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**Article**

## Incentive and Redistribution Effects of the "Karlsruher Entwurf zur Reform des Einkommensteuergesetzes"

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## Discussion

### Incentive and Redistribution Effects of the „Karlsruher Entwurf zur Reform des Einkommensteuergesetzes“

#### The Case of Married Couples

By Gerhard Wagenhals\*

#### Abstract

This paper studies the economic incentives and distributional impacts of a recent tax reform proposal, the “Karlsruher Entwurf zur Reform des Einkommensteuergesetzes”, on married couples in the Federal Republic of Germany. The approach is based on *GMOD*, a comprehensive microsimulation model for taxes, social security contributions and transfers in the Federal Republic of Germany, which is combined with a microeconomic behavioral model. The main findings of the paper are: (1) Most families profit from the reform. (2) Women with children tend to work less. (3) Inequality increases mainly due to a redistribution towards families with children. (4) On average, absolute cash gains increase, but relative cash gains decline with increasing gross household incomes. (5) The main winners of the reform are families with children.

#### Zusammenfassung

Dieser Beitrag analysiert die ökonomischen Anreiz- und Verteilungswirkungen des Karlsruher Entwurfs zur Reform des Einkommensteuergesetzes für verheiratete Paare in der Bundesrepublik Deutschland. Der Ansatz beruht auf *GMOD*, einem umfassenden Mikrosimulationsmodell für Steuern, Sozialversicherungsbeiträge und Transfers in der Bundesrepublik Deutschland, das mit einem mikroökonomischen Verhaltensmodell kombiniert ist. Die Hauptergebnisse der Arbeit sind: (1) Die meisten Familien profitieren von der Reform. (2) Das Arbeitsangebot von Frauen mit Kindern verringert sich tendenziell. (3) Die ökonomische Ungleichheit erhöht sich vor allem wegen einer Umverteilung zugunsten von Familien mit Kindern. (4) Mit zunehmenden Einkünften aus erwerbswirtschaftlichem Handeln erhöhen sich die absoluten und vermindern sich die relativen Zahlungsgewinne im Durchschnitt. (5) Die Hauptgewinner der Reform sind Familien mit Kindern.

*JEL-Classification: H2, C5, J2*

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## Introduction

The German income tax system is highly complex. In many cases, its regulations appear to be arbitrary, it favors special interest groups and lacks a systematic approach. On May 9<sup>th</sup>, 2001, the so-called “Karlsruher Arbeitskreis”, a study-group of prominent, independent tax jurists and tax practitioners headed by Paul Kirchhof proposed a tax reform which would greatly simplify and the German tax system (Kirchhof et al., 2001) by cutting tax rates and broadening the tax base.

The aim of this paper is to assess the impact of this tax reform on married couples. It analyses the impact on work incentives, on income redistribution, and it shows the winners and the losers of this reform.

Economic analyses of tax reforms are often restricted to summarizing conjectured tax revenues and to an assessment of the impact on “typical” (whatever this may mean) but fictitious households without taking into account behavioral responses of households. The results presented here are based on a representative data set (GSOEP) and on *GMOD*, i.e. a comprehensive tax-benefit microsimulation model, which includes a highly flexible microeconomic behavioral model. This combined model allows to assess the impact on tax revenues, on labor supply incentives and on the income distribution of reforms of the German tax, social security and benefit system. It avoids any interpretation-bias which may be caused by an arbitrary selection of “typical households”.

The results of this paper are restricted to married couples, because my main interest is in modeling the impact on labor supply incentives of the Karlsruhe tax reform proposal. Bork (2001) presents a more comprehensive analysis of the distributional impacts of the Karlsruhe tax reform proposal, but he neglects behavioral response. However, it will be shown later that this may be a reasonable assumption for the labor supply of married females, because their response turns out to be relatively small. Therefore, in an analysis of the Karlsruhe tax reform proposal, incentive impacts may be ignored in a first order approximation, thus justifying the approach of Bork (2001) and the Federal Ministry of Finance (see Kirchhof et al., 2001, p. 33–36). It is no surprise, therefore, that my aggregation to population totals is in line with the results of Bork and Kirchhof et al., and I do not repeat these figures here.

In principle, macroeconomic repercussions of the tax reform, e.g. by increasing taxes elsewhere, could be integrated in the model. However, the corresponding policy measures must be precisely formulated so that they can be converted into computer code. At the time being, this is not the case. The integration of the model in a numerically implemented intertemporal computable equilibrium model is possible, because the approach used in

this study is compatible with the assumption of life cycle optimization unlike most other labor supply models. But this paper does not attempt at such a comprehensive macroeconomic analysis of the tax reform proposal. Its aim is far more modest: It just tries to assess the impact of the tax reform on labor supply incentives and income distribution, where it focuses on a precise mapping and analysis of the reform.

### Model

This paper is based on a comprehensive microsimulation model for individual income taxes, social security contributions and transfers in Germany (see e.g. Wagenhals, 1998, 1999), and on a microeconomic labor supply model with endogenous labor force participation, wages and non-labor income. The model is estimated based on data of 23,873 married couples (with and without children) for the financial years 1984 – 1997.

The microeconomic behavioral model on which my simulations are based is explained in detail in Wagenhals (2000, 2001). Following Blundell, Duncan and Meghir (1998) I exploit the effects of a sequence of tax, social security and transfer system reforms which took place in Germany, to identify and estimate the labor supply of married women. Thus, to identify the model I define groups whose post-tax wages and other income have changed differently over time (see Wagenhals, 2001, for details).

To implement the model, first three linear reduced forms are estimated. They explain the labor force participation of married women, their wages and other income of the households<sup>1</sup>. In the reduced form the right-hand-side variables are the effective marginal tax rate when a woman does not work, a complete set of group variables, time variables, group-time-interaction variables and demographic variables. I assume a linear relationship between the age of the youngest child and labor supply. The participation equation is modeled using a probit approach estimated on the entire sample. The hazard rate generated serves as an additional regressor in the wage equation to allow for a potential selection bias.

I specify the equation of weekly hours of work (h) of female *i* in period *t*

$$h_{it} = a_g + m_t + \theta^T d_{it} + \beta \ln w_{it} + \gamma \mu_{it} + \delta^p v_{it}^p + \delta^w v_{it}^w + \delta^\mu v_{it}^\mu + e_{it}$$

where  $a_g$  are group dummies, the  $m_t$  are tax year dummies,  $d_{it}$  is a vector of demographic variables,  $\ln w_{it}$  and  $\mu_{it}$  are the individual levels of log after-

<sup>1</sup> Other income mainly includes the husband's labor income. This variable is endogenous, but I do not model it using a structural equation.

tax wages and other income (i.e. consumption minus labor income of the woman).  $\nu_{it}^p$  is the hazard rate from the reduced form probit,  $\nu_{it}^w$  and  $\nu_{it}^\mu$  are the residuals from the reduced forms of wages and other income to control for the endogeneity of participation, wages, and other income. My estimation procedure accounts for the fact that the error terms  $e_{it}$  may be dependent across individuals, e.g. reflecting common macroeconomic shocks, and may be correlated with the observables, especially with the wages. It also allows for the generated regressors, for intragroup correlation in the observables and for heteroskedasticity of unknown form.

### Data and Sample Selection

The data used in my empirical analysis are drawn from the German Socio-Economic Panel (GSOEP), 1984–1997. A cleaned subset of 42,331 married couples is used as the input of my microsimulation model *GMOD*.<sup>2</sup> For all private households and/or persons in the sample this model generates a large number of variables, e.g. taxable income, income taxes, social security contributions (for health, old age, unemployment and care insurances) as well as transfers (social assistance, housing benefits and child benefits). Total and marginal tax and social security burdens as well as total and marginal relief due to transfers may be calculated for any individual or household and may be extrapolated to the residential population of the Federal Republic of Germany.

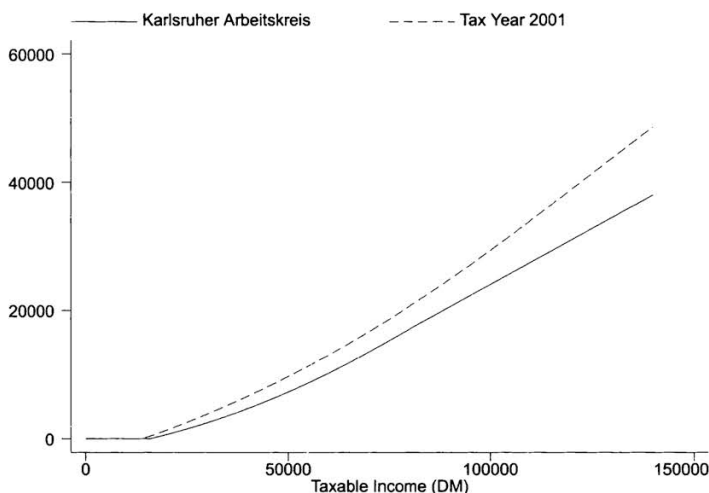
To estimate the parameters of the behavioral model I select from the complete data set of 42,331 married couples a subsample of married women aged between 23 and 55, who do not receive profit income (i.e. income from farming or forestry, income from trade or business or income from independent activities), and who are not eligible for social assistance or housing benefits, if a woman does not work. Finally, civil servants are excluded. The age restriction tries to avoid a mixing of labor supply, education and retirement decisions. I exclude married women with profit incomes because I want to concentrate on employees. To simplify, I concentrate on females who are not eligible for social assistance or housing benefits when they are out of work. Housing benefits and social assistance are means-tested benefits which are taxed away at a rate up to 100 per cent. The budget sets of such households are highly nonconvex, which complicates the estimation of labor supply functions considerably, because labor supply may not be unique or even discontinuous.

<sup>2</sup> See Laisney, Lechner, Staat, Wagenhals 1999, Laisney, Lechner, van Soest, Wagenhals 1993, Staat, Wagenhals 1994, Strøm, Wagenhals 1991, Wagenhals 1990, 1994, 1996a, 1996b, 1998, 1999, 2000, 2001 and Wagenhals, Kraus 1998 for previous applications of the microsimulation model *GMOD*.

After the application of these selection criteria I obtain a sample of 23,873 married couples (with and without children) on which the following analysis is based.

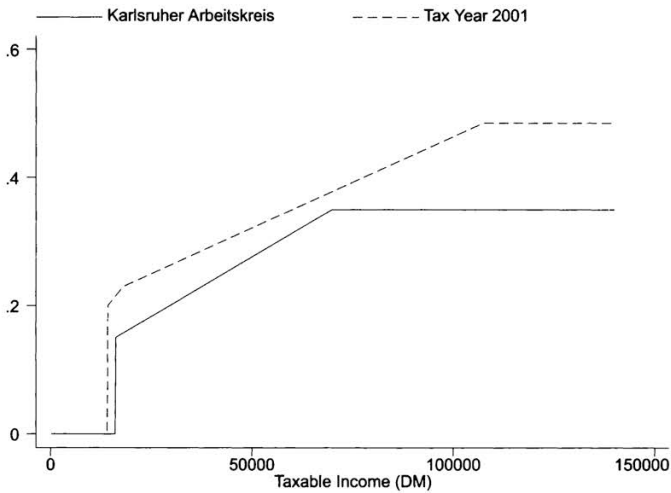
### The “Karlsruher Arbeitskreis” Tax Reform Draft

While the German tax system is extremely complicated and often difficult to apply, the alternative proposed by the “Karlsruher Arbeitskreis” is simple and easy to understand for every citizen. Most importantly, almost all deductions and allowances will be abolished, and there will be only one source of income (“Einkünfte aus erwerbswirtschaftlichem Handeln”) instead of seven different sources which are subject to different deductions and allowances. According to the Karlsruher Arbeitskreis, total and marginal taxes will be reduced significantly (see Figures 1 and 2). The basic tax allowance will increase to 16,000 DM (from some 14,000 DM currently). The basic tax rate will decline to 15% (from 19.9% currently), the top tax rate will decline to 35% (from 48.5% currently). However, the top rate already starts at an income of 70,000 DM instead of 108,000 DM. Last not least, child benefits will increase to 470 DM per month (from currently 270 DM for the first and second child, 300 DM for the third child, and 350 DM for each subsequent child).



Source: Own calculations based on § 32 a EStG (German Income Tax Law) and on § 16 of the “Karlsruher Entwurf zur Reform des Einkommensteuergesetzes” (Kirchhof et al. 2001).

Figure 1. Tax Functions, Karlsruher Arbeitskreis and Tax Year 2001

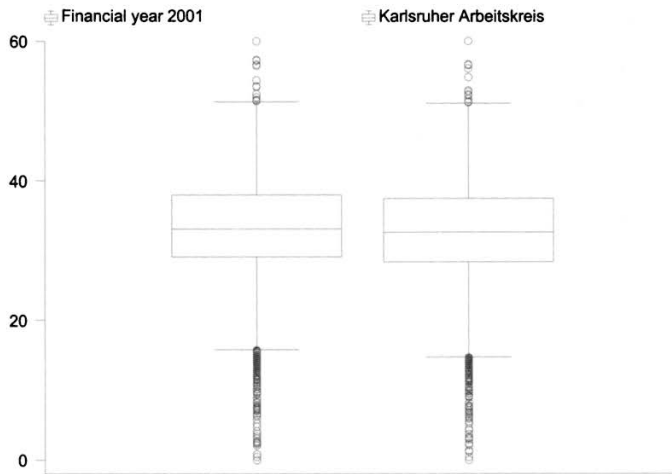


Source: Own calculations based on § 32 a EStG (German Income Tax Law) and on § 16 of the "Karlsruher Entwurf zur Reform des Einkommensteuergesetzes" (Kirchhof et al. 2001).

Figure 2. Marginal Tax Functions, Karlsruhe Arbeitskreis and Tax Year 2001

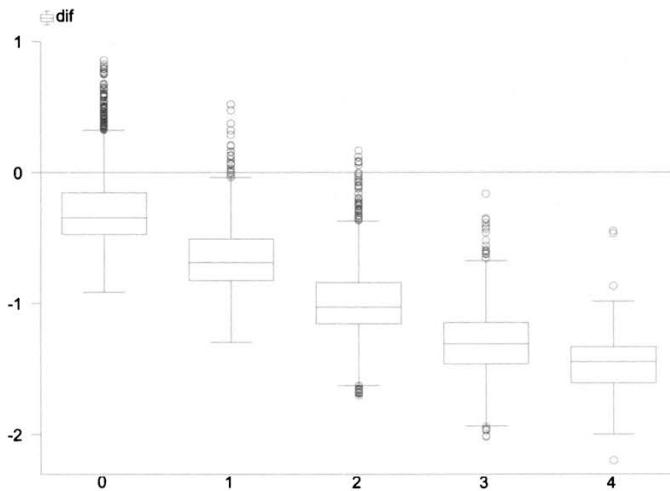
### Impact on Incentives

The labor supply responses of married females are mainly driven by the increases in child benefits, i.e. by a pure income effect. The box plots in Figure 3 show that the labor supply of married women remains almost constant. A closer look shows that it is somewhat reduced. If we say that labor supply does not change if the desired change is less than one hour of work, then some 80% of all individuals do not change their labor supply, while 19% want to work less. If we look at changes in labor supply by number of children in Figure 4, then there is practically no change in labor supply for the women without children. However, more than 50% all of women with two and more children want to reduce their weekly hours of work (though only by a small amount). Thus, many mothers with children reduce their hours of work, and – given labor demand – this small decrease in labor supply might imply a small reduction of unemployment under well-known conditions.



Source: Own calculations.

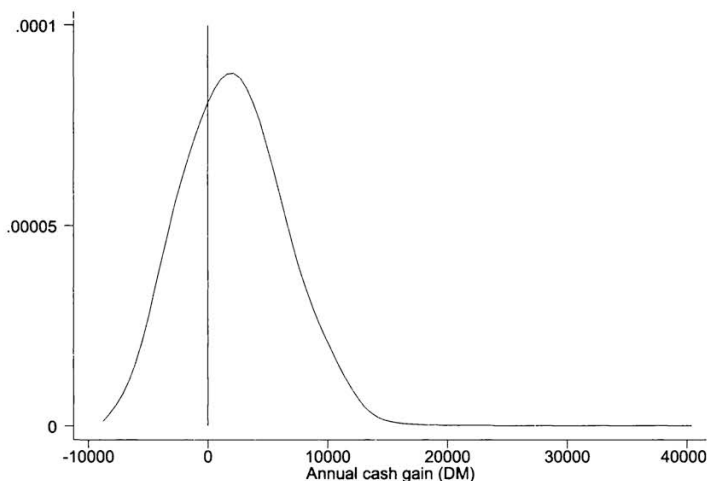
Figure 3. Weekly Hours of Work, Box Plots, Karlsruher Arbeitskreis and Tax Year 2001



Source: Own calculations.

Figure 4. Changes of Weekly Hours of Work by Number of Children, Box Plots



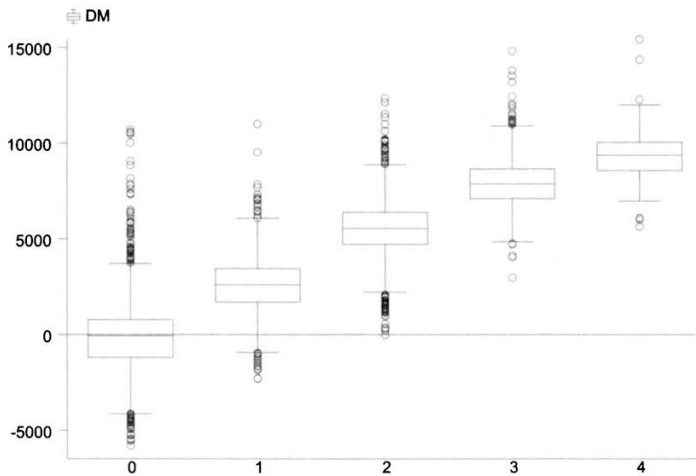


Source: Own calculations.

Figure 5. Annual Cash Gains, Approximation by Kernel Density Estimator

### Cash Gains

We can define the cash gain of a tax reform as the difference between the real net disposable incomes after and before the reform allowing for adjustments in labor supply. Figure 5 shows an estimated density function of the annual cash gain for the Karlsruhe tax reform proposal compared to the tax year 2001. It is based on an Epanechnikov kernel, other kernel types do not change the estimated density significantly. The median cash gain amounts to 1400 DM and the mean to 2300 DM. More illuminative than a look at the annual cash gains averaged over all families is a more detailed look at the average annual cash gains by number of children in Figure 6. It is no surprise that cash gains increase strongly with the number of children.



Source: Own calculations.

Figure 6. Annual Cash Gains, Box Plots by Number of Children

Table 1

**Inequality of Net Disposable Income, Measures and Bootstrap Statistics**

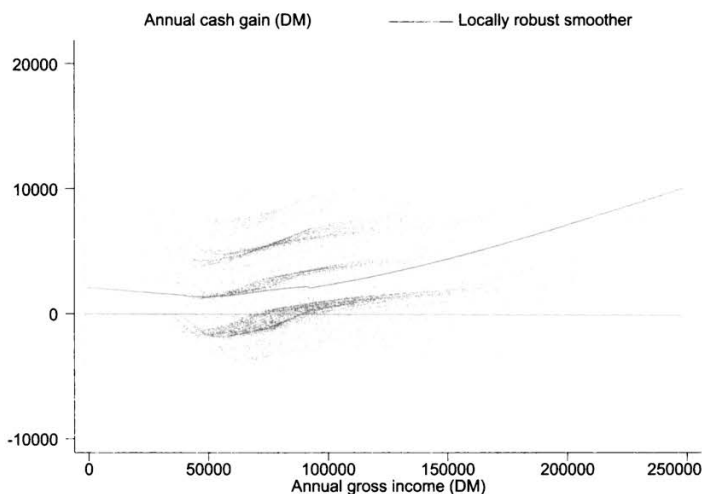
| Measure | Scenario                | Observed | [95% Conf. Interval] |      |
|---------|-------------------------|----------|----------------------|------|
| Gini    | Tax Year 2001           | .169     | .166                 | .173 |
|         | Karlsruher Arbeitskreis | .176     | .173                 | .181 |
|         | Gross income            | .215     | .211                 | .220 |
| Theil   | Tax Year 2001           | .056     | .052                 | .060 |
|         | Karlsruher Arbeitskreis | .061     | .057                 | .067 |
|         | Gross income            | .087     | .081                 | .094 |
| Piesch  | Tax Year 2001           | .139     | .135                 | .142 |
|         | Karlsruher Arbeitskreis | .144     | .140                 | .148 |
|         | Gross income            | .174     | .170                 | .179 |

Source: Own calculations, bias-corrected bootstrap confidence intervals based on 1000 replications

**Income Distribution**

Obviously, the distribution of cash gains shown in Figure 5 has a very fat right tail. This indicates an increase in inequality. To assess the changes in

inequality of net disposable incomes due to the reform Table 1 presents three inequality measures: the indices proposed by Gini, Theil and Piesch<sup>3</sup>. It is well known that the Gini index is most sensitive to changes in the middle income bracket, the Theil (entropy) index to changes in low incomes, and the Piesch index to changes in high incomes. Table 1 shows that all measures indicate an increase compared to the pre-reform status quo. The percentage increase attains its maximum if the bottom-sensitive Theil index is used, and its minimum if the top-sensitive Piesch index is used. The increase in inequality measures is significant when we compare them to their bootstrapped standard errors or their bootstrapped 95% confidence intervals shown in Table 1. However, according to all measures the inequality of the distribution of net disposable income remains still considerably smaller than the inequality of the distribution of gross income.



Source: Own calculations. Nonparametric local regression using a *lowess running-line smoother*.

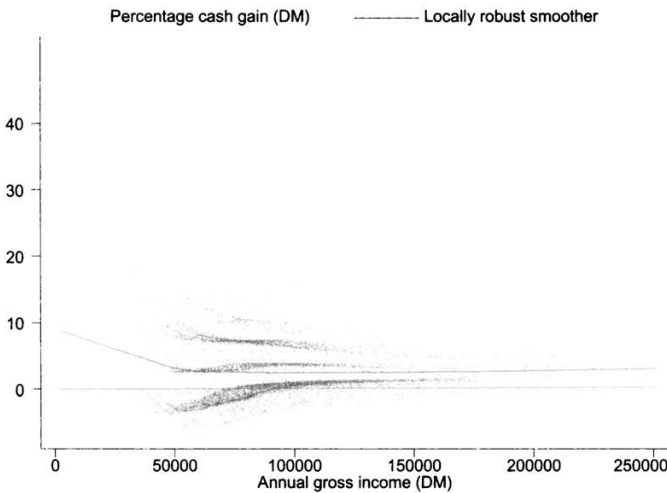
Figure 7. Absolute Relief, Cash Gains by Gross Income

### Who Profits?

The kernel density estimator of the distribution of cash gains has already illustrated that most households will profit from the tax reform. In numbers: After the reform, the real net disposable income of some 71% of all

<sup>3</sup> See Piesch (1975) for a comprehensive survey.

households will be higher than in 2001, for some 28% of the households their real net disposable income declines. Sorting for families with and without kids shows that in the subset of families without children we have 47% winners and 51% losers, but in the subset of families with children we have 99% winners, and only 1% losers. Figure 7 shows the *absolute* relief of the households, measured as annual cash gains, depending on annual gross income, and Cleveland's (1979) nonparametric robust local regression smoother. Not surprisingly, cash gains increase with gross income.



Source: Own calculations. Nonparametric local regression using a *lowess running-line smoother* (Cleveland, 1979).

Figure 8. Relative Relief, Percentage Cash Gains by Gross Income

Figure 8 shows the *relative* relief of the households, measured by the annual cash gains as percentage of the annual gross income. The relief for households with very small incomes amounts to some 10 percent of their gross income. With increasing gross income, relative relief declines to a level of less than 3 percent of the gross income. Summing up, relative relief declines with gross income.

### Conclusion

The aim of this paper was to investigate the economic impact of the “Karlsruher Entwurf zur Reform des Einkommensteuergesetzes”, a tax re-

form proposal by a study-group of well-known and well-respected independent tax jurists and tax practitioners in Germany. The results are based on a highly detailed and very flexible microsimulation model of the German tax, social security and benefit system, and on a microeconomic partial-equilibrium labor supply model. For a representative sample of households with married women in dependent employment it was shown that we may expect only minor changes in labor supply, cash gains for many households and a small, but significant, increase in inequality, especially in the bottom group of the income distribution. Families with children are the main winners of the reform. The pure income effect of the increase in child benefits gives working mothers an incentive to supply less hours.

The analysis is representative for married couples in dependent employment, a more comprehensive assessment of the impact on other population groups and of the long-run macroeconomic repercussions is left for future work.

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