Basic Income - With or Without Bismarckian Social Insurance?

Andreas Bergh

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Abstract

We model a welfare state with only basic income, a welfare state with basic income and Bismarckian social insurance, a pure market outcome and an informal sector. Using these models we study under what circumstances a system with basic income is economically feasible and supported by a majority. We conclude that there are reasonable circumstances under which a the combination of basic income and Bismarckian social insurance is superior to a system with only basic income, in terms of political sustainability and economic feasibility. We also show that in many cases, Bismarckian social insurance increases the vertical income redistribution because of a negative correlation between risk and income.

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1 Introduction

This paper explores the following question: Should an unconditional basic income be combined with Bismarckian (positively income related) social insurance schemes or not? I show that in terms of political and economic sustainability, a system that combines basic income with Bismarckian social insurance schemes is superior to a system with only basic income. The conclusion is driven by the assumption that individuals have the option to work in an untaxed informal sector.

This paper takes as given the arguments for replacing non-contributory benefits such as the social assistance in place in most modern welfare states with an unconditional basic income (see for example Van Parijs 1995), and focus on the question: Should basic income be combined with social insurance or not?

The paper proceeds as follows: In the next section, we describe the models of the di;erent alternatives analyzed. In section we derive conclusions regarding economic and political stability of di;erent types of welfare states, using both theoretical models and numerical simulations. In section four we discuss who benefits from social insurance, and section five concludes the paper.

2 Basic income and social insurance

Consider a setup with a basic income b and a constant marginal tax rate μ. Letting o denote gross income means that net income will be

$$b + (1 - \mu)\, o \tag{1}$$

Assuming that there are $\bar{}$ individuals and using subscript a to denote individual incomes, the public budget constraint will be

$$\mu \sum_{a=1}^{\bar{}} o_a = \bar{}\, b$$

$$\mu = \frac{b}{\hat{e}} \tag{2}$$

where $\hat{e}$ is the mean income. Let us now extend this standard model with an individual probability $:_a$ of income loss, for example due to sickness or unemployment. In state loss, Bismarckian social insurance replaces the income at rate 3. Assume that benefits are subject to taxation, as is the case in many advanced welfare states. Net income $»$ for individual a will now be

$$»_a = b + (1 - :_a)(1 - \mu)\, o_a + (1 - \mu) :\, 3\, o_a \tag{3}$$

and the public budget constraint is

$$\mu = \frac{\frac{b}{\hat{e}} + :\, 3}{1 - :\,(1 - 3)} \tag{4}$$

Example 1 Assume that mean income is 1 and that the basic income is 0.5. From expression (4) follows that by lowering the basic income level from 0.5 to 0.25 it will be financially possible to introduce social insurance with $3 = 0.75$ without having to increase taxes as long as the risk is less than 30 percent.

Based on market imperfections due to information asymmetries, there are well known arguments for why the state under can potentially be a more e>cient provider of income insurance (see for example Barr 1998). In fact, it might be the case that private insurance markets will not exist because of adverse selection problems. Therefore, we will first analyze the case when private income insurance is only available under pure market arrangements: It is not possible to

complement basic income with private income insurance, and it is not possible to buy private income insurance when working in the informal sector. In section 3.2 and 3.3, we add the possibility of buying private insurance to complement basic income and discuss how the results are changed by this.

We now go on to describe three di;erent systems and their corresponding expected utilities: A pure market system (**m**), a welfare state with only basic income (**b**), and a welfare state with basic income and social insurance (**s**). The systems are distinguished by superscripts m, b and s on the relevant variables.

2.1 Pure market system

In our model of pure market arrangements, the expected utility will be

$$\begin{aligned} eu_a^m &= (1 - :_a) \P (o_a - ¢_a) + :_a \P (2_a^\# o_a) [\\ \text{where } 2_a^\# &= \arg\max_{2_a} (1 - :_a) \P (o_a - ¢_a) + :_a \P (2_a o_a) [\\ \text{and } ¢_a &= \frac{2_a ¤ :_a}{1 - :_a} Z \end{aligned} \tag{5}$$

Here, the individual pays ¢ to get coverage 2[and ¢ is a markup ¤ over the actuarially fair premium. The parameter ¤ captures the costs firms have to identify risk groups, and profits due to imperfect competition.

2.2 Pure basic income

If the welfare state provides only basic income but no social insurance, expected utility will be

$$\begin{aligned} eu_a^b &= (1 - :_a) \P \left(b + (1 - \mu^b) ¢ o_a \right) + :_a \P (b) [\\ \text{where } \mu^b &= \frac{\bar{b}}{\sum_{a=1} (1 - :_a) o_a} Z \end{aligned} \tag{6}$$

2.3 Basic income with social insurance

When the welfare state provides both basic income and social insurance, the public budget will be

$$\mu^s \bar{\sum_{a=1}} (1 - :_a) o_a + \bar{\sum_{a=1}} :_a \mu^s 3 o_a = \bar{b} + \bar{\sum_{a=1}} :_a 3 o_a Z \tag{7}$$

Note that for 3 = 0[we have $\mu^s = \mu^b$Z Expected utility will be

$$\begin{aligned} eu_a^s &= (1 - :_a) \P (b + (1 - \mu^s) o_a) + :_a \P (b + 3 o_a (1 - \mu^s)) [\\ \text{where } \mu^s &= \frac{\bar{b} + \sum_{a=1} :_a 3 o_a}{\sum_{a=1} (o_a (1 - :_a (1 - 3)))} Z \end{aligned} \tag{8}$$

2.4 The informal sector

Because the welfare state requires taxation, it must compete with an informal sector where people can work without paying taxes. An individual a working in the informal sector will earn income $+^{o}{}_{a}[$ where the parameter $+ \wedge 0$ captures the relative productivity of working in the informal sector. If the informal sector is less developed, the matching of supply and demand will take longer time and decrease productivity. For example, finding customers may take longer time in the informal sector, and it may require time and e;ort to avoid tax authorities. In this case $+ \setminus 1$. On the other hand, if the informal sector is well developed and the formal sector requires time consuming activities like the filling in of tax forms, it is possible that $+ \wedge 1$.

The utility from working in the informal sector is written

$$e\,u^{i}_{a} = (1 \quad :_{a}) \P (b + +^{o}{}_{a}) + :_{a} \P (b), \tag{9}$$

Note that expression (9) assumes that there is no private income insurance available in the informal sector.

3 Analysis

Let us first draw some theoretical conclusions. Assume that a system is politically sustainable if it is supported by a majority. The basic income directly benefits those with income below the mean income because they are monetary net recievers. Thus, we can apply a standard result: Basic income is sustainable when the median income is below the mean income, because a majority gains from the redistribution from a minority.

The existence of an informal market complicates things slightly. If an individual prefers to work in the informal sector, the tax base will decrease and the welfare state must either increase taxes or decrease the basic income. One possibility is that this triggers further movement from the formal to the informal sector resulting in a collapse of the welfare state. So what factors influence the individual choice between the formal and the informal sector? The e;ect of $+$ is clear:

$$\frac{`\, e\,u^{i}_{a}}{`\, +} \wedge 0, \tag{10}$$

A more developed informal sector is more likely to be preferred than a less developed one. We then go on to note that

$$\frac{`\, e\,u^{i}_{a}}{`\, b} = (1 \quad :) \P^{0} (\cdot) + :\P^{0} (\cdot) \wedge 0 \tag{11}$$

The higher is the basic income, the higher is the expected utility from working in the informal sector. However, we must take into account that higher basic

income will also make the welfare state more attractive at least for some:

$$\frac{\partial eu^s}{\partial b} = (1 - \tau)\theta'(\cdot)(1 - \mu^\theta(b)) + \tau\theta'(\cdot)(1 - \mu^\theta) > 0 \qquad (12)$$

Because $\mu^\theta(b)$ is negative (higher basic income requires higher taxes), we know that the increased utility from a higher basic income is higher in the informal sector where taxes are avoided. In fact we can conclude the following:

Claim 1 If $\tau < 1 - \mu$ nobody will prefer to work in the informal sector.

Proof. The claim is very intuitive: If the income loss from working in the informal sector is bigger than the taxes that must be paid in the formal sector, people stay in the formal sector. ■

Claim 2 If $\tau > 1 - \mu$ then a welfare state with only basic income is not economically feasible because people enter the informal sector.

Proof. Compare eu^i to eu^b. If γ is large the impact on b (or μ) from one individual leaving the formal sector to work in the informal sector, is negligible. The gain from leaving the formal sector is the utility generated by difference between $+\theta$ and $(1 - \mu)\theta$ in state no loss. ■

Claim 3 If $\tau > 1 - \mu$ then a welfare state with basic income and social insurance could be feasible depending on the level of risk aversion.

Proof. The gain from leaving the formal sector is the utility generated by difference between $+\theta$ and $(1 - \mu)\theta$. This is possibly offset by the loss of utility created by the lack of income insurance in the informal sector. ■

The conclusion of our analysis so far is clear: When the welfare state competes with a developed informal sector, Bismarckian social insurance can generate support for a welfare state with basic income that would otherwise not be economically feasible. So far, we have only noted this result as a theoretical possibility. To examine if it holds under realistic circumstances we run some numerical simulations.

3.1 Numerical simulations

The theoretical models used so far say little about what will happen under realistic circumstances. To gain knowledge about this, we calibrate the model and run a simple simulation of the situation in a welfare state. The numbers used are loosely based on Swedish statistics, but the simulation is not intended to describe the situation in any particular country; the purpose is merely to see what the model will predict under reasonable parameter values.

We assume that society consists of three types ($n = 3$) and label these Lo, Med and Hi respectively. If we normalize the incomes of the top decile to 1[we

give the top third income 0.6, the mid third 0.3 and the lowest third 0.2. This income distribution is fairly equal and satisfies the criteria that median income is below the mean income. The risks are assumed to vary around 10 percent, being lowest for Hi and highest for Med. This typical risk distribution is based on data on sickness absence in Sweden.[1] The logic is that low and medium income earner use the sickness pay more than high income earners, because the latter often have better jobs and will be sick less often. The poorest, however, sometimes work even during sickness because they feel that they can not a; ord the income loss. We assume that the social insurance replacement rate is 80% and consider a basic income at 0Z1[i.e. half the level of the poorest third in the population. Finally, in the pure market alternative we assume that there is a markup at 10 percent over the actuarially fair premium (¤ = 1Z1)Z The expected utilities are calculated using a utility function with constant relative risk aversion (CRRA):

$$\P(°) = \frac{°1 \quad 2}{1 \quad 2}[\qquad (13)$$

where the risk aversion parameter 2 is set to 2 in our simulation. The parameter values and the resulting preferences (with the most preferred alternative to the left) is presented below.

Table 1. A numeric simulation of the four alternatives.

					income	risk	preferences
B	0,1	**t_s**	0,36				
c	1,1	**t_b**	0,32	**Hi**	0,6	0,05	m s i b
r	0,8	**c**	1,1	**Med**	0,3	0,15	s m i b
CRRA	2			**Lo**	0,2	0,1	s i b m

Two important conclusions can be drawn from the simulation. First of all, in this scenario, basic income with social insurance is the most preferred alternative for Lo and Med, whereas Hi would be better o; under pure market arrangements. Under a majority rule, welfare state **s** is politically sustainable.

Second, a welfare state with only basic income is unfeasible both politically and economically. Politically because Hi and Med would both be better o; under pure market arrangements, so welfare state B lacks majority support. Economically, because all three groups would prefer to work in the informal sector and thus welfare state B would collapse due to an eroding tax base.

3.1.1 Sensitivity analysis

By changing the parameter values in the scenario above, I have verified that the finding that welfare state **s** is superior to welfare state **b** in terms of political sustainability is rather robust. Higher risk aversion means a higher loss of utility

[1] Data from National Social Insurance Board in Sweden (RFV 1996).

from not being insured, and thus works in favor of welfare state **s**. The more developed the informal sector (higher +)[the higher must risk aversion be to make welfare state s economically feasible. When private insurance markets become more e>cient (lower ¤) political sustainability decreases, because the market alternative becomes more attractive.

3.2 Private insurance markets

So far we have assumed that there are no possibilities to buy income insurance on private markets. This is a fairly restrictive assumption, but it is far from obvious how private insurance markets should be modeled. If adverse selection is severe, it might be correct to assume that there are no private insurance markets functioning. Another possibility is the separating equilibrium as modeled by for example Rothschild and Stiglitz (1976) where low risk groups will only be able to by partial coverage. Perhaps the most realistic alternative is the one used here, where private insurers can separate risk groups but only by using a costly risk discrimination technology. In this case we write the expected utility from a welfare state with basic income as follows:

$$
\begin{aligned}
eU^{b}_{a} &= (1-\pi_a)\,u\left(b+1-\mu^{b}\omega_a-c^{b}_{a}+\pi_a\,u\left(b+z^{b\#}_{a}\omega_a-c^{b}_{a}\right)\right. && (14)\\
\text{where } z^{b\#}_{a} &= \arg\max_{z^{b}_{a}}(1-\pi_a)\,u\left(b+1-\mu^{b}\omega_a-c^{b}_{a}+\pi_a\,u\left(b+z^{b}_{a}\omega_a-c^{b}_{a}\right)\right.\\
c^{b}_{a} &= \frac{z^{b}_{a}\alpha\pi_a}{1-\pi_a}\left[\right.\\
\text{and } \mu^{b} &= \frac{P-\bar{b}}{\sum_{a=1}(1-\pi_a)\omega_a}\left.\right]
\end{aligned}
$$

Again, c^{b} is a markup ¤ over the actuarially fair premium, capturing the costs firms have to identify risk groups. The possibility to complement the basic income with income insurance bought on the market increases expected utility under a welfare state with basic income only (assuming that ¤ is su>ciently low so that there is at least some demand for market insurance).

If there are functioning private insurance markets, these may be available also for those who earn their income in the informal sector. If so, the expected utility from working in the informal sector can be written

$$
\begin{aligned}
eU^{i}_{a} &= (1-\pi_a)\,u\left(b+\omega_a-c^{i}_{a}+\pi_a\,u\left(b+z^{i\#}_{a}\omega_a-c^{i}_{a}\right)\right. && (15)\\
\text{where } c^{i}_{a} &= \frac{z^{i}_{a}\alpha\pi_a}{1-\pi_a}\left[\right.\\
\text{and } z^{i\#}_{a} &= \arg\max_{z^{i}_{a}}(1-\pi_a)\,u\left(b+\omega_a-c_1\right)+\pi_a\,u\left(b+z^{i}_{a}\omega_a-c_2\right)\left.\right]
\end{aligned}
$$

How does the availability of private insurance change the political support for the di;erent systems? Clearly, being able to buy market insurance increases the

expected utility of welfare state **b.** If, however, market insurance is available also in the informal sector, it is still attractive to enter the informal sector when + ^ 1 µℤ Thus, the result remains: Welfare state **s** will under some circumstances be politically more sustainable than welfare state **b**. The best situation for welfare state **b** is if basic income can be complemented with private income insurance whereas private income insurance is not available in the informal sector. This is analyzed numerically in the next section. In this case, the political choice regarding social insurance will depend on the e>ciency in social insurance compared to market insurance, and on the risk distribution in the population. If the median voter is a monetary net receiver from social insurance, social insurance can be less e>cient than market insurance and still be supported by a majority.

Numerical simulations, however, can illustrate more clearly the size of the e;ects under di;erent circumstances.

3.3 Numerical simulations with market insurance

Let us now introduce the possibility in welfare state **b** to complement basic income with private income insurance. Keeping all other parameter values constant, this changes the preferences to those described below:

Table 2. A numeric simulation of the four alternatives when basic income can be combined with market insurance.

	income	**risk**	**preferences**
Hi	0,6	0,05	m b s i
Med	0,3	0,15	s b m i
Lo	0,2	0,1	s i b m

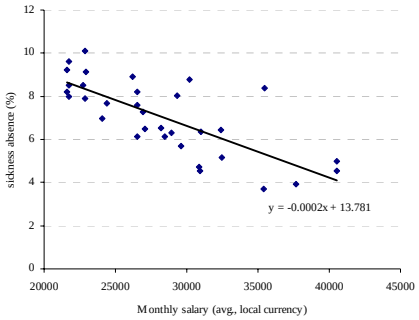
We see that welfare state **b** is now more attractive. But there is still a majority with s as the most preferred alternative, and welfare state b would still run into economic problems because Lo prefers to work in the informal sector. Note that this result is produced under the assumption that there is no private market insurance in the informal sector. Introducing this possibility renders the informal sector more attractive for everyone, and under some circumstances welfare state **s** will su;er problems because people prefer the informal sector. The conclusion is intuitive: If the informal sector is su>ciently well developed, any welfare state will run into problems becuase the tax base will decrease when people work informally rather than paying taxes. But a welfare state that combines social insurance with basic income is less vulnarble to this threat, regardless of whether market insurance is available as a complement to basic income or in the informal sector.

4 Bismarckian social insurance: Who is it good for?

The conclusions so far are clear: There are realistic situations when a welfare state that combines basic income and social insurance will be economically feasible and politically sustainable, whereas a welfare state with only basic income and correspondingly taxes would not be possible, neither economically nor politically. But besides the necessity to generate political support and economic feasibility, what can be said about the general desirability of Bismarckian social insurance?

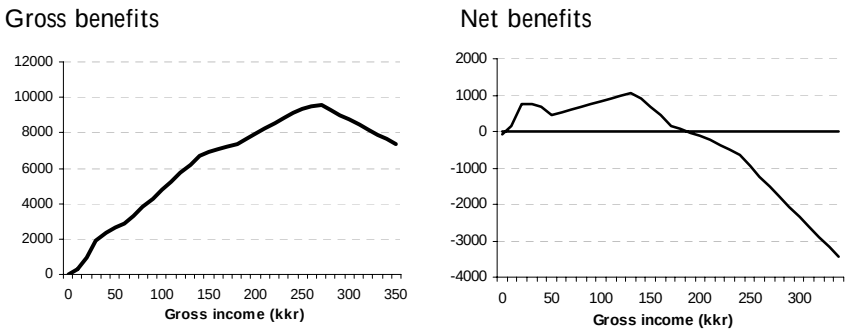
Intuitively, positively income related benefits may seem less appropriate from a redistribution perspective, because they provide higher absolute benefits to high-income earners. This intuition is wrong because it makes an implicit comparison with an irrelevant counter factual distribution. If a system without bismarckian social insurance lacks political support, then the relevant alternative to social insurance is market insurance. When social insurance is compared to market insurance, social insurance is in most cases the more egalitarian alternative. The reason is that social insurance pools the risks and forces all individuals to contribute to the insurance scheme based on the average risk. Under market insurance, on the other hand, there are incentives for sellers of insurance to separate individuals with low risk from those with high risk, and sell them insurance at a price based on their own risk. If it is possible for sellers to separate risk groups, high-risk individuals will pay more and low-risk individuals will pay less under market insurance compared to social insurance. Thus, the redistribution within Bismarckian social insurance goes from low-risk groups to high-risk groups. In many cases, this actually coincides with a redistribution from high-income earners to low and middle-income earners. One example is given in figure 1, which shows the relation between sickness absence and monthly wages for di;erent professions in Norway.

Figure 1: Monthly wages and sickness absence in Norway.[2]



We see that there is a clear negative relationship: Professions with higher wages have lower sickness absence. This is the case not only for Norway. Figure 2 shows how the Swedish sickness benefit pays more money to high-income earners, but assuming that the insurance is financed with proportional taxes, we see that there is actually a redistribution from high-income earners to low-income earners. This is the case partly because there is an upper benefit limit, but mainly because high-income earners have fewer sick days than low and middle-income earners.

Figure 2: Annual monetary payouts from the Swedish sickness benefit.[3]



Thus: Bismarckian social insurance replaces market insurance, which in many cases is less egalitarian than social insurance. Many advocates of welfare states with Bismarckian social insurance use exactly this type of counter factual argument. For example Stephens (1995) argue in favor of the institutional welfare state as follows:

[2] Data taken from Statistics Norway, various sources.
[3] Source: Bergh (2004).

> "the institutional welfare state crowds out all other alternatives (such as negotiated occupational benefits, private insurance, and personal savings), all of which are much more unequal than earnings related public benefits". (p. 148)

Ferrarini and Nelson (2003) note that low-income earners are more likely to use not only sickness pay but also unemployment benefits. It is important, however, to remember that the inverse relation between income and risk does not for all possible types of social insurance. For typical short term social insurance, closely related to the work situation, it seems likely that low-income earners have higher risk: High-income earners typically have more control over their work situation, and therefore they have better possibilities to avoid risks. Pension systems, however, represent a possible example of the opposite case: For several reasons, high-income earners have higher expected longevity than low-income earners. Thus, in a universal pension system with proportional fees and positively income-related pension benefits, high-income earners are net gainers, due to the shorter expected longevity of low-income earners.

To conclude: Combining basic income with short term Bismarckian social insurance will not decrease the redistributive e;ect of the welfare state, because high income earners are typically net payers to such insurance schemes.

4.1 Social insurance to compensate for brute luck events

Finally, we note that there is yet another possible defense of Bismarckian social insurance in that it compensates individuals for brute luck events. The concept of brute luck is usually attributed to Dworkin (1981a, b), and the idea is that individuals ought to be compensated for events for which they can not reasonably be held responsible. Vallentyne (2002) writes:

> "The occurrence of an event is due to brute luck for an agent if and only if the possibility of its occurrence was not (for the agent) a (reasonably) foreseeable outcome of his/her choices." (p. 532)

This definition of brute luck events fits well with the type of events for which social insurance gives protection. If set at 100 percent, a universal bismarckian social insurance financed by proportional taxation, would completely remove the income inequality due to risk di;erences between individuals, but leave una;ected the inequality due to wage di;erences. Thus, Bismarckian social insurance can be used to compensate for brute luck events, whereas progressive taxation and/or basic income can be used to create redistribution beyond risk pooling .

5 Conclusions

The paper is both positive and normative. The positive part is the prediction that systems with high basic income and no social insurance will suffer from a decreasing tax base. The normative part argues that a system should combine basic income with social insurance, not only because this maximizes political sustainability, but also because Bismarckian social insurance compensates individuals for brute luck events.

Previous research has indicated that much of the redistribution taking place in big institutional/universal welfare states is favorable for middle income earners rather than directly redistributive towards the poor.[4] Two things need to be said about this. First of all, that the poor in these societies may well be better off than they would have been under a more targeted welfare state, and for sure they are better off than they would be under pure market arrangements. Second, the fact that modern universal welfare states tend to favor the middle classes can be viewed as yet another strong argument for implementing a basic income. In this case, Bismarckian social insurance may not be directly beneficial for the poor, but is instrumentally important because they help to generate political support for a system which includes an unconditional basic income.

References

Barr, N. (1998), The Economics of the Welfare State, Stanford University Press, Stanford, California.

Bergh, A. (2004), 'The universal welfare state: Theory and the case of sweden', Political Studies **forthcoming**.

Dworkin, R. (1981a), 'What is equality? part i: Equality of welfare', PPA **10**, 185–246.

Dworkin, R. (1981b), 'What is equality? part ii: Equality of resources', PPA **10**, 283–345.

Ferrarini, T. & Nelson, K. (2003), 'Taxation of social insurance and redistribution: A comparative analysis of ten welfare states', Journal of European Social Policy **13(1)**, 21–33.

Goodin, R. E. & Grand, J. L. (1986), 'Creeping universalism in the welfare state: Evidence from australia', Journal of Public Policy **6**, 255–274.

RFV (1996), Socialförsäkring 1995 1996, National Social Insurance Board, Sweden. Sjukförsäkringsdata i tab. 6:6.

[4] See for example Goodin and Le Grand (1986).

Rothschild, M. & Stiglitz, J. (1976), 'Equilibrium in competetive insurance markets: An essay on the economics of imperfect information', Quarterly Journal of Economics **80**, 629–649.

Stephens, J. D. (1995), 'Preserving the social democratic welfare state', Nordic Journal of Political Economy **22**, 143–162.

Vallentyne, P. (2002), 'Brute luck, option luck, and equality of initial opportunities', Ethics **112**, 529–557.

Van Parijs, P. (1995), Real Freedom for All, Oxford University Press, New York.