average replacement rate for a pension, because the monthly wage for older individuals may be different: an estimate from a book lists the replacement rate for a pension at 65 percent (Lantsev 1976).

(120/90.3), while the minimum pension was equal to 33 percent of the average monthly salary (30/90.3).

Old-age pensioners had the greatest tax on pensions if they worked. Individuals who were eligible to receive an old-age pension, but worked at the same time could only keep a limited portion of their pension or none at all. They received 15 rubles of pension per month which was 31.6 percent (15/47.4) of the average pension in 1963, if their monthly salary did not exceed 100 rubles (110 percent of the average monthly salary in 1963).⁷ If their salary exceeded 100 rubles, then they did not receive a pension. So, for an average person the tax on their pension if they worked would be 84.2 percent.⁸ However, if a pensioner were employed as a temporary worker for two months in a calendar year, then his earnings were not counted in the pension calculation.⁹

The second largest pension was the invalidity pension, where 31.4 percent of work related pensions were invalidity pensions. Individuals were eligible for this pension during the whole time when they could not work (were disabled), and needed medical check-ups to prove eligibility. However, once a man reached age 60 and a woman reached age 55, then they were eligible for an invalidity pension for the rest of their lives. There were three types of invalids: type 1 was most disabled, and type 3 was least disabled. Individuals could receive this pension as a result of a work injury (10 percent of cases) or a general illness (90 percent of cases). If an individual became an invalid as a result of a work injury, then he/she could receive the pension regardless of length of employment. If an individual became an invalid as a result of general

⁷ This minimum pension constituted 50 percent of the smallest pension and 12.5 percent of the largest pension.

⁸ A conservative estimate would assume that 50 percent of people earned below 100 rubles per month (given that the mean monthly wage was 90.6 rubles). Then, the average tax rate would be: $0.5 \cdot 100 + 0.5 \cdot 68.4 = 84.2\%$.

⁹ The two-months time period is counted from the entry to a job until the end of the job, regardless of work breaks during the two-month period. This worker must be accepted to a job that is supposed to last less than two months. The worker can be accepted to several temporary jobs in a year, but the total time worked should be less than two months. If a person was accepted to a job to last no longer than 2 months, but stays longer, then he pays a tax on his pension starting after two months of work. If a pensioner was accepted to a temporary job to last longer than two months, then he has to pay the tax for the whole time.

illness, then he received the pension when he has worked enough years. The pension amounts depended on previous earnings, and differed for the type of invalid (on the job, general illness, job with difficult conditions). The share of the pension amount as a fraction of average national monthly salary was 30.3 percent. These pensions were similar to old-age pensions, because the replacement rate of the previous salary grew smaller as the salary grew larger, and minimum and maximum amounts were instituted.

The amount of the invalidity pension individuals could keep when employed was greater than for old-age pensions and depended on their level of disability. The most disabled (type 1) received their full pension regardless of salary, while the least disabled (type 3) the sum of the pension and earnings could not exceed earnings before pension receipt.¹⁰

B. Pension Reform to Encourage Employment: 1964 and 1970 Amendments

Starting from the 1960s, the Russian government was concerned with a smaller labor force than it desired (Lantsev 1976). Several factors can explain this concern. First, the decline in birth rates during World War II led to fewer people entering the work force twenty years later in the 1960s. Second, as a result of the 1956 pension reform, the number of people eligible for pensions significantly increased, where from 1956 to 1960 2.6 million people became newly eligible for pensions. Third, the inability of most individuals to keep their full pensions if they continued working substantially lowered the employment rate among pensioners. However, many individuals eligible for pensions were still able to work.

¹⁰ The less disabled (type 2) received their full pension regardless of the salary amount, so long as the salary was not greater than 120 rubles (133 percent of the average national monthly salary). Once the salary was over 120 rubles, then the sum of the pension and the earnings could not exceed the total earnings before first pension receipt. For the least disabled (type 3), the sum of the pensions and earnings could not exceed the total earnings before the first pension receipt, while if their earnings did not exceed 120 rubles they received no less than 50 percent of their pension.

The government decided to change legislation to incentivize pensioners to work, once it started viewing old-age pensioners as an untapped labor resource. After the 1956 pension reform, pensioners had few incentives to continue working, because of the high tax on pensions and the small difference between pensions and salaries, especially for people in low-paying jobs.¹¹ As a result, the government decided to implement a policy change that would incentivize the pensioner to work. The first initiatives started during the period from 1961 to 1963 and started eliminating the tax on pensions if a pensioner was employed as an agricultural worker (Astrakhan 1971). The government focused on agricultural work, because of its interest to increase production in this sphere, and the appropriateness of using old-age labor there.

In 1964, the government passed an amendment to the 1956 pension law applicable to a substantial portion of individuals with the goal of incentivizing work among old-age pensioners (Zabozlaev 1964). The main feature of the amendment was its allowance of employed old-age pensioners to keep a larger portion of their pension, or put differently – a decline in the tax rate on pensions when an individual continued working. This decline in the tax rate on pensions applied both to pensioners who entered employment, as well as the pensioners who continued working after the amendment.

The majority of individuals were eligible for the reduction in the tax rate on pensions: 85 percent of individuals were eligible. The government chose to target the amendment to occupations it thought needed the greatest increase in workers. All individuals employed in blue-collar occupations and some individuals in white-collar occupations were eligible. It is important to remember that the amendment only applied to old-age pensions, while the rules for all other types of pensions (invalidity pensions for example) were left unchanged.

¹¹ The difference was small, because salaries were taxed, but pensions were not taxed.

In 1970, another amendment further expanded the incentives for pensioners to work (Tsederbaum 1971). Similarly to the previous change in law, the goal was to provide pensioners the greatest incentives to work in occupations and industries where they could work without hurting their health, and with the greatest help to the nation. This time, the amendment allowed pensioners in the majority of occupations to keep their full pension if they worked.¹² Finally, the amendment increased the limit on the sum of the pension and salary a pensioner could keep to 300 rubles (from 200 rubles in the 1964 amendment).

II. Roll-Out of Pension Reform and Expected Employment Changes

A. Geographic Differentiation of Pension Tax Rate Amendments

On February 26, 1964, the Soviet government passed an amendment to incentivize old-age pensioners to work (Sovmin, 1964). The amendment went into effect on April 1, 1964. At that time, individuals who were eligible for a pension and continued working in regions in Siberia, the Far East and the Urals (I call these “eastern regions”) had a 25 percent tax rate on their pensions. In the rest of Russia (I call these “western regions”), individuals who were eligible for a pension and continued working had a 50 percent tax rate on their pensions. The government may have decided to offer a greater reduction in the pension tax rate in certain regions, because it wanted to increase labor supply the most in these lower populated regions of the country which were important in industrial production. This amendment was scheduled to last from 1964 to 1968, but it was in effect until the end of 1969.

Figure 1 shows a map of regions of Russia that experienced differential reductions in the tax rates on pensions, where the eastern regions are shaded. The eastern regions were less

¹² Pensions continued to be taxed at a 25% rate in the Urals, Siberia and the Far East, and at 50% in the rest of Russia for some occupations. These occupations mainly included those that became eligible for tax reductions after the 1964 law, but not eligible for the full reduction in 1970.

populous and only 25 percent of individuals eligible for old-age pensions resided there in 1963. Table 2 shows the employment rate, educational attainment, and the share of blue collar workers in the eastern and western regions in 1959.

The pensioners found out quickly about the new law, because the details of the law were printed in major newspapers. An article on March 6th, 1964, listed all the details of the law, such as the occupations of workers eligible for the reduction in the pension tax and the areas that would have a lower tax rate on their pensions. There were follow-up articles in both major newspapers, where the head of the pension department answered questions the readers had about the amendment. One article mentioned that the readers of the newspaper support the change in law, and were very interested in how it would work (Izvestija 1964).

On December 31 of 1969, the government passed an amendment that reduced the tax rates on pensions to 0 percent in both the eastern and western regions (Sovmin 1969). It was to go in effect on January 1, 1970, and was to last through 1975. Table 1 summarizes the tax rates on pensions in the eastern and western regions before 1964, between 1964 and 1969, and after 1970.

The presence of a substantial proportion of pensioners eligible to keep a greater share of their pension demonstrates that the pension amendments affected a lot of people. As a result of the 1964 and 1970 amendments, the composition of pensioners who worked changed so that a greater share of them received a greater part of their pension. The following statistics apply to the samples of pensioners who were working in 1968 and in 1973, where the 1973 numbers are in parentheses. By 1968 (1973): 34.3% (91.4%) of pensioners kept 100% of pensions, 30.8% (5.7%) kept either 50% or 75% of pensions depending on region of work, and 34.9% (2.9%) received the minimum pension or did not receive a pension at all (Lantsev 1976). As a result of

this sample consisting only of working pensioners, these numbers provide an upper bound for the percent of all pensioners eligible for pension tax reductions. It is likely that pensioners with the greatest incentives to work remained in the labor force, while those not eligible for pension tax reductions retired.

B. Expected Effects of Pension Amendment on Employment

It is reasonable to expect a fairly quick adjustment in the employment rate of pensioners after the 1964 or the 1970 pension law amendments. This is due to two reasons. First, based on articles in widely-read newspapers, individuals found out about each amendment quickly. Second, individuals could simply choose to continue working after the law, which does not require time for adjustment. Although, individuals who already retired before the law change may take longer to adjust their behavior.

In the context of Russia at the time, the pension tax reductions would primarily affect the decision of the pensioner whether to work, and not the choice of how many hours to work. This is because there were very limited possibilities of part-time work at the time, which was virtually nonexistent. Thus, the pension tax reductions would primarily affect whether the individual worked full-time or retired. Given the expectation that the effect would be concentrated on the extensive margin, this study focuses on the outcome of employment rates.¹³

The pension tax reductions may increase the employment rate among old-age pensioners through two channels. First, pensioners who would have retired, when they lost most of their pension if they worked, could decide to keep working for their organization. This decision to keep working would result in an immediate increase in individuals employed, after the passing of

¹³ There are no data on hours of work, but in this context, one can assume that when a person works it is in a full-time job.

the amendment. Also, this would lead to an increase in the employment rate every year, because the stock of individuals reaching the old-age pension eligibility age would increase every year. Second, pensioners who stopped working could decide to go back to work. This decision to go back to work may not result in an immediate increase in individuals employed, because it could take time for the pensioner to find a desirable job. Unlike the stock of pensioners becoming eligible for an old-age pension, this stock will likely not grow after the amendment, because then pensioners for whom a reduced pension tax rate provides an incentive to work would just continue working. As a result of these two channels, I would expect the share of pensioners employed to go up in 1964, mainly due to continued work, and to keep rising in the following years, due to both people reaching the age to receive an old-age pension and those who retired previously finding desirable employment.

Descriptive evidence suggests that the channel where pensioners choose to keep working in their jobs, after a reduction in the pension tax rate, would be mostly responsible for the increase in employment rates in Russia. The following statistics are based on a study of organizations in several oblasts (Lantsev 1976). It documented that most pensioners stayed in the same occupation: 91 percent of pensioners continued working in the occupation they had before becoming eligible for a pension. Typically, pensioners did not go back to work once they left work. Out of all the working pensioners: 84 percent continued working without a break, while 16 percent went back to work after a break. There were no obligations for a firm to increase its re-employment of previously retired pensioners, because the amendment did not require organizations to take back pensioners who left their jobs beforehand. To the question of whether the amendment required to hire previously retired pensioners, the minister of pension affairs said

that if an organization had a need for workers, and the pensioner could do the task, then he/she could be accepted for a job there (Izvestija 1964).

Because of geographic differences in the reduction in pension taxes, I expect differential geographic increases in employment among old-age pensioners. I expect the eastern regions (Siberian, Far East and Ural regions) to experience a greater percent increase in the employment rate between 1964 and 1969, but a smaller percent increase after 1970 compared to the western regions. The next two statements elaborate on this prediction. First in 1964, I expect a greater percent increase in the employment rate in regions where the tax rate on pensions was reduced to 25% (the eastern regions) compared to regions where the tax rate was reduced to 50% (the western regions). Second in 1970, I expect a greater percent increase in the employment rate in regions where the tax rate on pensions was reduced from 50% to 0% (the western regions) compared to regions where the tax rate was reduced from 25% to 0% (the eastern regions).

Because the amendments only applied to old-age pensioners, I expect only this group of pensioners to experience an increase in employment rates. The pension tax rates for invalidity pensions have not changed in 1964 or in 1970. Thus, I expect a greater increase in employment rates for old-age pensioners compared to other types of pensioners, and I expect this increase to represent the overall effect of moving to a new tax rate.

III. The Effect of Pension Reform on Employment Rates of Pensioners: Comparison of Areas with Different Pension Tax Reductions

I analyze whether reducing the tax on pension benefits increases pensioners' labor force participation. To do this, I collected and manually entered data from the RGAE archives in Moscow. These data were not released to the public, and were only used internally during the Soviet period. These documents only became available to the public after the Soviet Union

collapse. Thus, these are the most reliable data on employment statistics for the time period. These data are tabulated on standardized reporting forms and include data on the number of individuals eligible for different types of pensions, and of those the number who are employed in the Russian Soviet Federal Socialist Republic (RSFSR). These data are hand-written onto forms and are enumerated as the number of pensioners of each type. These data are by oblast and span the years from 1960 to 1975. Each of these counts are as of January 1 in every year, and so measure the number of individuals employed over the previous year. I use these data to calculate employment rates of individuals eligible to receive a pension. The sample excludes collective farmers, because they had a different system of pension rules that applied to them.¹⁴

A. Descriptive Evidence on Employment Responses to Pension Reform

The evolution of employment rates in the eastern and western regions provides evidence of a positive effect of reducing pension taxes on employment rates. The first piece of evidence comes from the evolution of employment rates before and after 1964. After 1964 the eastern regions experienced a greater reduction in the pension tax compared to the western regions. Figure 2 plots employment rates of old-age pensioners in the eastern and western regions. Before 1964, employment rates of old-age pensioners were fairly low, 9.5 percent of those who were eligible for old-age pensions were employed in 1963. Employment rates followed similar trends in the eastern and western regions. Employment rates increased in both regions starting from 1964, which is consistent with the reduction in the tax on pensions in both regions. However, the percent increase in employment rates was greater in the eastern compared to the western regions.

¹⁴ The results of this study apply to all workers except for collective farmers. In 1964, there was a legislation that also unified the rules for pensions of collective farmers in one national law (Profizdat 1966). As a result, more collective farmers became eligible for pensions. This does not affect the results in this study, because they are excluded from my data-set.

Further, employment rates were increasing at a faster rate in the eastern regions. These trends are consistent with a greater increase in employment rates for greater pension tax reductions.

The second piece of evidence comes from the evolution of employment rates before and after 1970. After 1970 the western regions experienced a greater pension tax decline compared to the eastern regions. By 1968, employment rates in the eastern regions grew substantially closer to the western regions: from the difference of 2.9 percentage points in 1964 to a difference of 1.5 percentage points in 1968. However, employment rates increased by more in 1971 in the western regions compared to the eastern regions: from the difference of 1.5 percentage points in 1968 to a difference of 2.7 percentage points in 1970.

B. Generalized Differences-in-Differences Framework

I exploit the effect of two amendments that reduced the tax rate on pensions, which together help paint a richer picture of the effects of taxing pensions on labor supply. First, I quantify the effect of changing the tax rate from 50 to 25 percent. To do this, I exploit the differential effect on regions of the 1964 amendment in a generalized differences-in-differences framework to adjust the raw comparisons for other covariates and construct confidence intervals (Jacobson et al. 1993). The specification is,

$$\log(E_{o,y}) = \alpha + \gamma_o + \delta_y + \sum_{t=59}^{62} \theta_t * D_o * 1(y = t) + \sum_{t=64}^{67} \pi_t * D_o * 1(y = t) + X_{o,y} + \epsilon_{o,y} \quad (1)$$

where $E_{o,y}$ is the employment rate among individuals eligible to receive a pension in oblast, o , and year, y ; γ_o are oblast fixed effects that capture time-invariant oblast level differences, δ_y are year fixed effects that capture changes common to all oblasts, and D_o equals to 1 if it is an eastern region. The regression also includes a limited set of covariates that vary at the year and

oblast level: wages and overall employment rates.¹⁵ These covariates allow me to test for whether the change in old-age employment rates was due to other changes across regions.¹⁶ The dummy for the year before the start of the amendment, $1(y = 1963)$, is omitted which normalizes the estimates for θ and π to zero in 1963. The point estimates of interest, θ and π , directly test whether employment rates were on parallel trends before the amendment and whether estimates diverged after the amendment.

I use the logged dependent variable, because oblasts have different levels of employment rates, where the employment rates are on average 3 percentage points higher in the eastern relative to the western regions in 1963. The coefficients π_{1964} to π_{1968} capture the percent change in the employment rate in the eastern regions, where the coefficients measure the percent change in the employment rate if the tax rate on pensions dropped from 50 to 25 percent. This is smaller than the total effect in the eastern regions, because it quantifies the additional change in employment rates to the one already generated when the tax rate drops to 50% as it did in the western regions. This strategy implicitly assumes that the percent increase in the eastern regions if their tax rate were reduced to 50% (instead of a reduction to 25% that actually happened) would have been the same as in the western regions.

Second, I quantify the effect of changing the tax rate on pensions from 25 to 0 percent. To do this, I quantify the differential effect on regions of the 1970 amendment in a generalized differences-in-differences framework. The specification is,

$$\log(E_{o,y}) = \alpha + \gamma_o + \delta_y + \sum_{t=65}^{67} \theta_t * D_1 * 1(y = t) + \sum_{t=70}^{75} \pi_t * D_o * 1(y = t) + X_{o,y} + \epsilon_{o,y} \quad (2)$$

¹⁵ These covariate data were also collected in the archives by Elizabeth Brainerd, who has generously shared them with me.

¹⁶ The inclusion of these covariates does not affect my estimates of the effect of the pension reform.

where D_1 is a dummy for a western region, and the dummy for the year before the start of the reform, $1(y = 1968)$, is omitted. The coefficients π_{70} to π_{75} capture the percent change in employment in western regions, where the coefficients measure the percent change in employment rates if the tax rate on pensions dropped from 25% to 0%. This is smaller than the total effect in the western regions, because this measures the additional change in employment rates to the one already generated when the tax rate drops from 50 to 25 percent. This strategy implicitly assumes that the percent increase in employment rates in the western regions if their tax rate were moved from 50 to 25 percent would have been the same as in the eastern regions when their tax rate was moved from 25 to 0 percent.

C. Results:

Figure 3 displays estimates from specification (1), representing the covariate-adjusted differences in employment rates between the eastern and western regions compared to the difference in 1963. The results are weighted by the number of pensioners in 1963 in each oblast. Standard errors are clustered at the oblast-level to allow for an arbitrary correlation structure within an oblast.

These results indicate that lowering the tax on pensions increases employment rates of old-age pensioners. First, there is no difference in the employment rate trends in the eastern and western regions five years before the 1964 amendment. The point estimates for years 1960 to 1962 are individually indistinguishable from zero and follow a flat trend. Second, the difference between the eastern and western regions rises starting from 1964, which coincides with the amendment.

Employment rates rose immediately in the year when taxes were lowered on pensions. The increase was greater in the eastern relative to the western regions, consistent with their

greater reduction in the pension tax rate. This greater increase in employment rates can be translated into a 10 percent increase in employment when the tax rate on pensions moves from 50 to 25 percent during the year of the amendment (1964), and a 24 percent increase in employment five years after the amendment (1968).

Similarly to the results from the 1964 amendment, employment rates had a greater increase in the western regions that experience a greater reduction in the tax rate on pensions after the 1970 amendment. Figure 4 displays estimates from specification (2), representing the covariate-adjusted differences in employment rates between the eastern and western regions compared to the difference in 1968. This greater increase can be translated into a 6 percent increase in employment when the tax rate on pensions moves from 25 to 0 percent one year after the amendment (1971), and a 7 percent increase in employment five years after the amendment (1975). The trends in employment rates across the eastern and western regions differ during the period from 1965 to 1968, but this is consistent with the eastern regions experiencing a greater increase in employment rates as a result of the 1964 amendment. However, after 1970 there is a trend break in the difference between the eastern and western regions, providing suggestive evidence of the effect of the 1970 reform. Moreover, the estimated effects of this reform are under-estimates, because of the differential pre-trends before the reform.

IV. The Effect of Pension Reform on Employment Rates of Pensioners: Comparison of Pensioners with and without Tax Reductions

Next, I quantify the overall effect of the 1964 amendment, when changing the pension tax rate to 25 percent and 50 percent separately. To do this, I exploit the fact that only old-age pensioners were eligible for the tax reductions while other types of pensioners were not. The following specification follows a generalized difference in difference framework,

$$\log(E_{o,y,p}) = \alpha + \gamma_{o,p} + \delta_y + \delta_{o,y} + \sum_{t=59}^{62} \bar{\theta}_t * D_p * 1(y = t) + \sum_{t=64}^{68} \bar{\pi}_t * D_p * 1(y = t) + \epsilon_{o,y,p} \quad (3)$$

Where $E_{o,y,p}$ is the employment rate in oblast, o , year, y , and for a pensioner of type, p ; $\gamma_{o,p}$ are oblast fixed effects for each pensioner type, and D_p equals one for an old-age pensioner. The oblast by year fixed effects, $\delta_{o,y}$, allow me to control for the differential evolution of covariates in different oblasts across time. I perform these regressions using three samples: all oblasts, the western regions, and the eastern regions. The coefficients of interest are, $\overline{\pi}_{64}$ to $\overline{\pi}_{68}$, which measure the effect of reducing the pension tax rate in three cases. In the eastern regions it measures the effect of reducing the tax to 25%; in the western regions it measures the effect of reducing the tax to 50%; while using all oblasts it measures the combined effect of the tax reductions for the whole country. Before the amendment, the average tax on pensions was 84 percent.

Figure 5 displays estimates from specification (3), representing the covariate-adjusted differences in employment rates between old-age and invalidity pensioners compared to the difference in 1963.¹⁷ The results are weighted by the number of pensioners of each type in 1963 in each oblast. Standard errors are clustered at the oblast-level to allow for an arbitrary correlation structure within an oblast.

These results indicate that lowering the tax on pensions increases the employment rate of old-age pensioners. When using all areas, moving from almost full taxation (on average 84%) to substantial reductions in pension taxes (some areas to 25% and some areas to 50%) increases the employment rate by 27% in the year of the amendment (1964), and by 70 percent five years after the amendment (1968). The regression results point to similar trends four years prior to the amendment. For the eastern regions (25 oblasts, where the tax rate was reduced to 25 percent), in the year of the amendment employment went up by 35 percent, while five years after the

¹⁷ The results do not change when I also include other types of pensioners in the control group for whom the amendment did not change the tax rate on pensions.

amendment employment went up by 103 percent. For the western regions (48 oblasts, where the tax rate was reduced to 50 percent), in the year of the amendment employment went up by 22 percent, while five years after the amendment employment went up by 56 percent. Again, these findings support the previous finding of a greater increase in employment in areas with the greatest decrease in the tax rate on pensions.

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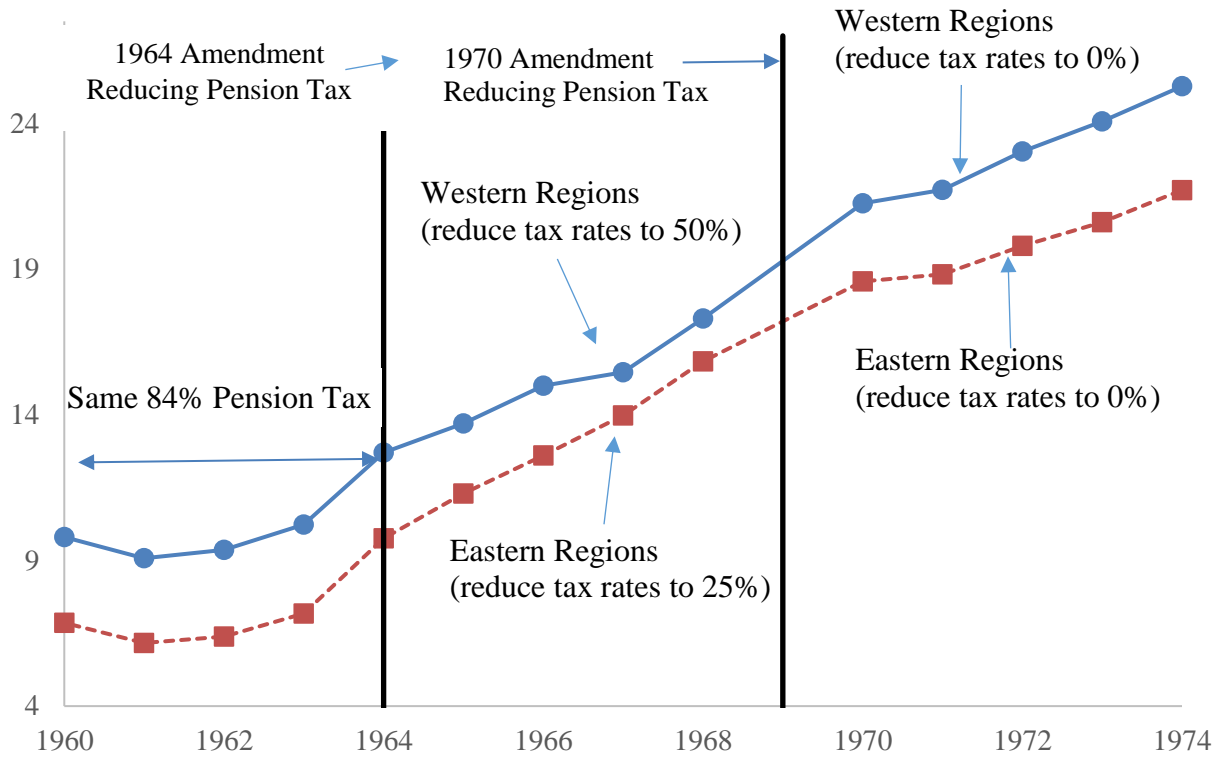
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Figure 1. Map of Differential Tax Reductions across Russia



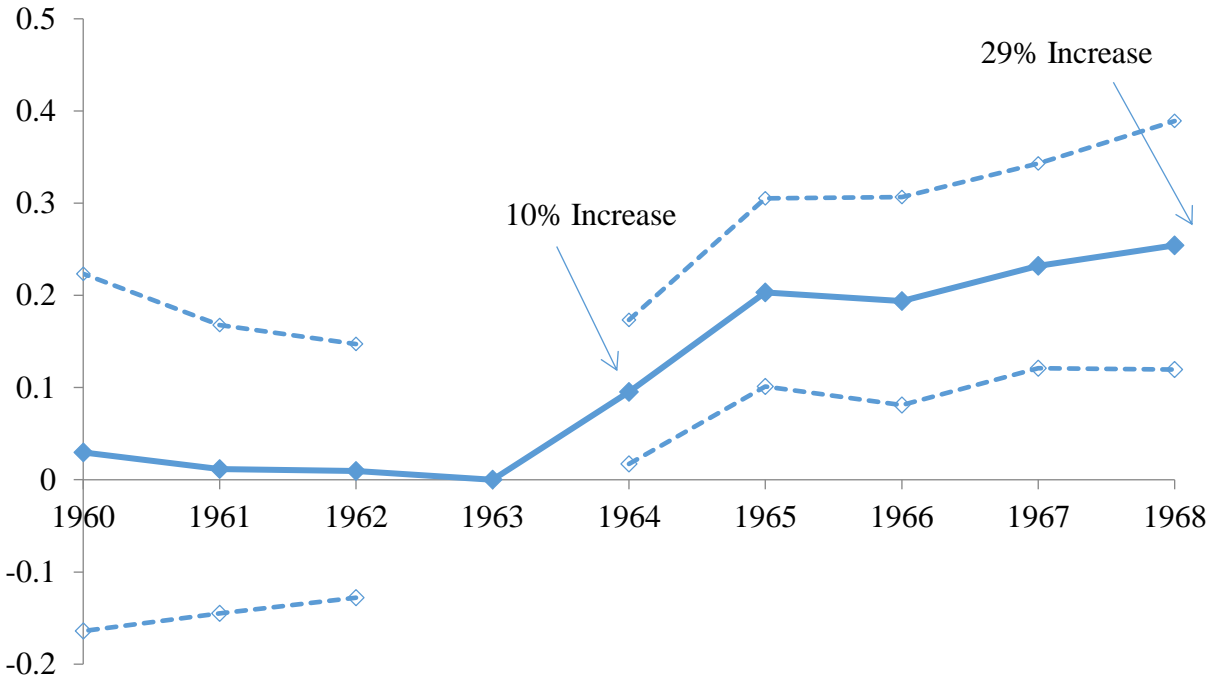
Notes: The eastern regions are shaded (the Urals, Siberia and the Far East), while the western regions are white. Before 1964, both the eastern and the western regions of Russia had the same high tax rate on pensions of 84%. This tax applied to individuals eligible for old-age pensions, and who continued working. Between 1964 and 1969, the tax rate went down to 25% in the eastern regions, while it went down to 50% in the western regions. After 1970, the tax rate went down to 0% in both the eastern and the western regions.

Figure 2. Descriptive Evidence on the Effect of the 1964 and 1970 Amendments Reducing Tax on Pensions on Employment Rates



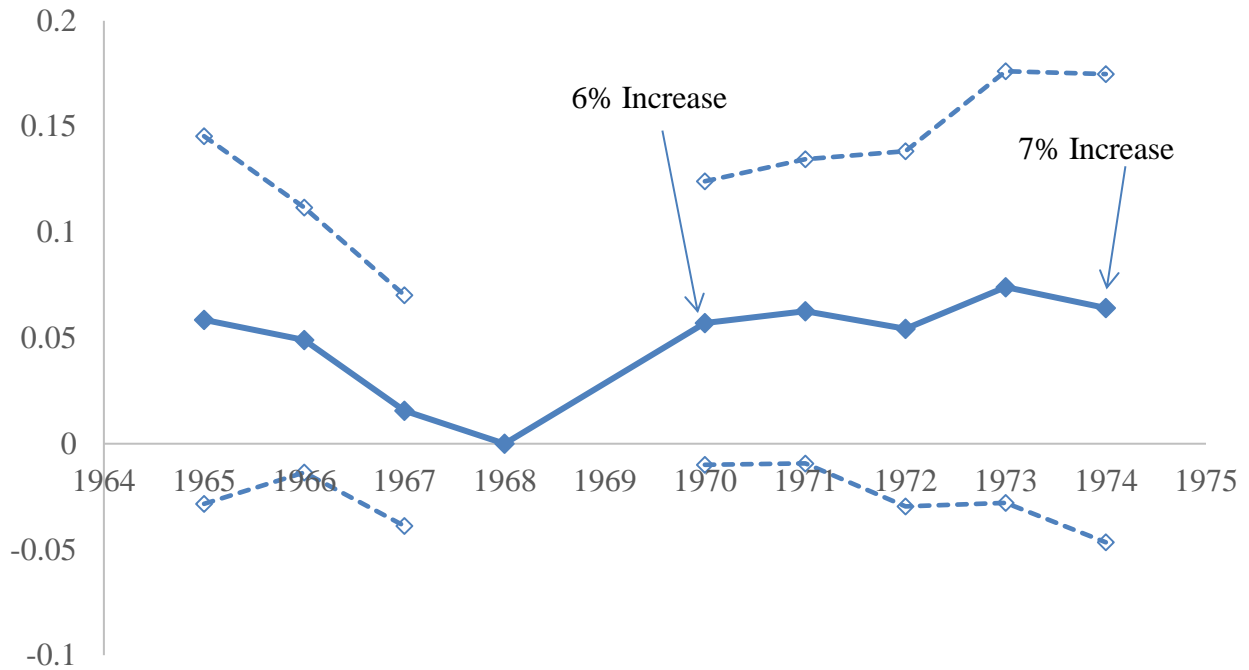
Notes: The figure plots the evolution of employment rates among old-age pensioners in the eastern and western regions. The eastern regions include the Urals, Siberia and the Far East, while the western regions include the rest of Russia. Before 1964, both the eastern and the western regions of Russia had the same high tax rate on pension of 84%. Between 1964 and 1969, the tax rate went down to 25% in the eastern regions, and it went down to 50% in the western regions. After 1970, the tax rate went down to 0% in both the eastern and the western regions. Source: RGAE archives.

Figure 3. Effect of the 1964 Reduction of Pension Tax on Employment Rates of Old-age Pensioners: Eastern relative to Western Regions



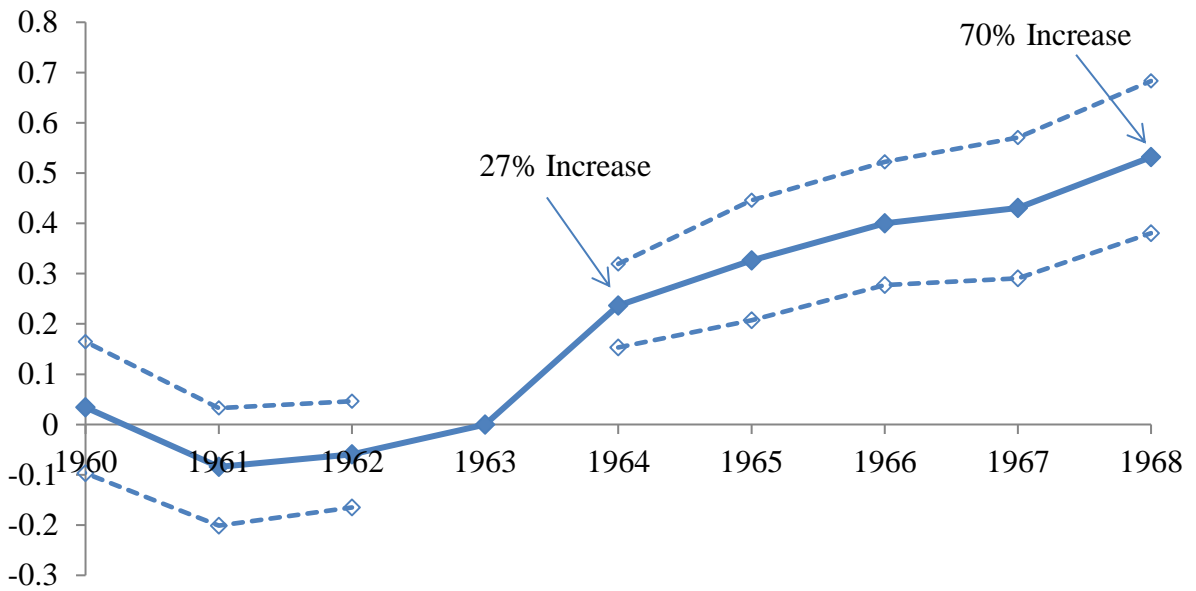
Notes: These coefficients represent the difference in employment rates between the eastern and western regions in each year relative to the difference in 1963. The eastern regions are the treatment group. I present θ and π from equation (1) using old-age employment rates as a dependent variable. The coefficient on year 1964 presents the effect of the tax reduction from 50 to 25% in the year of the amendment, while the coefficient on year 1968 presents this effect five years after the amendment. Heteroskedasticity-robust standard errors clustered by oblast construct 95-percent, point-wise confidence intervals (dashed lines). Regressions are weighted by the number of old-age pensioners in an oblast in 1963. Source: RGAE archives.

Figure 4. Effect of the 1970 Reduction of Pension Tax on Employment Rates of Old-age Pensioners: Western relative to Eastern Regions



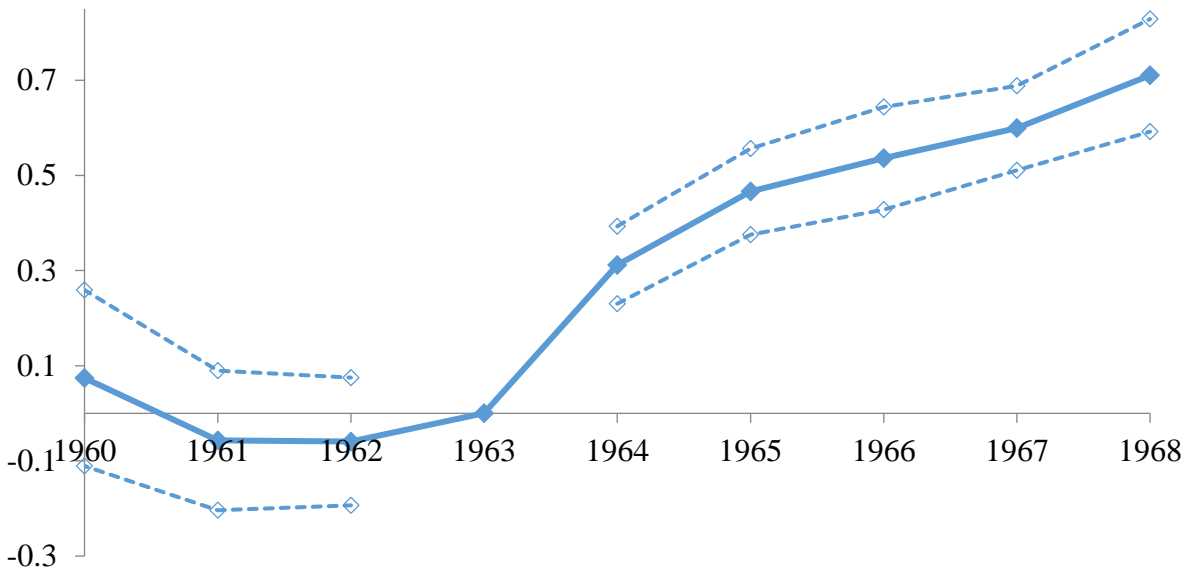
Notes: These coefficients represent the difference in employment rates between the western and eastern regions in each year relative to the difference in 1968. The western regions are the treatment group. I present coefficients from equation (2) using the old-age employment rate as a dependent variable. The coefficient on year 1970 represents the effect of the tax reduction from 25 to 0% in the year of the amendment, while the coefficient on year 1974 presents the effect five years after the amendment. See notes for figure 2.

Figure 5. Effect of 1964 Reduction of Pension Tax on Employment Rates of Old-Age Pensioners



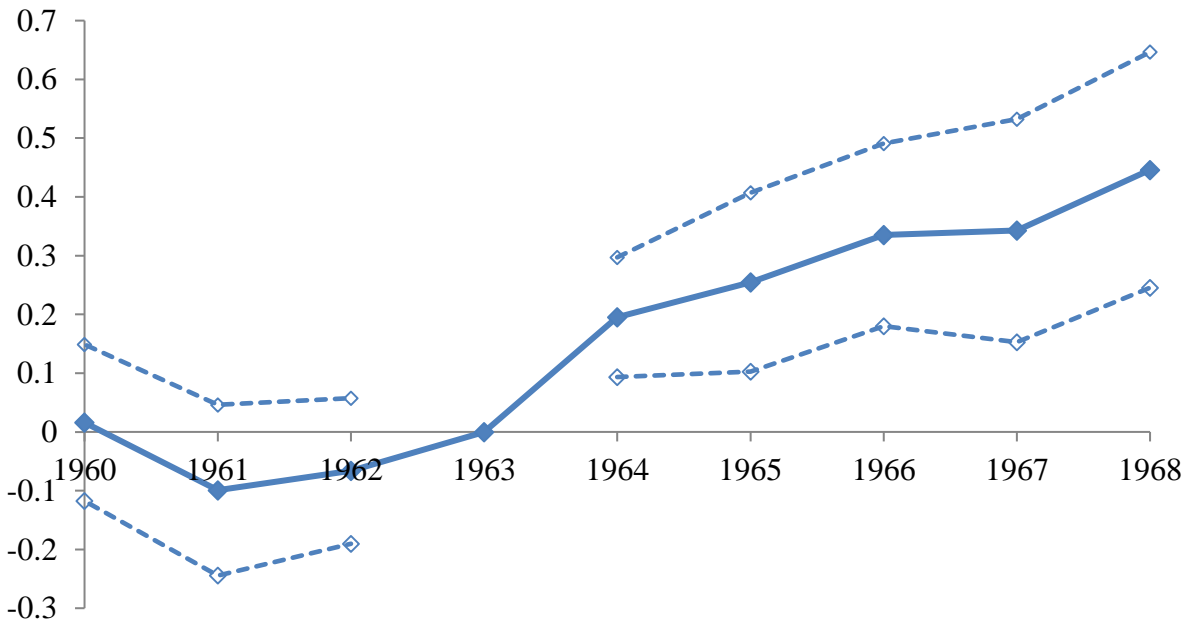
Notes: These coefficients represent the difference in employment rates between old-age and invalidity pensioners in each year relative to the difference in 1963. I present coefficients from equation (3) using the employment rate as a dependent variable. The coefficient on year 1964 presents the overall effect of reducing the tax rate on old-age pensions (from 84% to either 25% or 50%) in the first year of the amendment, while the coefficient on year 1968 presents the overall effect five years after the amendment. Heteroskedasticity-robust standard errors clustered by oblast construct 95-percent, point-wise confidence intervals (dashed lines). Regressions are weighted by the number of pensioners in an oblast in 1963. Source: RGAE archives.

Figure 6. Effect of 1964 Reduction of Pension Tax on Employment Rates of Old-Age Pensioners: Eastern Regions



Notes: The sample in this regression consists of 25 eastern regions where the tax rate on pensions if a pensioner worked was reduced to 25%. Thus, the coefficients measure the effect of reducing the pension tax rate from 84% to 25%. See notes for figure 4.

Figure 7. Effect of 1964 Reduction of Pension Tax on Employment Rates of Old-Age Pensioners: Western Regions



Notes: The sample in this regression consists of 48 western regions where the tax rate on pensions if a pensioner worked was reduced from 84% to 50%. Thus, the coefficients measure the effect of reducing the pension tax rate to 50%. See notes for figure 4.

Table 1. Taxes on Pensions in the Eastern and Western Regions of Russia

| | Before 1964 | 1964 to 1969 | After 1970 |
|-----------------|--------------------|---------------------|-------------------|
| Eastern Regions | 84% | 25% | 0% |
| Western Regions | 84% | 50% | 0% |

Notes: These represent the share of pensions that will be taxed away if a person who is eligible for an old-age pension continues to work. This tax was reduced from 84% to 25 % in the eastern regions between 1964 and 1969, and further reduced from 25% to 0% in these regions after 1970. This tax was reduced from 84% to 50% in the western regions between 1964 and 1969, and further reduced from 50% to 0% in these regions after 1970.

Table 2. Characteristics of the Eastern and Western Regions of Russia

| | Eastern Regions | Western Regions |
|---|------------------------|------------------------|
| % Employed | 74.1 | 76.9 |
| % at least High School | 22.1 | 29.5 |
| % at least Some College | 4.9 | 8.3 |
| % Blue Collar | 74.3 | 69.8 |
| Number of Oblasts | 25 | 48 |
| Share of Old-Age Pensioners Living in Oblasts | 24.5 | 75.5 |

Notes: These statistics are based on the entire population of Russia. Source: 1959 Russian census.

APPENDIX A

DESCRIPTION OF PENSIONS AND PENSION REFORM

Old-age Pensions

Individuals could receive some of their old-age pension, even if they have not worked the number of years required to receive the full pension. In this case, if a person worked no less than 5 years (including no less than 3 years before asking for the pension benefits), the pension was proportional to the number of years worked, but no less than a quarter of the full pension. For work in jobs under difficult conditions (underground work, harmful work conditions and in hot shops) men could start receiving pensions at the age of 55 if they worked no less than 25 years, while women could start receiving pensions at the age of 50 if they worked no less than 20 years. Individuals were eligible for these pensions if no less than half of their work years were spent in these jobs, regardless of the place of the last job.

It was possible for the pension to go up, after it was first determined. If a person eligible for a pension worked after becoming eligible for no less than 2 years with a higher salary, than the one used to calculate the pension, then their pension was recalculated for a higher amount.

The size of the pension depended on the level of monthly earnings. If monthly earnings, y , were less than or equal to 35 rubles, then received 100% of the salary; $35 < y < 50$ then 85%, $50 < y \leq 60$ then 75%, $60 < y \leq 80$ then 65%, $80 < y \leq 100$ then 55%, $y > 100$ then 50%. The maximum pension was 120 rubles, while the minimum pension was 30 rubles. If worked under difficult conditions: $y \leq 35$, then 100%; $35 < y < 50$ then 90%, $50 < y \leq 60$ then 80%, $60 < y \leq 80$ then 70%, $80 < y \leq 100$ then 60%, $y > 100$ then 55%. The minimum pension was 30 rubles. Residents of rural areas who were connected to rural production received 85 percent of the pension size of all other workers.

If a person had an unbroken service record greater than 15 years, they received a 10 percent addition to their pension. If a pensioner was supporting family who could not work: if they supported one such person they received an additional 10 percent added to their pension, for two or more they received an additional 15 percent.

If a person were eligible for a partial pension because he did not work enough years, then if he worked he could not receive this pension. Individuals received this pension for life regardless of their capacity to work. Individuals could also receive additions to pensions based on their length of service and if they were supporting family members. If a person was working in difficult conditions, then he received 50 percent of the pension regardless of salary if he continued working after becoming eligible for the pension.

Invalidity Pensions

If you are an invalid from a general illness before age 20, then you get the pension regardless of length of service. For men: age 20-23 need to have worked at least 2 years, age 23-26 need 3

years, age 26 to 31 need 5 years, age 31-36 need 7 years, age 36-41 need 10 years, age 41-46 need 12 years, age 46-51 need 14 years, age 51-56 need 16 years, age 56-61 need 18 years, age 61 and over need 20 years.

The following rules apply to those disabled from injuries on the job, and the numbers in parentheses apply to those disabled from a general illness. Type 1 disabled, received 100% (85%) of salary under 50 rubles per month, and 10% from the remaining salary; type 2 disabled received 90% (65%) of salary under 45 rubles and 10% of the remaining salary; type 3 disabled received 65% (45%) of salary under 40 rubles and 10% of the remaining salary. Minimum pension was: 36 rubles (30 rubles) for type 1, 28.5 rubles (23 rubles) for type 2 and 21 rubles (16 rubles) for type 3. Maximum pension was 120 rubles (90 rubles) for type 1, 90 rubles (60 rubles) for type 2 and 45 rubles (40 rubles) for type 3. Workers in difficult conditions received higher pensions, and could get them if worked no less than half of the time in these jobs.

If became an invalid as a result of army service then: type 1 received 100 percent of salary under 50, and above that 10 percent from the remaining; type 2 received 90 percent from salary under 45 rubles and above that 10 percent of the remaining salary; type 3 received 65 percent of salary under 40 rubles and above that 10 percent of the remaining salary. They received more if they worked in work in difficult conditions. The minimum pension size was: (type 1) 38.5 rubles, (type 2) 28.5 rubles, (type 3) 21 rubles. The maximum was: (type 1) 120 rubles, (type 2) 90 rubles, (type 3) 45 rubles. If became an invalid from other reasons then get: (type 1) get 85 percent of salary under 50 rubles and above that 10 percent of the remaining salary, (type 2) got 65 percent of salary under 45 rubles and above that 10 percent of the remaining salary, and (type 3) 45 percent of salary under 40 rubles and above that 10 percent of the remaining salary. The minimum was: (type 1) was 33 rubles, (type 2) 23 rubles, (type 3) 16 rubles. Maximum: (type 1) 90 rubles, (type 2), 60 rubles, (type 3) 40 rubles.

Details of the Pension Reforms

1964 Reform

The following is a general list of eligible occupations for the 1964 reform: workers engaged in the provision of material services; junior service staff and workers in communication, engineering-technical workers (at organizations for industry, building, and transportation (except for railroads and city transport), communications, consumer services, and businesses that produce agricultural goods); sellers; cooks; doctors and medical staff in medical care and preschool facilities, nursing homes; pharmacists; kindergarten, primary and secondary school teachers.¹⁸ The sum of the monthly pension and salary an old-age pensioner received could not

¹⁸ Here are some types of workers that could qualify as those providing material services: manage or service machines, mechanisms; supervision and management of work of machines, manual making of instruments, repair of equipment, building and repair of buildings, transportation, loading and unloading of raw materials, finished products, work on the reception, accepting, storage and sending of goods in repositories if they mostly perform work to transport the goods; also workers who work as drivers of trucks, taxis, and buses, or conductor, repair of transportation and communication lines.

exceed 200 rubles. If the sum exceeded 200 rubles, then subtractions were made from the pension such that the sum was equal to 200 rubles.

During the period from 1966 to 1967, individuals employed in certain occupations received the right to their full pension if they continued to work (Lantsev 1976). Here is a list of occupations: nurses in hospitals, polyclinics and nursing homes; takers of orders and cleaning ladies in consumer services businesses, workers in food and meat processing organizations in the period of mass processing of perishable goods which was no longer than four months per year.

1970 reform

Many of the occupations matched those eligible for a lower tax rate on pensions in 1964 with some exceptions: some occupations present in the 1964 list were excluded, while some not present were added. The list excluded engineering-technical workers, pharmacists, and teachers in urban areas, but it added accountants, insurance agents and workers in the food industry.¹⁹

Pensions continued to be taxed at a 25% rate in the Urals, Siberia and the Far East, and at 50% in the rest of Russia for some occupations. These occupations mainly included those that became eligible for tax reductions after the 1964 law, but not eligible for the full reduction in 1970.²⁰

Pensions continued to be taxed at a 25% rate in the Urals, Siberia and the Far East, and at 50% in the rest of Russia for some occupations. These occupations mainly included those that became eligible for tax reductions after the 1964 law, but not eligible for the full reduction in 1970.²¹

¹⁹ The more detailed list of occupations eligible to keep their entire pension if they worked included: workers engaged in the provision of material services; junior service staff regardless of place of work; postmen, telecom operators, sorters at the post office and printing press companies, telegraphers at the printing press; sellers, cashiers, cooks, waiters, foremen at building companies; controllers and accountants who work in banks and savings banks, insurance agents; some categories of communications workers; workers in the food industry and consumer services; medical staff at health care facilities, preschools, and nursing homes, the red cross; doctors at hospitals, polyclinics, dentist offices, clinics, sanatoriums, emergency rooms and nursing homes; teachers in kindergarten, primary, secondary and technical schools in rural areas.

²⁰ The more detailed list of occupations that continued receiving tax reductions from the 1964 amendment included: some categories of communications workers, engineering-technical workers in the same organizations as under the 1964 amendment, doctors at sanitary care facilities, preschools, and forensic medical examination facilities, pharmacists, teachers of kindergarten, primary, secondary and technical schools in urban areas, and train controllers

²¹ The more detailed list of occupations that continued receiving tax reductions from the 1964 amendment included: some categories of communications workers, engineering-technical workers in the same organizations as under the 1964 amendment, doctors at sanitary care facilities, preschools, and forensic medical examination facilities, pharmacists, teachers of kindergarten, primary, secondary and technical schools in urban areas, and train controllers