Welfare Reform in Switzerland

A microsimulation case study for Basel

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Please do not quote. Comments welcome.

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Abstract

This paper provides a microsimulation-based evaluation of the current tax-benefit system in Switzerland (represented by the canton Basel-Stadt). The current tax-benefit system is characterised by a high guaranteed minimum income and high marginal tax rates on labour income while the benefits are being phased out. This system is criticised for keeping persons on welfare out of the labour market. The alternative to this traditional form of welfare are in-work benefits or earned income tax credits for the employed poor, which have been introduced in several European countries in the past years. The microsimulation model is built upon a labour supply model that explicitly accounts for discrete labour market participation responses, because empirical evidence shows the most labour supply responses to wage changes occur at the extensive margin. We define a measure of the efficiency-equity trade-off effect of a marginal tax reform. Based on this measure we evaluate two marginal reforms: a traditional welfare reform which increases the minimum income level and a working poor reform where transfers are only paid to low income working individuals. Both reforms are financed by a uniform increase in the marginal income tax rate, and both reforms are revenue-neutral. The results from the microsimulation are clear-cut: while the traditional welfare reform generates an efficiency loss, the working poor reform actually increases efficiency and equity. The size of this effect depends on the underlying labour supply elasticities, but remains valid for a range of sensible values of these elasticities. Overall, the results in this paper indicate that in-work benefits are an efficient type of redistributive policies and should be part of future welfare reform.

Keywords: Redistribution, efficiency-equity trade-off, optimal income taxation, microsimulation

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1 Introduction

In most European countries transfer programmes for the working age population have become a major part of social policy (e.g. social assistance, unemployment insurance, and health insurance). The design and size of transfer programs is an important and controversial issue in public policy because of the efficiency-equity trade-off involved. Redistribution from high incomes to low incomes increases equity, but it also creates efficiency costs by reducing work efforts. Traditionally, these programmes have been characterised by a high guaranteed minimum income and high marginal tax rates on labour income while the benefits are being phased out. In recent years a consensus has emerged that traditional programmes create an unfavourable trade-off between equity and efficiency by keeping individuals out of the labour market. As an alternative in-work benefit systems have been proposed and introduced in several countries. In-work benefits usually take the form of tax credits for working individuals with household income below some threshold. The best known example is the US Earned Income Tax Credit (EITC), which works as a wage subsidy for very low earnings up to some threshold, beyond which the tax credit is phased out. In Europe, the most important examples of earned income tax credits are the Working Tax Credit in the UK (formerly Working Families Tax Credit) and the Family Income Support programme in Ireland. Several countries have introduced small scale in-work benefits in recent years. Examples include France (“prime pour l’emploi”), Germany (as part of the Hartz IV reform), Belgium (“Bonus à l’emploi”), and the Netherlands (“Employment Tax Credit”). OECD (2005) provides an overview.

Analysing welfare reform in Switzerland is tricky. Essentially, Switzerland operates 26 tax-benefit systems (one in each canton). Building a tax-benefit model that takes account of all institutional features in all cantons is a very complex task that has not been accomplished yet. Previous studies of tax-benefit reform (e.g. Gerfin and Leu, forthcoming) were based on a harmonised and simplified tax benefit model. Given that each canton has the authority for its tax-benefit system (within regulations issued by the federal government) it is unlikely that all cantons will reform their systems in the same way (if at all). Hence it makes sense (both on a practical and on a tax policy level) to analyse possible reforms for individual cantons. In this paper, we analyse the canton Basel-Stadt, which is interesting for several reasons. First, Basel has the highest proportion of working age individuals in need of Social Assistance in Switzerland (6.5%
in 2004). The unemployment rate is also above the Swiss average (4.1% and 3.8%, respectively, in 2005). Second, Basel is a high-tax canton compared to other cantons (the overall tax index is 113.1 compared to 100 for the Swiss average). Third, there are already tax reform proposals such as tax rebates for employed individuals with low earnings that go in the direction of in-work benefits.

The microsimulation model is built upon a labour supply model that explicitly accounts for discrete participation responses. This is important because recent empirical evidence shows the most labour supply responses to wage changes occur at the extensive margin. We define a measure of the efficiency-equity trade-off created by a marginal tax reform. Based on this measure we evaluate two reforms: a traditional welfare reform which increases the minimum income level for the unemployed and a working poor reform which only affects working individuals. Both reforms are financed by a uniform increase in the marginal income tax rate, and both reforms are revenue-neutral. The results from the microsimulation are clear-cut: while the traditional welfare reform generates an efficiency loss, the working poor reform actually increases efficiency and equity. The size of this effect depends on the underlying labour supply elasticities, but remains valid for a range of sensible values of these elasticities. In a comparable analysis for 15 European countries Immervoll et al. (forthcoming) obtain similar results for five European countries. Overall, the results in this paper indicate that in-work benefits are an efficient type of redistributive policies and should be part of future welfare reform.

The paper is organised as follows: section 2 briefly summarises the classic and the extended model of optimal income taxation and provides a calibration of optimal tax rates for Basel. In section 3 we describe the model and the measure of trade-off employed in this paper. Two simple tax reforms are presented in section 4. The institutional set-up and the data used for simulation are discussed in section 5. Simulation results are presented in section 6, and section 7 concludes.

2 Welfare Reform and Optimal Tax Theory

The redistribution of income and the design of transfer programs is an important and controversial issue in public policy because of the efficiency-equity trade-off involved. Redistribution from high incomes to low incomes increases equity, but it also creates efficiency costs by reducing work efforts. An optimal tax-benefit system balances these two effects by
maximising a social welfare function, which embodies both equity and efficiency effects. The theoretical analysis of this problem has been introduced by Mirrlees (1971).

There are several well-known results from the theory of optimal income taxation. For the present context the results for low incomes are of primary interest. If everybody in the economy works marginal tax rates at the bottom should be zero. However, if there are non-workers marginal tax rates for low income workers should be large in order to prevent higher income workers from mimicking the low skilled workers (by less labour supply or effort). The optimal income tax is a negative income tax with a substantial guaranteed minimum income and a large marginal tax rate at bottom of earnings distribution. This result, however, crucially depends on the underlying labour supply model. In the Mirrlees framework only labour supply responses along the intensive margin are possible, i.e. hours of work can be adjusted marginally, even if optimal hours are zero. In other words, people deciding to enter the labour market can do so at infinitesimal small hours of work.

This result was first challenged by Diamond (1980). He analysed the case in which labour supply is reduced to a participation decision (work or no work). In his model optimal marginal tax rates may be negative for some income ranges. Saez (2002) was the first to combine participation decision (extensive margin) and hours decision (intensive margin) simultaneously. Based on vast empirical evidence from past 20 years it is acknowledged that the participation decision is more important than marginal changes of hours worked. As argued by Heckman (1993) previous high estimates of labour supply elasticities did not separate participation elasticities and hours elasticities. Recent research shows that most of these high estimates are due to high participation elasticities, especially for low wage earners.

Saez (2002) was the first to combine the intensive and extensive margin of labour supply within a model of optimal income taxation. He derives the following expression for optimal tax rates

\[
\frac{T_j - T_{j-1}}{c_i - c_{i-1}} = \frac{1}{\varepsilon_i h_i} \sum_{j=1}^{L} h_j \left[ 1 - \eta_j \frac{T_j - T_0}{c_j - c_0} \right],
\]

\[1 \] Equation (8) in Saez (2002)
where $i$ denotes occupation (or ability) group, $i = 0, 1, \ldots, I$. The intensive (hours) elasticity is $\varepsilon_i$, the participation elasticity $\eta_i$, and $h_i$ denotes the population share of group $i$. The net taxes paid by each class of individuals are denoted by $T_i$. This net tax consists of both taxes paid to the government and transfers received from the government. After tax income in occupation $i$ is denoted by $c_i = w_i - T_i$. Finally, $g_i$ are the marginal social welfare weights of group $i$. Hence optimal tax rates depend on the current income distribution, labour supply responses described by the intensive and extensive elasticity, and social preferences for redistribution. Of these, only the redistributive tastes are controversial and difficult to communicate. The advantage of the approach described in the next section is that it does not require the specification of these redistributive tastes.

Nevertheless, we end this section by showing two sets of calibrated optimal tax rates for single persons based on the income distribution in the canton of Basel-Stadt, because to our knowledge this has never been done for Switzerland yet. These are presented in Figure 1. In both cases the intensive elasticity $\varepsilon$ is set to 0.1. In the left-hand graph the redistributive taste parameter $\nu$ is set to 1 representing fairly strong redistributive tastes. The participation elasticity $\eta$ is either 0.2 or 0, where the latter case corresponds to the standard Mirrlees model. Government revenue is the same as in the current system. If $\eta = 0$ the optimal system looks like a negative income tax with a guaranteed minimum income of 30'000 CHF per year and marginal tax rates of about 75% in the low earnings range. If $\eta = 0.2$ the system looks very different at low incomes: the guaranteed minimum income drops to 10’000 CHF per year, and marginal tax rates are negative for low earnings up to 12’000 CHF. After this point both systems are similar, but the second system provides more support for employed persons. Hence in the case of a positive participation elasticity the optimal system is some form of earned income tax credit with a wage subsidy at very low earnings. This fundamental result is not overturned if redistributive tastes are smaller (right-hand side graph). In this case guaranteed minimum incomes are much lower and marginal tax rates are lower as well (around 55% in the positive range). These calibration results by and large correspond to those obtained by Saez (2002) for the USA.

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$\nu = 1$ implies that the government values marginal consumption $N$ times less when disposable income is multiplied by $N$. 

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2 The welfare weight $g(c)$ is defined as $g(c) = 1/(p \cdot c^\nu)$, where $p$ denotes the marginal value of social funds. $\nu = 1$ implies that the government values marginal consumption $N$ times less when disposable income is multiplied by $N$. 

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3 Model

As argued above an analysis of welfare reform directly based on the optimal taxation theory requires assuming a set of social preferences. Browning and Johnson (1984) derived a different approach: rather than calculating a tax schedule that optimises the equality-efficiency trade-off for a particular social welfare function, they formulate a measure of the trade-off associated with a marginal reform of the current tax system. Hence instead of finding a tax-benefit system that maximises social welfare this approach evaluates the current system against marginal changes of it. This measure is called the marginal efficiency cost of redistribution (MECR). Subsequently, the MECR was used by Ballard (1988), Triest (1994), and Browning (1995). The original formulation of the MECR is adapted to the Saez (2002) framework with intensive and extensive labour supply responses by Immervoll et al. (forthcoming, IKKS hereafter). We largely follow their methodology in our empirical analysis. By contrast to IKKS we perform our analysis on the individual level.

Labour Supply

In order to analyse the welfare effects of welfare reform we need a model of individual labour supply behaviour. As argued above it is important to model labour supply responses both at the extensive (participation) and at the intensive margin (hours). Indeed, as e.g. Heckman (1993) and Meyer (2002) convincingly argue the extensive margin may be empirically much more important. Following the seminal work by Cogan (1981) the discrete nature of the participation decision is modelled by introducing fixed costs of working. These fixed costs, denoted by $q$, are heterogeneous across individuals. They capture both monetary and time costs of working (e.g. child care costs, travel time), but also distaste of working or possibly search costs. These costs tend to create economies of scale in the work decision, implying that very small hours become non-optimal for the individual.

We specify a stochastic formulation for the fixed costs where each individual $j$ draws a fixed cost $q_j$ from the distribution $F_j (q)$ with density $f_j (q)$. This formulation implies that each individual has a probability of labour market participation, which may be interpreted as an individual participation rate. The main advantage of the stochastic formulation is that it generates

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3 For comparison purposes the following derivation of the model is quite similar to that in IKKS:
a smooth participation response at the individual level, where small changes in wages or tax rates create small changes in the probability of participation. Hence we may capture the sensitivity of entry-exit behaviour by setting elasticity parameters for each individual. Although the participation response is smooth in this set-up, it is also discrete in the sense that, conditional on entry, the individual never chooses very low hours of work.

Individuals choose labour supply after the realisation of their fixed cost of working. The labour earnings of individual \( j \) if she enters the labour market are given as \( w_j h_j \), where \( w_j \) is the wage rate and \( h_j \) is the hours of work. The tax system is described by a function \( T(w_j h_j, z) \), where \( z \) is an abstract parameter which we use to capture policy reform. The tax function is a net payment to the public sector, embodying both taxes and transfers. Hence \(-T(0, z)\) defines the welfare benefit for those not working.\(^4\) We assume that the tax system can be represented by a piece-wise linear schedule with virtual incomes. Thus we can assume that each group faces a marginal tax rate \( \tau_j \) and a virtual income \( I_j \).

Individual utility of individual \( j \) with fixed costs of working \( q \) is assumed to take the following simple quasi-linear form

\[
(1) \quad u_j(c, h, q) = w_j h - v_j(h) - q \cdot 1[h > 0],
\]

where \( v_j(\cdot) \) is a convex and increasing function normalised such that \( v_j(0) = 0 \), and \( 1[\cdot] \) is the indicator function taking the value one if the expression in brackets is true. Hence fixed costs are only incurred if the individual is working. Obviously, this specification of the utility function rules out income effects. This is a common feature of several recent theoretical studies (e.g. Diamond, 1998, Saez, 2001, 2002), because it simplifies considerably the theoretical analysis and in particular welfare aggregation. However, ignoring income effects may bias our simulation results. We will come back to this point when discussing the simulation results.

The individual chooses \( h \) to maximise

\[
(2) \quad u_j(w_j h - T(w_j h, z), h, q) = w_j h - T(w_j h, z) - v_j(h) - q \cdot 1[h > 0]
\]

\(^4\) In deriving the model we assume for simplicity that individuals have no non-labour income and that \( T(0,z) \) is the same for all individuals. In the empirical analysis we take account of non-labour income and the joint taxation of couples, and of the fact that \( T(0,z) \) depends on family composition and non-labour income.
In case of participation optimal labour supply for individual $j$ is given by

$$W_j = (1 - \tau_j)w_j = v_j'(h_j),$$

where $h_j$ denotes hours of work for a participating worker $j$, $\tau_j$ is the marginal tax rate for $j$, and $W_j$ is the after-tax wage rate. Hence optimal hours of work only depend on the marginal after-tax wage rate $W_j$ and not on virtual income, i.e. we can write the labour supply function as $h_j(W_j)$. This implies that the intensive labour supply margin displays no income effects. Without income effects compensated and uncompensated elasticities are identical and fully characterise the intensive labour supply response to marginal tax changes. The intensive labour supply elasticity $\varepsilon_j$ for individual $j$ is

$$\varepsilon_j = \frac{\partial h_j(W_j)}{\partial W_j} h_j$$

The decision to participate in the labour market is based on the difference between the utility of non-participation and the utility of participation. This participation constraint gives an upper bound on the fixed costs of working, denoted by $\bar{q}_j$ for individual $j$. Consumption when working is given by $c_j = w_j h_j - T(w_j, h_j, z)$ and consumption when not working is given by $c_0 = -T(0, z)$. Now the upper bound on fixed costs can be written as

$$\bar{q}_j = c_j - c_0 - v_j(h_j)$$

Individuals with fixed costs below $\bar{q}_j$ decide to work $h_j$ hours, while those with costs above $\bar{q}_j$ will not participate in the labour market. Then the probability to participate in the labour market is given by $\int_0^{\bar{q}_j} f_j(q) dq = F_j(\bar{q}_j) \equiv F_j$. The participation elasticity (or extensive elasticity) $\eta_j$ is defined as the percentage change in the participation probability following a one-percent change in the difference in consumption between working and not working, $c_j - c_0$. Formally,

$$\eta_j = \frac{\partial F_j}{\partial (c_j - c_0)} \frac{c_j - c_0}{F_j}.$$
The participation tax rate \( a_j \) (as opposed to the marginal tax rate \( \tau_j \)) is given by
\[
a_j = \frac{[T(w_j h_j) - T(0)]/(w_j h_j)}{H(w_j h_j)}
\]
i.e. the participation tax rate is the average tax rate on labour market participation.

Aggregate labour supply is then given by
\[
(7) \quad L = \sum_{j=1}^{N} w_j h_j(W_j),
\]
where \( h_j(W_j) \) is the labour supply function depending on after tax wages (and hence on \( \tau_j \)) and \( N \) is the total population. This completes the description of labour supply behaviour.

**The Equity-Efficiency Trade-Off**

We analyse the effects of an arbitrary and small tax reform on utilities and tax revenue and derive a measure for the marginal trade-off between equity and efficiency. We show that these effects can be expressed in terms of behavioural elasticities as well as various parameters of the current tax-benefit system. In this paper we consider tax reforms that are revenue neutral.

Redistributive policies providing income support for the poor reduce income and welfare among the middle- and high income earners. Let us denote by \( dG \geq 0 \) the aggregate welfare gains of those who gain from the reform and by \( dL \leq 0 \) the aggregate welfare loss of those who lose.

Due to the behavioural responses to tax reforms the welfare loss of the rich may be much higher than the welfare gain of the poor \( (dG + dL < 0) \). The question is how to evaluate reforms involving such interpersonal utility trade-offs. The standard approach is to specify a social welfare function involving certain welfare weights across individuals, which are usually decreasing with increasing incomes. A reform is then considered beneficial if it increases the value of the social welfare function. However, these welfare comparisons based on social welfare weights are subjective and difficult to apply in the policy making process.

Browning and Johnson (1984) suggested an alternative approach. The population is divided into those who gain from the reform and those who lose from the reform. This partitioning is endogenous both to the reform and to the behavioural responses created by the reform. Within
each of the two groups we assume an utilitarian welfare function. The interpersonal trade-off $\psi$ is then defined as

$$\psi = -\frac{dL}{dG}$$

If the reform increases redistribution, $\psi$ measures the welfare cost to the rich from the transfer of one additional Swiss franc of welfare to the poor. If on the other hand the reform reduces welfare programs, $\psi$ is the cost to the poor per CHF transferred back to the rich. The magnitude of $\psi$ reflects the degree to which there is a trade-off between equity and efficiency. In the case of no behavioural response, redistributive taxation does not imply lower efficiency, and the welfare gain of the gainers is equal to the welfare loss of the losers (in absolute terms). In this case $\psi$ will be exactly one. If $\psi$ is larger than one there is a trade-off between equity and efficiency (those who lose from the reform lose more than the gainers gain), whereas if $\psi$ is less than one there is no conflict between efficiency and equity (the reform actually increases efficiency).

To derive $\psi$ for a general tax reform we first need to derive the effect of a marginal change in the reform parameter $z$ on individual utilities. From (2) and (3) we have

$$\frac{du_i(q)}{dz} = \begin{cases} -\frac{\partial T_j}{\partial z} & \text{if } q \leq \bar{q}_j, \\ -\frac{\partial T_0}{\partial z} & \text{if } q > \bar{q}_j \end{cases}$$

with $T_j \equiv T(w_i, j, z)$ and $T_0 \equiv T(0, z)$. Hence the effect on individual utility is simply the mechanical (direct) change in the tax liability. This is due to the envelope theorem, which implies that a marginal tax-induced change in hours of work or participation does not affect utility because labour supply is initially at its optimal level.

Because the reforms analysed in this paper do not reduce welfare of the non-working individuals, we know that $\frac{\partial T_0}{\partial z} \leq 0$. Thus we may include these individuals among the gainers of the reform. If we denote with $G$ the set of employed individuals who gain from the reform and with $L$ the set of employed individuals who lose from the reform we can write $\psi$ as
where $E$ is aggregate employment.

In order to derive explicit expressions for $dG$ and $dL$ we need to derive the change in government revenue following a tax reform. Aggregate government revenue $R$ is given by

$$R = \sum_{j=1}^{N} \left[ T_j F_j + T_0 (1-F_j) \right],$$

where the first component reflects tax revenue from employed individuals and the second term is the (negative) tax revenue from those out of work. A small change in the reform parameter $z$ affects revenue as follows

$$\frac{dR}{dz} = \sum_{j=1}^{N} \left[ \frac{\partial T_j}{\partial z} F_j + \frac{\partial T_0}{\partial z} (1-F_j) + \tau_j w_j \frac{dh_j}{dz} F_j + (T_j-T_0) \frac{dF_j}{dz} \right].$$

Terms one and two in (12) represent the mechanical change in tax revenue, $dM$, and terms three and four represent the change in tax revenue due to behavioural changes along both margins of labour supply, $dB$. Along the intensive margin the reform induces employed individuals to adjust hours in response to a change in the marginal after-tax wage $W_j$. On the extensive margin some individuals will be induced to enter or leave the labour market as the reform affects the after tax income gain from working, $c_j - c_0$.

Using (3) – (6) we can rewrite (12) as

$$\frac{dR}{dz} = \sum_{j=1}^{N} \left[ \frac{\partial T_j}{\partial z} F_j + \frac{\partial T_0}{\partial z} (1-F_j) \right] + \sum_{j=1}^{N} \left[ -\frac{\tau_j}{1-\tau_j} \frac{\partial \tau_j}{\partial z} e_j - \frac{a_j}{1-a_j} \frac{\partial a_j}{\partial z} \eta_j \right] w_j h_j F_j.$$

For any revenue-neutral reform ($dR/dz = 0$) we can compute the equity-efficiency trade-off $\psi$ using (13). Revenue neutrality implies that $dM = -dB$. As we saw above, due to the envelope theorem $dM$ also equals $-dW$ in the population, implying that $dB = dW = (dG + dL)$. In other

$$\Psi = \frac{\sum_{j=1}^{N} \frac{\partial T_j}{\partial z}}{\sum_{j=1}^{N} \frac{\partial T_j}{\partial z} + (N-E) \cdot \frac{\partial T_0}{\partial z}}$$
words, the aggregate change in welfare following the reform is equal to the behavioural effect of the reform. Therefore, \(-dB\) can be seen as the extra deadweight loss generated by the reform. The trade-off measure \(\psi\) is larger than one (implying an aggregate welfare loss) if and only if \(dB < 0\).\(^5\) For a given value of \(-dB\) it is easy to show that the larger the absolute values of gains and losses, the smaller is \(\psi\), i.e. the larger is the amount of redistribution the reform achieves.

\[4\quad \textbf{Two Reforms}\]

In this section we discuss two simple tax reforms for which closed form expressions for \(\psi\) may be derived. These two types of policies are chosen to illustrate some of the most important trade-offs which policy-makers may be facing when considering welfare reform. In the following we derive the expressions by replacing \(F_j\) by the indicator variable \(E_j\) taking the value one if a individual is working. By this, the expressions can be directly applied to the data.\(^6\)

\[\text{A Demogrant Reform}\]

The first reform is a classic welfare reform which redistributes income from high income earners to individuals earning low incomes and to the unemployed. This kind of reform has been labelled demogrant reform by Browning and Johnson (1984). It raises the marginal tax rate on labour earnings by \(\tau\) and returns the collected revenue as a lump sum \(TR\) to all individuals in the economy. Formally, this reform is characterised by

\[
\frac{\partial \tau_j}{\partial z} = \tau, \quad \frac{\partial T_j}{\partial z} = \tau w_j h_j - TR, \quad \frac{\partial T_0}{\partial z} = -TR
\]

Inserting these expressions into (13) and setting \(dR/dz = 0\) yields

\[
TR \cdot N = \left[1 - D_d \right] \cdot \tau \sum_{j \in E} w_j h_j; \quad D_d \equiv \sum_{j \in E} \left( \frac{\tau_j}{1 - \tau_j} e_j + \frac{a_j}{1 - a_j} \eta_j \right) s_j \geq 0,
\]

\(^5\) This can be seen by noting that \(dB = dG + dL \Rightarrow dB < 0\) if \(|dL| > dG\).

\(^6\) Alternatively, we would need to estimate individual participation probabilities and labour earnings for non-participants. This would unnecessarily complicate the analysis. The chosen approach assumes that each individual has made her optimal participation decision based on the realisation of her fixed costs.
where \( s_j = w_j h_j / \sum_{j \in E} w_j h_j \) is the wage share of aggregate labour income of an working individual \( j \). Hence the aggregate lump sum transfer \( TR \cdot N \) is equal to the direct increase in tax revenue multiplied by a factor \( (1 - D_d) \) reflecting the behavioural response to the reform. In other words, a fraction \( D_d \) of the mechanical additional tax revenue is lost due to the behavioural response. Hence \( D_d \) is the marginal excess burden of the tax reform. \( D_d \) is an increasing function of the labour supply elasticities \( \varepsilon_j \) and \( \eta_j \) and of the tax rates of the current system \( \tau_j \) and \( a_j \). In the special case of no labour supply response \( D_d \) is equal to zero. Note that the revenue effects by the two margins of labour supply response are related to two different tax wedges. The intensive margin is related to the marginal tax rate \( \tau_j \) while the extensive margin is related to the participation tax rate \( a_j \), which is an average tax rate including any transfers that are lost or reduced when entering the labour market.\(^7\)

Using (14) and (15) we can rewrite (10) as

\[
\Psi_d = 1 + \frac{D_d}{p_g (1 - D_d) - s_g} \geq 1, 
\]

where \( p_g \) denotes the population share of those who are gaining from the reform, while \( s_g \equiv \sum_{j \in G} s_j \) is the cumulative wage share of the gainers. Note that \( p_g \) contains all non-participants. If there is no efficiency loss \( (D_d = 0) \), then \( \Psi_d \) is equal to one, i.e. one additional CHF transferred to the poor imposes costs of exactly one CHF to the rich.

**B. A Working Poor Policy reform**

In contrast to the demogrant reform, the working poor policy reform redistributes income to low wage earners, while keeping constant the income of those out of the labour market. Again, the reform raises the tax rate on all units of labour income by \( \tau \), but now the collected revenue is returned only to those who are working positive hours. Conditional on working the transfer is lump sum. This type of reform may be interpreted as an introduction of a form of Earned Income Tax Credit, financed by higher taxes on high wage earners.

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\(^7\) Note that in the case of only intensive labour supply response \( (\eta = 0) \) the expression \( D_d \sum_{j \in E} w_j h_j \) corresponds to the traditional Harberger formula for excess burden.
Formally, this reform can be described by

\[ \frac{\partial \tau_j}{\partial z} = \tau; \quad \frac{\partial T_j}{\partial z} = \tau w_j h_j - TR; \quad \frac{\partial T_0}{\partial z} = 0 \]

Inserting these expressions into (13) and setting \(dR/dz\) to zero yields

\[ TR \cdot E = [1 - D_w] \cdot \tau \sum_{j \in E} w_j h_j; \quad 1 - D_w \equiv \frac{1 - D_d}{1 - \left( \sum_{j \in E} \frac{a_j}{1 - a_j} \eta_j \right) / E}, \]

Like the analogous equation (15) for the demogrant policy, this expression shows that the aggregate lump sum transfer \(TR \cdot E\) (as opposed to \(TR \cdot N\) for the demogrant reform) is given by the direct revenue increase multiplied by a parameter \((1 - D_w)\) capturing the behavioural responses to the reform. The difference is given by the denominator of the \((1 - D_d)\) parameter. This denominator reflects the positive participation response which arises because the transfer is given only to workers. Because the denominator is always less than one, the value of \(D_w\) may be less than zero, implying that the behavioural feed-back effects on revenue may be positive or negative. Consequently, a redistribution towards the working poor may increase overall efficiency. This will be the case if either the participation tax \(a_j\) or the participation elasticity \(\eta_j\) is sufficiently large. In this case the gain from the participation response will be larger than the excess burden created by raising the revenue.

Inserting \((17)\) and \((18)\) into \((10)\) yields

\[ \Psi_w = 1 + \frac{D_w}{e_g (1 - D_w) - s_g}, \]

where \(e_g\) is the share of employed individuals gaining from the reform. In this expression \(\psi_w\) can be smaller or larger than one, depending on the sign of \(D_w\). If it is smaller than one the welfare cost to high wage earners from the transfer of one CHF to low wage earners is less than one CHF, so the reform would increase both equity and efficiency.

If there are no labour supply responses at the extensive margin (the “classic” case) the two reforms create identical behavioural responses, because the denominator in \((18)\) is zero if \(\eta = 0\). In this case \(D_d = D_w\), and the difference between gains \(dG\) and losses \(-dL\) is the same for the two
reforms. However, while the difference is the same the absolute magnitude tends to be higher in the case of the demogrant reform. The reason for this is that in the demogrant reform the unemployed receive additional transfers without paying taxes, hence aggregate gains will be higher than in the working poor reform. Given the definition of \( \psi \) and the fact that \( \psi \) is larger than one if \( D_d = D_w \), we can deduce that \( \psi_d < \psi_w \), i.e. the demogrant involves a more favourable trade-off. This highlights the importance of the extensive margin in order to make working poor policies potentially attractive.

5 Institutional Set-Up and Data

As already discussed in the introduction the simulation in this paper is focussed on the canton of Basel-Stadt. There are several reasons why it makes sense to focus on one single Swiss canton. First, tax and benefit systems differ significantly across Switzerland, and even within cantons. The use of Basel allows to apply a very accurate tax-benefit model in order to calculate marginal and participation tax rates. Previous studies covering all of Switzerland (e.g. Gerfin and Leu, forthcoming) were based on a simplified and harmonised tax benefit model. Second, Basel is a canton where the political pressure for tax reform is strong. Tax rates are high by Swiss standards, and the aggregate proportion of people on welfare (unemployment benefit, social assistance, and disability pensions) among the working age population is also very high (almost 15% in 2005). Proposals for some form of a working poor policy (e.g. tax rebates for employed individuals with low earnings) are in the political process.

Benefits

Unemployment insurance benefits are paid for a maximum duration of 18 months. The replacement ration is 70 or 80%, depending on the family situation. The maximum payment is CHF 7000 per month. Eligible are workers losing their jobs who have contributed to the unemployment insurance for at least two years. After 18 months the unemployed are moved to social assistance if they were not able to find a job.

Apart from unemployment insurance the main component of the Swiss benefit system for the working age population is Social Assistance (“Sozialhilfe”). The Swiss Conference for Social
Assistance\textsuperscript{8} publishes guidelines defining minimal subsistence incomes differentiated by family size. Basel has adopted these guidelines, which constitute a guaranteed minimum income. This guaranteed income differentiated by household size is shown in Table 1. Note that this income is defined as the minimal subsistence levels plus housing and health insurance premiums which are paid by Social Assistance up to some maximum (again differentiated by household size). The figures in Table A.1 are computed using these maximum values.

Basel was one of the first cantons to introduce work incentives into Social Assistance. In 2002 the traditional system with implicit marginal tax rates of (almost) 100\% was replaced by a make-work-pay system in which the marginal tax rate on additional labour earnings was reduced to 66\% (in other words, each additional CHF of earnings reduced the Social Assistance transfer only by 0.66 CHF). In 2005, this system was abandoned again with the argument that it was too expensive. Now there is a limit up to which the Social Assistance reduction rate is 66\% (up to an income of 21’600 CHF per year and person). Beyond this limit the reduction rate is 100\%. This corresponds to the modified SKOS guidelines published in 2005 which also acknowledge the need for more work incentives. Besides the reduced marginal tax rate for the first 21’600 CHF there now is the possibility to vary the transfer to non-workers according to their willingness to search for a job and to participate in labour market programmes.

In addition there is low income support in the form of contributions to health care insurance premiums (“Prämienverbilligung”) and housing benefits (“Mietzinsbeiträge”) for households which are not eligible for Social Assistance, i.e. their income is above the Social Assistance threshold but still low enough to be eligible for these additional benefits. Again, details can be found in the Appendix, Table A.1.

**Taxes**

Income taxes are levied on the cantonal and the federal level. The federal tax, however, only accounts for a relatively small fraction of total taxes (depending on income, the fraction is between 10 and 30\%).\textsuperscript{9}

\begin{itemize}
  \item[8] Schweizerische Konferenz für Sozialhilfe, SKOS.
  \item[9] In general, there are also communal taxes that are some fraction of cantonal taxes. This fraction varies across communities within a canton. Basel-Stadt is a special case because there is only one community (Basel).
\end{itemize}
Income taxation is based on household income. There is no splitting, hence secondary earners may face relatively high marginal tax rates when entering the labour market. This problem is alleviated to some extent by lower tax rates for couples, but there is still a marriage penalty with respect to income taxation. Standard deductions include deductions for children, a deduction for work-related costs, and a deduction for insurance premiums and child care. All these deductions are subtracted from household income in order to derive taxable income. More details can be found in the Appendix. In principle, both unemployment benefits and social assistance are subject to taxation. The current practice, however, is to exempt households on welfare from taxation.

Social security contributions include payments for old age insurance (AHV), unemployment insurance, and pension fund contributions. Overall, these contributions amount to 11.5% if the employer contributions are not included and 16% if they are included. There is no upper limit to these payments. These rates apply to gross earnings. Taxable income is net of social insurance payment. Finally, we include value added tax (VAT), which is 7.5% for most goods (for some consumption goods such as food a lower VAT rate is applied).

Figures 2.a – 2.d show the budget constraints resulting from the tax-benefit system in Basel for 4 household types: singles, lone parents, single-earner couples (differentiated by number of children), and double-earner couples (differentiated by number of children). These budget constraints are computed using a detailed tax-benefit model for Basel. Several features are noteworthy. First, not surprisingly, the budget constraints are very flat while the household is in the social assistance regime. Second, the end of this regime is always marked by a drop in disposable income. The amount of this drop varies across household types. Third, after the social assistance range, the shape of disposable income resembles a saw tooth due to the discrete changes in health insurance premiums contributions and housing benefits. The benefit system is completely faded out at rather high gross incomes, e.g. CHF 100’000 for a family with two

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10 We do not include health insurance contributions in social security payments. Health insurance is private in Switzerland, with roughly 100 insurance companies providing compulsory insurance. Premiums vary considerably across these companies. Most importantly, premiums do not directly depend in income. Indirectly, however, premiums vary by income because there are premium contributions for low income households that are not eligible for social assistance. These contributions are taken account of in the tax-benefit model.

11 We are very grateful to Peter Schwendener of the Department of Finance of the canton Basel-Stadt for providing us with his tax-benefit model.
children. Overall, these figures show the presence of poverty traps and weak work incentives for individuals with low earnings.

Marginal tax rates and participation tax rates for each individual are computed as follows. Marginal tax rates are computed by increasing actual earnings by CHF 100 and measuring the resulting changes in all taxes and benefits, i.e. $\tau_j = \frac{[T(y_j + 100) - T(y_j)]}{100}$. To compute the participation tax rate we have to compute the difference between current household taxes and benefits and household taxes and benefits if the individual’s earnings are set to zero. This difference is then divided by current disposable household income, i.e. $a_j = \frac{[T(y_j) - T(0)]}{y_j}$.

Average marginal and participation tax rates differentiated by household income and by earnings deciles are presented in Figure 2. Both marginal and participation tax rates are very high at the bottom of the household income distribution. The reason for this obvious: most persons in this group are still in the social assistance range, hence they would not have much less income if they dropped out of the labour market (participation tax rate) or much more if they increased their labour supply (marginal tax rate). The participation tax is still very high in the second decile but then drops continuously with increasing household income. This implies that the higher household income the lower the influence of the benefit system on the participation tax. The marginal tax rate has a u-shaped pattern. First, the marginal tax rates decrease because the impact of the benefit system gets smaller, and once the benefit system is phased out the increasing marginal tax rates of the income tax system determine the shape of the average marginal tax rate.

If we differentiate by earnings deciles the picture is different. The participation tax is much smaller at low earnings deciles compared to the left-hand graph. The reason for this is that individuals with low earnings do not necessarily live in low income households. Especially secondary earners, who often have low earnings, tend to be in the middle and high income groups in the left-hand graph. In other words, the two graphs show average tax rates for different subpopulations. For the same reasons the u-shape for the marginal tax is also much less pronounced in the right-hand graph.
Data

The individual data for the microsimulation come from the Swiss Labour Force Survey (SLFS). In order to obtain sufficient data for Basel we pool the waves 2002 – 2005. We select observations aged between 20 and 65, at least in part-time employment, not in full-time education and not retired. We also drop self-employed because their tax treatment is different and because there is evidence that the income data are not very reliable for this group. Furthermore, observations with missing information on either labour or household income are not used. We end up with a sample of 2,304 observations. Of these 1,614 are working at least 50%, so the overall participation rate is 69%.

Analysing the earnings and household income distribution shows that the means of both distributions are almost the same in Basel and Switzerland. Inequality, however, is more pronounced in Basel, especially inequality in household income. The ratio of the ninth decile to the first decile (D9/D1) of the household income distribution is 5.0 in Basel and 4.4 in Switzerland. This additional inequality is concentrated in the lower part of the income distribution, where the D5/D1 ratio is 2.1 in Basel and 1.8 in Switzerland. In the upper part both distributions exhibit similar inequality. This finding of course reflects the high rate of people depending on welfare in Basel. This will be important for the analysis of the tax-benefit reforms because the performance of the reforms depends on the underlying income distribution. The earnings distribution exhibits a very similar pattern with less inequality than household income.

6 Results

Given the results from the tax-benefit model we can now compute the welfare effects of the two policy reforms. The final ingredients are the intensive and the expensive labour supply elasticities. Since estimating these elasticities is beyond the scope of this paper we instead set values for them that correspond to previous estimates (e.g. in Gerfin and Leu, forthcoming). In our base-case simulation the intensive elasticity $\varepsilon$ is assumed to be 0.1. This appears to be a reasonable value given that it has been shown in many papers that labour supply responses at the intensive margin are weak. The choice of the extensive elasticity is less straightforward. In our base-case simulation we set $\eta = 0.3$ in the lowest quintile of the earnings distribution, $\eta = 0.2$ in the second quintile, $\eta = 0.15$ in the third quintile, $\eta = 0.1$ in the fourth quintile and $\eta = 0$ in the
fifth quintile. This yields an average participation elasticity of 0.15. Alternatively, we simulate the efficiency and trade-off parameter for higher values of $\eta$ as well as for the case where $\eta = 0$ for all observations. This second scenario implies that there is no labour supply response at the extensive margin. The higher values of $\eta$ are $\eta = 0.4$ in the lowest quintile of the earnings distribution, $\eta = 0.25$ in the second quintile, $\eta = 0.2$ in the third quintile, $\eta = 0.15$ in the fourth quintile and $\eta = 0$ in the fifth quintile.

The simulation results based on these values are presented in the first row of Table 1. We display the parameters $D$, which measures the efficiency loss of the reform, and $\psi$, which measures the trade-off between efficiency and equity. Given that these measures are estimated we also show bootstrapped standard errors. The message of our base case simulation is clear-cut: the working poor reform actually increases overall efficiency ($D > 0$, $\psi < 1$), whereas the traditional reform involves a notable efficiency loss. Increasing the participation response reinforces this result. In the case of no participation response, however, the traditional reform performs better than the working poor reform. These results highlight the importance of the extensive margin in evaluating tax reforms.

It is illustrative to compare our base-case result with those obtained by IKKS for 15 European countries. They find efficiency increasing effects of the working poor policy for five countries: Denmark, France, Ireland, Portugal, and Spain. Of these, the value for Ireland is the closest for the same configuration of the elasticities.

It is possible to compute the fraction of individuals gaining from the reforms. In the base case 36% of the population gain (5% of the working population plus the 31% non-participants) from the demogrant reform. This suggests that in a vote there would be only a minority in favour of this reform. On the other hand, 64% of the working population are in favour of the working poor reform, suggesting that this reform would be accepted in a vote (assuming that non-participants, whose welfare is not changed by the reform, would not uniformly vote against the reform).

It is possible to calibrate the participation elasticities such that a) both reforms feature identical trade-offs, and b) the trade-off of the working poor policy is exactly unity. Identical trade-offs are obtained for an average participation elasticity of 0.034, which is a very low value.
The trade-off is equal to 1.45 in this case.\textsuperscript{12} The trade-off of the working poor policy is exactly equal to unity for an average $\eta$ of 0.11, which still is a very low value compared to most estimates of the participation elasticity.\textsuperscript{13} Finally, a Pareto-improvement ($\psi_w = 0$) is obtained for an average participation elasticity of 0.34.\textsuperscript{14}

Table 2 presents the results when we change the intensive elasticity. The first rows repeats the base case, whereas $\varepsilon$ is set to 0.2 in the second row and to zero in the third row. It becomes obvious that the results for the trade-off parameter crucially depend on the intensive elasticity as well. Doubling $\varepsilon$ significantly increases $\psi$ for both reforms, especially for the working poor reform. Setting $\varepsilon$ to zero, on the other hand, reduces $\psi$ for both reforms. By contrast to varying the participation elasticity different values for the hours elasticity influence $\psi$ in a similar way. However, an average value of $\varepsilon$ above 0.1 has hardly been found in recent empirical analyses of labour supply.

What is found in many papers is that elasticities vary significantly across demographic groups. Especially married women with children and lone parents appear to have large participation (and to a lesser degree hours) elasticities, whereas single persons and men in couples have very low elasticities (see e.g. Gerfin and Leu, forthcoming, for Switzerland). Therefore, in a final set of results we vary elasticities according to these empirical findings. These results are presented in Table 3. The upper rows again displays the base case with participation elasticities only varying by earnings deciles and hours elasticity equal to one throughout. In the second rows participation elasticities for lone parents and for married women with children are set to $\eta = 0.7$ in the lowest quintile, $\eta = 0.5$ in the second quintile, $\eta = 0.4$ in the third quintile, $\eta = 0.2$ in the fourth quintile and $\eta = 0$ in the fifth quintile. For married women without children $\eta = 0.6$ in the lowest quintile, $\eta = 0.4$ in the second quintile, $\eta = 0.3$ in the third quintile, $\eta = 0.1$ in the fourth quintile and $\eta = 0$ in the fifth quintile of the earnings distribution. For single persons in the lowest quintile $\eta = 0.1$.\textsuperscript{15} For all other persons the participation elasticity is zero. The average participation elasticity is 0.15. The resulting trade-off for the working poor policy is somewhat larger compared to the base case, but this difference is not significant. The trade-off for the

\textsuperscript{12} In IKKS similar values are obtained for Denmark, France, Ireland, Portugal, Spain, und the UK.
\textsuperscript{13} In IKKS similar values are obtained for Denmark, France, and Ireland.
\textsuperscript{14} In IKKS similar values are obtained for France and Ireland.
traditional reform is smaller than in the base case, but still above 2. Overall, the differences to the base case are only modest (as long as average elasticities remain unchanged).

In the final row of Table 3 we introduce household type heterogeneity in the participation and the hours elasticity. Participation elasticities are as in row two, but now the intense elasticity is set to 0.25 for the same subgroups that have positive participation elasticities. The average hours elasticity remains 0.1. Now the trade-off measures for both reforms improve compared to the second row because now there is no behavioural response from a significant part of the population (presumably to a large extent the losers of the reforms). But the general finding of this analysis remains unchanged by these variations of the underlying labour supply elasticities. Ultimately, it will be necessary to estimate individual elasticities based on a labour supply model that reflects the simulation approach using the data at hand. This is left to future research.

When evaluating the working poor policy it has to be kept in mind that it has been defined on the individual level, independent of household income. In other words, the working poor policy provides the same benefit to a low income lone parent and to a secondary earner with low earnings living in a high income household. Hence it is possible that the redistributive impact of the working poor policy is less attractive if total household income is taken into account. Figure 4 presents the share of gainers of the working poor reform within deciles defined by total household income. It is obvious that the share of gainers is a decreasing function of total income, with all individuals in the lowest three deciles gaining from the reform. At the top of the household income distribution roughly 20% of the individuals are gaining from the reform. Thus there is redistribution from high income households to low income households. However, it may be argued that giving income support to low income spouses of high income primary earners is not desirable. On the other hand, it is well known from empirical studies (e.g. Eissa and Hoynes, 2004, for the EITC) that working poor policies based on household income have a significantly negative effect on the labour market participation of secondary earners. This raises another interesting trade-off for tax-benefit policy: either base transfers on household income and drive secondary earners out of the labour market, or base transfers on individual earnings and support non-poor secondary earners. An analysis of this trade-off is left for future research.

The participation elasticity for single persons in the lowest quintile is set to 0.1 because this group displays considerable movements in and out of social assistance.
7 Conclusion

This paper provided a microsimulation-based evaluation of the current tax-benefit system in Switzerland (represented by the canton Basel-Stadt). The current tax-benefit system is characterised by a high guaranteed minimum income and high marginal tax rates on labour income while the benefits are being phased out. This system is criticised for destroying work incentives for persons on welfare. The alternative to this traditional form of welfare are in-work benefits or earned income tax credits for the employed poor, which have been introduced in several European countries in the past years (e.g. in the UK, Ireland, France, and the Netherlands). Given that in-work benefit systems tend not to reduce transfer volume the public debate and reform proposal is more concerned with a redesign of the benefit system and less with a general reduction.

The microsimulation model is built upon a labour supply model that explicitly accounts for discrete participation responses. This is important because recent empirical evidence shows the most labour supply responses to wage changes occur at the extensive margin. We define a measure of the efficiency-equity trade-off effect of a marginal tax reform. Based on this measure we evaluate two marginal reforms: a traditional welfare reform which increases the minimum income level and a working poor reform where transfers are only paid to low income working individuals. Both reforms are financed by a uniform increase in the marginal income tax rate, and both reforms are revenue-neutral. The results from the microsimulation are clear-cut: while the traditional welfare reform generates an efficiency loss, the working poor reform actually increases efficiency and equity. The size of this effect depends on the underlying labour supply elasticities, but remains valid for a range of sensible values of these elasticities. In a comparable analysis for 15 European countries Immervoll et al. (forthcoming) obtain similar results for five European countries, with Ireland being the closest to our results. Overall, the results in this paper indicate that in-work benefits are an efficient type of redistributive policies and should be part of future welfare reform.

The results of this paper have been obtained using several critical assumptions. First of all, we only consider marginal reforms. However, it appears that our “small reform” approach provides a reasonable approximation of the effect of introducing this kind of program as long as it remains modest, as has been the case for most European countries that actually introduced them. For large
reforms this methodology may provide a poor approximation. However, a similar argument applies to the approach based on estimating a structural labour supply model given the current tax-benefit system and using this to simulate the responses to reforms of the tax-benefit system. The further the new tax-benefit system is away from the current the less reliable will be the simulation results.

The treatment of households is restrictive in the labour supply model, which essentially assumes that each person maximises her own utility function with holding her spouse’s labour supply and income fixed. Again, it may be argued that this is a reasonable approximation when analysing marginal reforms. Nevertheless, given the progress made in the analysis of cooperative behaviour (see Vermeulen, 2002) within households future research has to address this problem.

The labour supply model used in our microsimulation assumes that labour markets are competitive. This implies that all unemployment is voluntary, which may be a poor description of real labour markets. Several recent papers analyse the effects of taxation in imperfect labour markets (e.g. Sörensen, 1999, Boone and Bovenberg, 2004). In general, the results from these papers do not overturn the results based on perfect labour markets. For example, the main results concerning optimal tax rates are the same in Saez (2002) and Boone and Bovenberg (2004). For our analysis, the main difference occurs in the analysis of the participation decision, which generates discrete changes in individual utilities (as opposed to infinitesimal changes in the marginal analysis in perfect labour markets). This reinforces the positive result for the working poor policy in the sense that the welfare gain of individuals able to join the labour market will be greater compared to the case analysed in this paper. However, not all wanting to join the labour market will find a job, but their utility will not decrease. Hence the aggregate welfare gain of those previously unemployed is likely to be larger in imperfect labour markets. We leave an analysis of this important point to future research.

Assuming no income effects has simplified the analysis considerably. However, from empirical labour supply research it is known that at least for some demographic groups such as married women and lone parents income effects may be important (see Blundell and MaCurdy, 1999, for a survey). There are two reasons why our results may not be too sensitive to ruling out income effects. First, we only consider marginal reforms, hence income effects are unlikely to be

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16 In a sense this kind of simulation is out-of-sample, and it is well known that out-of-sample predictions become
substantial anyway. Second, income effects would influence the results for the two reforms in a similar way (they both take away money from high income individuals and give money to low income individuals). So the relative performance of both reforms should not be substantially affected by income effects. Finally, Eissa et al. (2005) show that income effects are only present in the intensive elasticity.\textsuperscript{17} The participation elasticity is unaffected by the presence of income effects as long as \( T_0 \) is not changed by the reform. However, incorporating income effects is a necessary step to be taken in future research.

Child care costs have not been fully taken into account. For low income households child care costs are covered by social assistance. Child care prices depend on household income in Switzerland, which will increase participation and marginal tax rates for secondary earners with high household income. However, this price setting is not directly part of the tax-benefit system and was excluded from the present analysis. Moreover, we do take account of fixed costs of work in the labour supply model, which at least partially covers the issue of child care costs. Finally, empirical evidence suggests that labour supply responses are weak for secondary earners with high earnings. In future work, we plan to address this problem.

Several general issues have not been addressed in this paper. These include the question whether transfers should be based on household or individual income, the question of targeted transfers, the question of cash vs. in-kind transfers, and the question of time limits. The first question not only concerns transfers but income taxation in general. Whether joint or individual taxation is better is an open question in public economics. Boskin and Sheshinski (1983) provide an efficiency argument for individual-based taxation, which is based on the empirical observation that labour supply elasticities are considerably larger for secondary earners. Hence secondary earners should face lower marginal tax rates than the primary earner, and not the same as is the case in a joint taxation system. However, this conclusion is based on a labour supply model with only intensive responses. As argued repeatedly above, most labour supply responses occur at the extensive margin, so the Boskin and Sheshinski argument may be wrong in this case. The analysis of optimal income taxation of couples is rather complicated and not yet fully developed (see Kleven, Kreiner, and Saez, 2005, for a first step). A related point has been discussed at the end of section 6: basing transfers on individual or household income introduces another a

\textsuperscript{17} less reliable the further we get away from the original sample

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efficiency-equity trade-off. There is not systematic analysis of this point, but it may well be the incentive considerations outweigh redistributive considerations, i.e. transfers should be based on individual income to a large extent.

References


For our analysis the compensated elasticity is relevant. Assuming no income effects the compensated and the uncompensated elasticity are identical.


OECD (2005), Employment Outlook, Paris


Table 1: Welfare Effects of Tax Reform under different participation response scenarios

<table>
<thead>
<tr>
<th>Demogrant Policy</th>
<th>Working Poor Policy</th>
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<tbody>
<tr>
<td>Efficiency ($D_d$)</td>
<td>Trade-Off ($\psi_d$)</td>
</tr>
<tr>
<td>1) Base case scenario: $\eta = 0.15$ (on average) and $\varepsilon = 0.1$</td>
<td>-0.37</td>
</tr>
<tr>
<td>2) High participation response: $\eta = 0.2$ (on average) and $\varepsilon = 0.1$</td>
<td>-0.47</td>
</tr>
<tr>
<td>3) No participation response: $\eta = 0$ and $\varepsilon = 0.1$</td>
<td>-0.09</td>
</tr>
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</table>

Own computations based on data from the Swiss Labour Force Survey 2002 – 2005. Taxes and benefits computed using a tax-benefit model provided by the Department of Finance of the canton of Basel-Stadt. Number of observations used in simulation: 1614

Efficiency denotes the marginal efficiency cost of the tax reform (a negative number indicates an efficiency loss).

Trade-off denotes the ratio of the welfare loss of losers to the welfare gain of gainers of the reform.

Base case: $\eta = 0.3$ in the lowest quintile, $\eta = 0.2$ in the second quintile, $\eta = 0.15$ in the third quintile, $\eta = 0.1$ in the fourth quintile and $\eta = 0$ in the fifth quintile of the earnings distribution.

High participation response: $\eta = 0.4$ in the lowest quintile of the earnings distribution, $\eta = 0.25$ in the second quintile, $\eta = 0.2$ in the third quintile, $\eta = 0.15$ in the fourth quintile and $\eta = 0$ in the fifth quintile.

Bootstrap standard errors in parentheses (500 replications)
Table 2: Welfare Effects of Tax Reform under different hours elasticity scenarios

<table>
<thead>
<tr>
<th>Demogrant Policy</th>
<th>Working Poor Policy</th>
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<tbody>
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</tr>
<tr>
<td>2) High elasticity: $\eta = 0.15$ (on average) and $\epsilon = 0.2$</td>
<td>-0.46</td>
</tr>
<tr>
<td>3) No hours response: $\eta = 0.15$ and $\epsilon = 0$</td>
<td>-0.28</td>
</tr>
</tbody>
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Own computations based on data from the Swiss Labour Force Survey 2002 – 2005. Taxes and benefits computed using a tax-benefit model provided by the Department of Finance of the canton of Basel-Stadt. Number of observations used in simulation: 1614

Efficiency denotes the marginal efficiency cost of the tax reform (a negative number indicates an efficiency loss).

Trade-off denotes the ratio of the welfare loss of losers to the welfare gain of gainers of the reform.

Base case: $\eta = 0.3$ in the lowest quintile, $\eta = 0.2$ in the second quintile, $\eta = 0.15$ in the third quintile, $\eta = 0.1$ in the fourth quintile and $\eta = 0$ in the fifth quintile of the earnings distribution.

Bootstrap standard errors in parentheses (500 replications)
Table 3: Welfare Effects of Tax Reform if participation responses are concentrated on specific demographic groups

<table>
<thead>
<tr>
<th>Demogrant Policy</th>
<th>Working Poor Policy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Efficiency (D_d)</strong></td>
<td><strong>Trade-Off (ψ_d)</strong></td>
</tr>
<tr>
<td>1) Benchmark scenario: ( \eta = 0.15 ) (on average) and ( \varepsilon = 0.1 )</td>
<td>-0.37</td>
</tr>
<tr>
<td>2) Participation response only for lone parents and married women: ( \eta = 0.15 ) (on average) and ( \varepsilon = 0.1 )</td>
<td>-0.28</td>
</tr>
<tr>
<td>3) Participation and labour supply response only for lone parents and married women: ( \eta = 0.15 ) (on average) and ( \varepsilon = 0.1 ) (on average)</td>
<td>-0.25</td>
</tr>
</tbody>
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Own computations based on data from the Swiss Labour Force Survey 2002 – 2005. Taxes and benefits computed using a tax-benefit model provided by the Department of Finance of the canton of Basel-Stadt. Number of observations used in simulation: 1614

Efficiency denotes the marginal efficiency cost of the tax reform (a negative number indicates an efficiency loss).

Trade-off denotes the ratio of the welfare loss of losers to the welfare gain of gainers of the reform.

Base case: \( \eta = 0.3 \) in the lowest quintile, \( \eta = 0.2 \) in the second quintile, \( \eta = 0.15 \) in the third quintile, \( \eta = 0.1 \) in the fourth quintile and \( \eta = 0 \) in the fifth quintile of the earnings distribution.

Heterogeneity in participation response: elasticities for lone parents and married women with children are \( \eta = 0.7 \) in the lowest quintile, \( \eta = 0.5 \) in the second quintile, \( \eta = 0.4 \) in the third quintile, \( \eta = 0.2 \) in the fourth quintile and \( \eta = 0 \) in the fifth quintile of the earnings distribution. For married women without children \( \eta = 0.6 \) in the lowest quintile, \( \eta = 0.4 \) in the second quintile, \( \eta = 0.3 \) in the third quintile, \( \eta = 0.1 \) in the fourth quintile and \( \eta = 0 \) in the fifth quintile of the earnings distribution. For single persons in the lowest quintile \( \eta = 0.1 \).

Heterogeneity in hours response: \( \varepsilon = 0.25 \) for lone parents and married women (with and without children), \( \varepsilon = 0 \) for all other demographic groups.

Bootstrap standard errors in parentheses (500 replications)
For this simulation the extensive elasticity $\eta$ is either set to zero (only intensive response) or to 0.2. The intensive elasticity $\varepsilon$ is set to 0.1 in both cases. The income distribution is estimated using the Swiss Labour Force Survey, 2002 – 2005. The redistributive taste parameter is set to a value reflecting either high redistributive tastes ($\nu=1$) or low redistributive tastes ($\nu=0.25$).
Figure 3.a:

Figure 3.b
These figures have been computed using the tax-benefit model provided by the Department of Finance of the canton of Basel-Stadt. They include income taxes (federal and cantonal), payroll taxes, social assistance, health insurance premium contributions and housing benefits. More details can be found in the text and in Table A.1

**Figure 4: Share of Winners of Working Poor Reform by Household Income deciles**

Table A.1: Summary of Tax-Benefit System in Basel (incomplete)

<table>
<thead>
<tr>
<th></th>
<th>Single</th>
<th>Lone Parent</th>
<th>Couple, no children</th>
<th>Couple, 1 child</th>
<th>Couple, 2 children</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Social Assistance</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic Needs</td>
<td>11520</td>
<td>17628</td>
<td>17628</td>
<td>21432</td>
<td>24648</td>
</tr>
<tr>
<td>Housing</td>
<td>7200</td>
<td>10800</td>
<td>10800</td>
<td>15600</td>
<td>19200</td>
</tr>
<tr>
<td>Health Insurance</td>
<td>4848</td>
<td>6048</td>
<td>9696</td>
<td>10896</td>
<td>12096</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>23568</td>
<td>34476</td>
<td>38124</td>
<td>47928</td>
<td>55944</td>
</tr>
</tbody>
</table>

**Health Insurance Contributions**

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>13200</th>
<th>3200/4400</th>
<th>13200/14400</th>
<th>21200/22400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional child care</td>
<td>-</td>
<td>the general deduction is increased by 10.50 CHF for each additional 100 CHF of income</td>
<td>-</td>
<td>the general deduction is increased by 10.50 CHF for each additional 100 CHF of income</td>
<td>if before-tax income &gt; 8000 than the general deduction is increased by 17.85 CHF for each 100 CHF of additional before-tax income</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Contribution if <strong>relevant income</strong> (= before-tax income minus total deduction) is between a)</th>
<th>0 – 23 / 36</th>
<th>23/36 – 27/43</th>
<th>27/43 – 31/50</th>
<th>31/50 – 35/57</th>
<th>35/57 – 39/60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contribution if relevant income (= before-tax income minus total deduction) is between a)</td>
<td>2976</td>
<td>2136</td>
<td>1596</td>
<td>1116</td>
<td>600</td>
</tr>
<tr>
<td></td>
<td>4080</td>
<td>2976</td>
<td>2256</td>
<td>1584</td>
<td>924</td>
</tr>
<tr>
<td></td>
<td>5952</td>
<td>4272</td>
<td>3192</td>
<td>2232</td>
<td>1200</td>
</tr>
<tr>
<td></td>
<td>7056</td>
<td>5112</td>
<td>3852</td>
<td>2700</td>
<td>1524</td>
</tr>
<tr>
<td></td>
<td>8160</td>
<td>5952</td>
<td>4512</td>
<td>3168</td>
<td>1848</td>
</tr>
</tbody>
</table>

**TO BE COMPLETED**

a) Income in 1000 CHF. The first number is for one-adult households, the second for two-adult households

b) The first figure is for one-earner households, the second for two earner households (if applicable)