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Source: *The Economic Journal*, Vol. 112, No. 481 (Jul., 2002), pp. 481-503

Published by: Oxford University Press on behalf of the Royal Economic Society

Stable URL: <https://www.jstor.org/stable/798517>

Accessed: 25-11-2019 16:59 UTC

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INFORMAL FAMILY INSURANCE AND THE DESIGN OF THE WELFARE STATE*

Rafael Di Tella and Robert MacCulloch

We study unemployment benefit provision when the family also provides social insurance. In the benchmark case, more generous State transfers crowd out family risk-sharing one-for-one. An extension gives the State an advantage in enforcing transfers through taxes (whereas families rely on self-enforcement). More generous State transfers lead to more than one-for-one reductions in intra-family insurance, so that total transfers to the unemployed fall as the State's generosity increases. This does not imply that the optimal size of the Welfare State is zero. Our results still hold when families are assumed to be better than the State at monitoring job search activities of unemployed.

A large literature in economics has analysed the problem of optimal unemployment benefit provision and the impact of unemployment benefits on the unemployment rate; see Ehrenberg and Oaxaca (1976), Feldstein (1976; 1978), Baily (1978), Shavell and Weiss (1979), *inter alia*. A review by Atkinson and Micklewright (1991) has pointed out that a shortcoming of this literature is that it does not allow for several major institutional features observed in actual unemployment compensation programmes around the world. For example, an important factor that has been ignored is the potential of families as insurance providers. Yet, in a world without government, families may provide much of the social insurance available to people. This introduces several questions. If family members are bound together by insurance provision, will a more generous Welfare State increase total insurance available to people? Or will it crowd out insurance provided by families? How does this occur? Could the State make things worse by destroying informal insurance to such an extent that total insurance falls? What are the implications for the optimal size of the Welfare State? This paper attempts to provide some answers to these questions by linking work on the optimal Welfare State with that on informal (non-market) insurance activities of families.

The traditional approach in economics to modelling family activities follows Barro (1974) and Becker (1991), and assumes altruistic preferences. Within this framework, attention has been given to how altruistic families may undo government actions by transfers between different generations. An alternative approach treats intra-family transfers as a counterpart to the exchange of services provided by family members. While this has long been the standard approach in anthropology, economists have only recently begun to apply the 'exchange model' to study insurance against uncertain longevity (Kotlikoff and Spivak, 1981), insurance

* We thank Andrew Oswald for extensive comments, as well as George Akerlof, Tony Atkinson, Christopher Bliss, Lars Calmfors, Donald Cox, Barry McCormick, Meg Meyer and seminar participants at Nuffield College, Oxford, the IIES (Stockholm) and Harvard University. We also thank two anonymous referees for many helpful suggestions, as well as Dennis Snower, Steven Davis and participants at both the CEPR conference 'Rethinking the Welfare Society' and the Northwestern/Chicago JCPR conference 'Risk Sharing and Economic Vulnerability'. An earlier version of this paper was called 'Does the welfare state destroy the family?' (Di Tella and MacCulloch, 1997).

against accidents (Arnott and Stiglitz, 1991) and in-kind services (Bernheim *et al.*, 1985; Cox, 1987). This paper follows the non-altruistic approach to model family insurance against unemployment, and then introduces the government as a second source of insurance.¹

An important problem in modelling insurance among self-interested members of a family is contract enforcement. Although exchange models, such as Kotlikoff and Spivak (1981), show intra-family transfers may not depend on altruism, they do rely on some level of mutual trust existing to avoid the problem of informal family transfers being legally non-enforceable. The problem is that if person *A* makes a private transfer to person *B* who has had an unlucky spell, *B* may not reciprocate when luck changes and *A* needs help. The State does not have this problem when running an insurance scheme since it can force lucky members to pay through the tax system.² Our paper follows Kimball (1988) and Coate and Ravallion (1993) by assuming families can only use self-enforcing contracts.³ We model informal insurance schemes as a group of individuals who interact repeatedly and punish defectors by excluding them from future risk-sharing arrangements. Hence, the punishment for defection is autarky. The State is modelled as a second source of insurance, funded by taxation. Our paper then goes on to consider the realistic possibility that families have an informational advantage (*vis-à-vis* the State) about the activities of their members. Specifically, we assume that families are in a better position than the State to know if unemployed members are actively searching for a job and reduce moral hazard considerations.

The main result of the paper is that State-provided unemployment benefits can crowd out intra-family transfers more than one-for-one. The intuition for this result in the simple case (no moral hazard) is as follows: an increase in State-provided unemployment benefits would be followed by a one-for-one reduction in intra-family transfers as families try to return to the initial level of risk-sharing. However, the increased generosity of State benefits makes defecting from the informal family risk-sharing contract more attractive. Hence, family transfers must be reduced even further to keep the informal risk-sharing contract incentive compatible. This result implies a dramatic departure from the predictions of previous exchange and altruistic models.⁴ The more than one-for-one crowding out result arises because the State changes the opportunity cost of belonging to a family. Thus, the Welfare State affects the amount of informal insurance that families can sustain by changing the

¹ The anthropology literature has also stressed how families provide unemployment insurance. Peace's (1979, p. 31) study of migrant Nigerian workers states

that most (network members) manage to generate some surplus from time to time that is mostly used in the support of members in difficulty. This brings us to the second major function of migrants' networks: they are support units which allocate available surplus finances in such a way as to come to terms with insecure conditions of employment

² The ability to coerce individuals to pay is one of the features that political scientists use to *define* the State. See, for example, the entry on origins of the State in Kuper and Kuper (1996).

³ Although we use the word 'families', the ideas here apply to more general informal insurance arrangements that exists between individuals, who may or may not be related by blood or marriage.

⁴ For example, market imperfections can be introduced into altruistic models to show why Ricardian equivalence fails, implying State actions are only partially offset by private actions (ie less than one-for-one crowding out). However, instead of *reducing* the effect of changes in Welfare State generosity on family risk-sharing transfers, the imperfections we introduce *increase* the size of the effect.

punishment available for those who default (ie by changing the set of admissible contracts). This result is related to Rotemberg and Saloner (1986) on the business cycle's effect on collusive agreements, and Baker *et al.* (1994) on the interaction between explicit and implicit incentive contracts in firms.⁵ Our work is also related to Krueger and Perri (1999) which solves for optimal non-stationary insurance arrangements when both public and private insurance exist.

The intuition for the main result when families have an informational advantage (moral hazard case) is that, not only does autarky become more attractive but employed family members must now also pay higher taxes to support the greater numbers of unemployed due to the moral hazard problem. This result does not mean that the State should not provide social insurance. The optimal size of the Welfare State when families are strong (in the sense that they can maintain a high level of insurance on their own) is zero. Increasing State benefits serves only to increase unemployment due to the moral hazard problem and collapse intra-family transfers. If families are sufficiently weak, however, it is optimal for the State to intervene and become the sole-provider of social insurance. Arnott and Stiglitz (1991) first proposed the 'peer monitoring view' of the family in a model where market insurance reduces the care an individual takes to avoid accidents, but non-market insurance may not have this effect due to the ability of members to monitor each other. They do not allow for the informational asymmetry to affect the aggregate cost of risk (whereas, in our model, more generous benefits may increase the unemployment rate) nor do they consider problems of enforcement of informal contracts between family members.⁶

The model tries to capture two stylised facts about the Welfare State and the family. The first is that large extended families seem to be more common in countries where the Welfare State is not developed.⁷ The second pertains to electoral competition between political parties. Political scientists have long argued that successful parties *either* give priority to individual interests and liberty *or* to collective demands. In practice, this means that parties supporting a small Welfare State *also* oppose laws/agencies perceived to be competing with traditional family institutions. We would like to know why political parties (and voters) seem to associate the size of the Welfare State with family strength.

Section 1 presents a model showing the interaction between the transfer decisions of the family and the State. Section 1.1 extends the basic setting to capture the State's advantage at enforcing contracts through the power to tax. Section 1.2 further extends the model by assuming the family has an advantage relative to the

⁵ We believe that a similar logic underlies Kranton (1996) on the interaction of market and reciprocal exchange in primitive society, and Prendergast and Stole (1999) on restricting the means of exchange.

⁶ A small literature in development economics has applied this 'peer monitoring view' to credit markets; see the review in Besley (1995). The present paper can also be seen as applying the literature on the public provision of private goods to the case of social insurance. The main papers in this literature focus on goods that cannot be consumed from both providers at the same time, such as education or health care; see, for example, Besley and Coate (1991).

⁷ Policy debates already incorporate the idea that the optimal size of the Welfare State must take into account the importance of family networks: 'Comparisons with the Asian tigers may be unfair – these countries can get away with lower social transfers because families tend to offer much greater support to their members than in industrial nations' (*The Economist*, 6 April 1996).

State in monitoring job search efforts of their unemployed members. Section 2 discusses implications and provides direct evidence. Section 3 concludes.

1. The Model

The economy is populated by M infinitely lived, risk-averse individuals who have instantaneous utility $z(x) - c(e)$ where x is income ($z_x > 0$, $z_{xx} < 0$ – subscripts denoting derivatives) and e is the level of search effort made by unemployed individuals to find a job (where $c(0) = 0$, $c_e > 0$, $c_{ee} > 0$). Define A as the life-time expected utility of an unemployed worker, where

$$rA = z(b) - c(e) + j(B - A) \quad (1)$$

and B as the life-time expected utility of an employed worker, where

$$rB = z(W) + t(A - B). \quad (2)$$

In these equations, b is the level of total benefits paid to the unemployed, j is the outflow rate from unemployment into employment, r is the exogenous rate of time preference (or ‘discount rate’) and t is the exogenous inflow rate into unemployment.⁸ The inflow rate is the stationary employment risk that workers desire insurance against. The net wage is $W (= w - n)$, where w is the gross wage and n is the premium required to support the transfers. Solving (1) and (2) simultaneously gives

$$rA = \frac{jz(W) + (r + t)[z(b) - c(e)]}{j + r + t} \quad (3)$$

and

$$rB = \frac{(j + r)z(W) + t[z(b) - c(e)]}{j + r + t}. \quad (4)$$

Assume that people form networks of friends and relatives (called ‘families’) for the sole purpose of sharing labour income risk – as in Kotlikoff and Spivak (1981) – families are identical and labour income risk is uncorrelated across members.⁹ We assume saving is not possible due to the absence of a capital market, which may be an alternative way to deal with employment shocks. To the extent that saving is also used to smooth such shocks, the effect of the development of capital markets on family risk-sharing arrangements may be similar to the Welfare State.¹⁰ Private markets for unemployment insurance (UI) are assumed not to exist. Empirically, this seems plausible. Chiu and Karni (1998) state that ‘unemployment insurance is unique in

⁸ The intuition for (1) is that the returns for the unemployed equal the flow of utility they receive from benefits, $z(b)$, plus the expected capital gain from finding a job, whereby utility rises from A to B with probability j (and probability $(1 - j)$ no change occurs). Equation (2) says the returns from being employed equal the flow of utility one receives from the net wage, $z(W)$, plus the expected capital loss of losing one’s job, whereby utility falls from B to A with probability t .

⁹ Whereas the model imposes the exogenous assumption of non-correlation of labour income risk, family members may endogenously choose to ensure that most risk is idiosyncratic. Dasgupta (1993) reports work by Udry (1990) showing that, even in very primitive environments, households diversify activities to reduce the extent to which their incomes are correlated with one another. Estimates of the share of idiosyncratic risk in the variance of total household income is over 75%. See also Fafchamps and Lund (2000).

¹⁰ The effect of insurance on precautionary savings is studied by Kotlikoff *et al.* (1986).

that unlike other forms of insurance it has never been provided by the private sector'; see also Oswald (1986) and Atkinson and Micklewright (1991). The assumption of no private UI market has been widely made in the previous literature; see, *inter alia*, Baily (1978), Azariadis (1975) and Wright (1986). Chiu and Karni (1998) observe that private UI was not even offered when there was no public sector UI. Hence, they argue that some fundamental problem, such as adverse selection, must be invoked to explain the near-universal absence of private UI (rather than just crowding out by the public sector). Note that the two sources of insurance considered here (the state and families) totally avoid adverse selection problems.

We also assume families are large so that, at all times, a constant proportion of members are unemployed.¹¹ If a family has m members, $(1 - u)m$ will be employed and um unemployed, where u is the family unemployment rate. Simulations of Kotlikoff and Spivak's (1981) model show that even small families with 3 or 4 members can achieve 60–70% of the risk-pooling welfare gain of market full insurance. Since we assume the number of members is fixed, the Welfare State cannot affect the family by changing its optimal size. This ignores several issues. For example, by increasing the number of members, families can pool risk more efficiently. However, gathering information about members' activities may grow harder in larger families. Arnott and Stiglitz (1991) emphasise the risk-pooling advantage of the State relative to small families and the informational advantage of the latter. They show that informal insurance may be harmful. The reason is that it crowds out market insurance, replacing it with insurance that involves less risk-pooling. However, if family insurers hold perfect information about their members' effort, informal insurance is beneficial. Since the focus of the present paper is on the consequences of the State's advantage at enforcing contracts, rather than pooling risks, we assume large families.

The outflow rate from unemployment, $j(e)$, depends on the level of search effort, e , by unemployed family members (where $j_e > 0$ and $j(e) > c > 0 \forall e$). Labour market equilibrium implies that flows into and out of unemployment are equal: $j(e)um = t(1 - u)m$. The steady state unemployment rate of family members is

$$u = \frac{t}{j(e) + t}. \quad (5)$$

Family risk-sharing is governed by a budget constraint. Employed members pay a premium, n^f , to support 'family transfers' of b^f to each unemployed member: $(1 - u)n^f = ub^f$. The State also provides transfers to the unemployed, which we shall call 'public transfers'. Assume there are M people in our economy and the aggregate unemployment rate is U . The $(1 - U)M$ employed must pay a premium (through taxes) to provide for UM unemployed, who each receive b^p . The State's budget constraint is $(1 - U)n^p = Ub^p$. Total transfers are $b = b^f + b^p$.

¹¹ Evidence related to this assumption is provided by Peace. He reports that it is not possible for network members to have money in hand for several successive months 'because networks must carry unemployed members on a recurrent basis' (Peace, 1979, p. 31). For work that analyses risk sharing without commitment and a small number of agents, see Thomas and Worrall (1988) and Kocherlakota (1996).

The State moves first, setting public transfers to maximise aggregate social welfare, taking account of the subsequent reaction of families. Each family responds by setting its own transfers to maximise the welfare of a random member. Hence, Stackelberg equilibria are analysed. We study optimal stationary insurance arrangements, whereby fixed transfers are paid to the unemployed that do not vary over time or with an individual's history. These arrangements are studied for simplicity although they may not be the best ones for the family to use.¹²

1.1. 'Benchmark Case': Enforceable Family Contracts

Let families possess the same 'contracting technology' as the State. Thus families can legally enforce any level of insurance transfers they choose. Assume the State can perfectly monitor the job search activities of the unemployed so there are no moral hazard problems and families take effort as given. The assumption of the State's ability to monitor search is quite strong, and will later be relaxed, but one could imagine a law prescribing the level of search for individuals who are averse to breaking the law or a sanction consisting of withdrawal of benefits if lower search were observed. For identical families, the outflow rate (and hence unemployment rate) is equal across all families (ie $u = U$). Families choose transfers to maximise welfare of a random member, given public transfers, subject to their budget constraint:

$$\max_{b^f} M = [UA + (1 - U)B] \quad (6)$$

such that

$$n^f = \frac{Ub^f}{1 - U}.$$

Substituting for the budget constraint, the first-order condition (FOC) for families is

$$\frac{(t + rU)[z_b(b) - z_W(W)]}{r(j + r + t)} = 0. \quad (7)$$

The net wage, W , equals $w - Ub/(1 - U)$. Equation (7) implies that family members will be fully insured. Let $b^f = f(b^p)$ be the optimal level of family transfers, for a given level of public transfers.

PROPOSITION 1 (One-for-One Crowding Out). *With no moral hazard and enforceable family contracts, increases in public transfers crowd out family transfers one-for-one.*

Proof The FOC (7) implies that $W = b$. Consequently, $b^f = w(1 - U) - b^p$ and

$$\frac{db^f}{db^p} = -1. \quad (8)$$

¹² Papers that study informal bilateral insurance arrangements have shown that non-stationary arrangements can do better; see, for example, Kocherlakota (1996), Gauthier *et al.* (1997), Ligon *et al.* (1997), and Thomas and Worrall (1988).

The State sets the level of public transfers and search effort to maximise social welfare, given its budget constraint and the response of families:

$$\max_{b^p, e} S = [UA + (1 - U)B] \quad (9)$$

such that

$$\begin{aligned} \text{(i)} \quad n^p &= \frac{Ub^p}{1 - U} \\ \text{(ii)} \quad b^f &= w(1 - U) - b^p. \end{aligned}$$

PROPOSITION 2 *With no moral hazard and enforceable family contracts, the level of public insurance transfers to the unemployed is irrelevant to social welfare.*

Proof Families set transfers so that, regardless of public transfers, they are always fully insured (from FOC (7)). Substituting for constraints (i) and (ii) in the welfare function (9), gives $[z(W) - Uc(e)]/r$ where $W = b^f + b^p = w(1 - U)$. Hence social welfare is independent of the level of public transfers.

1.2. Non-enforceable Family Contracts

To reflect the State's advantage at enforcing contracts, we make the following assumption:

ASSUMPTION 1 *The State can fully enforce risk-sharing contracts using the power to tax the employed. Families only have available self-enforcing contracts.*

This implicitly assumes that the State cannot hire out its contract enforcement services, possibly due to the costs of legal contracting. Such transaction costs could therefore be a reason to justify the provision of services inside the family. The problem for families now is that the promise of unemployed members to reciprocate transfers in the future is not credible as there is no legal enforcement of family risk-sharing contracts.¹³ To overcome this problem, families enter informal contracts whereby members refuse to provide insurance transfers forever to anyone defaulting on their obligations to the unemployed. Hence the penalty for default is to exclude the worker from enjoying family risk-sharing arrangements in the future.¹⁴ This introduces a constraint on the

¹³ Coate and Ravallion (1993) argue that 'illiteracy, cultural intimidation by modern institutions, and problems of asymmetric information ...' make informal insurance contracts relevant even if formal insurance markets do exist.

¹⁴ We ignore other punishments available to families, like stigmatising defectors or depriving them of affection. Otherwise, playing a simple trigger strategy would not be optimal (Abreu, 1988). The possibility of renegotiation between the family and unemployed defectors is also ignored. Although non-cooperation between the family and defector is credible (ie it is a Nash equilibrium of the subgame) the players could renegotiate to leave the punishment phase for an equilibrium where everyone is better off (Farrell and Maskin, 1989). MacLeod and Malcomson (1989) consider which of their market equilibria are renegotiation proof for implicit employment contracts.

set of informal contracts that are enforceable. Our trigger strategy consists of each employed member continuing to pay a premium, $n^f = Ub^f/(1 - U)$, enabling unemployed members to receive transfers of b^f (as well as b^p) so long as all other employed members also pay their premium. The family is maintained only while the value to employed members from not cheating, V^F , exceeds the value from autarky, V^A . In other words, $V^F(b^p, b^f, U, e) - V^A(b^p, U, e) \geq 0$ where

$$V^F(b^p, b^f, U, e) = \frac{[j(e) + r]z\left(w - \frac{ub^f}{1 - u} - \frac{Ub^p}{1 - U}\right) + t[z(b^f + b^p) - c(e)]}{r[j(e) + r + t]} \quad (10)$$

and

$$V^A(b^p, U, e) = \frac{[j(e) + r]z\left(w - \frac{Ub^p}{1 - U}\right) + t[z(b^p) - c(e)]}{r[j(e) + r + t]}. \quad (11)$$

The term for V^A states that employed defectors (those who stop contributing towards the support of unemployed family members) will be punished by not receiving b^f should they fall unemployed.¹⁵ The only transfer available for defectors will be what the State provides. Simplifying yields the condition:

$$F(b^p, b^f, U, e) = [j(e) + r] \left\{ z \left[w - \frac{U(b^f + b^p)}{1 - U} \right] - z \left(w - \frac{Ub^p}{1 - U} \right) \right\} + t[z(b^f + b^p) - z(b^p)] \geq 0 \quad (12)$$

when $u = U$. Call (12) the 'enforceability constraint'.¹⁶ If it cannot be satisfied for any $b^f > 0$, then families can provide no self-enforcing insurance arrangements for their members (whereas the State enforces the premium payments that provide for public transfers through its power to tax). If the constraint can be satisfied for positive family transfers, then families may still be unable to achieve their desired full insurance due to the temptation of members to shirk on their premiums. The family problem is

$$\max_{b^f} M = [UA + (1 - U)B] \quad (13)$$

such that

$$(i) \quad n^f = \frac{Ub^f}{1 - U}$$

$$(ii) \quad F(b^p, b^f, U, e) \geq 0.$$

The family budget constraint is given by (i) and the enforceability constraint by (ii). Substitute for the budget constraint in the objective function, M . The solution is

$$M_{b^f} + \lambda F_{b^f}(b^p, b^f, U, e) = 0. \quad (14)$$

¹⁵ Kimball (1988) and Coate and Ravallion (1993) give fuller descriptions of informal insurance arrangements.

¹⁶ The more general term is 'incentive compatibility constraint'.

$$F\lambda = 0 \quad F \geq 0, \lambda \geq 0 \quad (15)$$

where M_{bf} and F_{bf} are the partial derivatives of $M(\cdot)$ and $F(\cdot)$ with respect to b^f and λ is the Lagrange multiplier associated with the enforceability constraint. When $\lambda = 0$, the constraint is not binding: $F(b^p, b^f, U, e) > 0$ and $M_{bf} = 0$. Hence $z_b(b) - z_W(W) = 0$ and family members are fully insured.

When $\lambda > 0$, the enforceability constraint binds and the level of family transfers is governed by the equation $F(b^p, b^f, U, e) = 0$, which implicitly defines family transfers in terms of public transfers. At such points, increasing family transfers further would collapse the informal risk-sharing arrangements since the value from cheating would exceed the value from continuing transfer premium payments. Formally, when the enforceability constraint binds, $\partial F / \partial b^f \leq 0$.

REMARK

- (i) Family transfers decrease with the discount rate when the enforceability constraint binds.
- (ii) For a sufficiently low discount rate, families can enforce full insurance on their own.

Proof See the Appendix.

The intuition is that the present value of the future discipline, activated when a family member is discovered cheating, falls as the discount rate rises. Hence, the discount rate can be used to measure family strength. For a sufficiently low rate, the present value of the future discipline can be made large enough to make it not worthwhile for any family member to defect on their premium payments.

PROPOSITION 3 (More than One-for-One Crowding Out, Part I) *Assume no moral hazard exists and the enforceability constraint binds. Increases in public transfers crowd out family transfers by more than one-for-one.*

Proof See the Appendix.

This result is driven by the properties of the enforceability constraint. Start from a position of equilibrium and consider an increase in public transfers. The immediate effect is that it improves the life-time utility of someone defecting from the family by reducing the cost of falling unemployed; see V^A in (11). For employed family members, the immediate effect is that they now find they have too much insurance; see V^F in (10). By simply offsetting the increase in public transfers through a one-for-one reduction in family transfers, employed members would return to the same level of insurance they had before the State increased transfers. However, this is no longer an equilibrium since defecting is now not so bad an option. Hence, the family must further reduce transfers so that employed members still wish to be a part of future arrangements. Fig. 1 illustrates. Segment AB represents how total transfers change when family insurance is being crowded out (Proposition 3). Segment DE illustrates the same process when families are weaker (are more impatient for example). Since total transfers fall as public transfers rise,

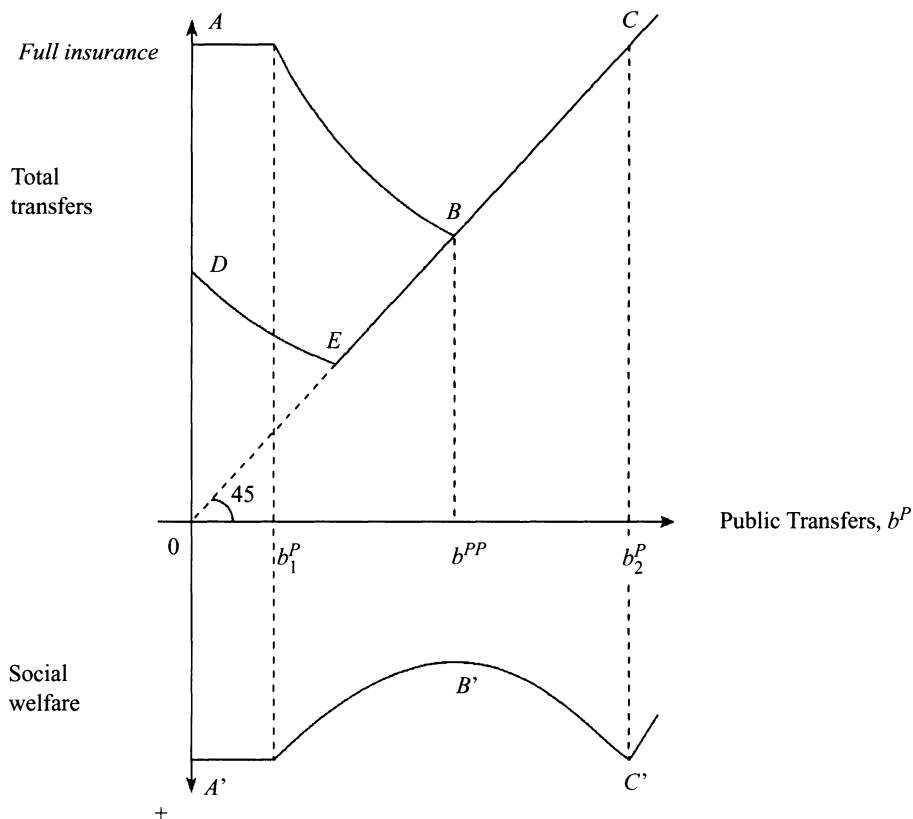


Fig. 1. *Total Transfers and Social Welfare as a Function of Public Transfers when Family Contracts are Non-enforceable and no Moral Hazard Problems Exist*

there will exist a level of public transfers, b^{PP} , at which point families collapse (for weak families this happens at point E , while for strong families this happens at point B). Thereafter, total transfers equal public transfers (assuming transfers are non-negative).

Let $b^f = f(b^p)$ describe family transfers as a function of public transfers. The State sets the level of public transfers and search effort to maximise social welfare, given its budget constraint and the response of families:

$$\max_{b^p, e} S = [UA + (1 - U)B] \quad (16)$$

such that

$$(i) \quad n^p = \frac{Ub^p}{1 - U}$$

$$(ii) \quad b^f = f(b^p).$$

PROPOSITION 4 (Optimal Size of the Welfare State, Part I) *With non-enforceable family contracts and no moral hazard, the State attains the social welfare optimum by supplying full insurance. If families are strong enough to enforce full insurance on their own then a welfare optimum also occurs when public transfers are zero.*

Proof See the Appendix.

Consequently, the welfare maximising level of public transfers depends on family strength.¹⁷ If families can enforce full insurance on their own, then the State can achieve the welfare optimum in two ways. It can set a low level of transfers, denoted b_1^P in Fig. 1, and let the strong families provide the difference between that level and full insurance through informal arrangements. Increasing public transfers beyond b_1^P leads to lower total transfers and welfare (along curve AB). Alternatively the State could set transfers equal to full insurance, at b_2^P . A bad choice is a middle value of transfers, like b^{PP} . Here the ability of families to enforce their own transfers collapses and social welfare (depicted by curve $A'B'C'$ in the second quadrant) is low. For weak families, the only way the State can deliver high insurance is by being the sole provider. DEC shows how total transfers vary with public transfers for this case. The State is now better off to increase public transfers beyond point E until $b^P = b_2^P$ at C, at which point family risk-sharing disappears.

1.3. Non-enforceable Family Contracts and Moral Hazard Problems

To reflect the information advantage of families, we make an additional assumption:

ASSUMPTION 2 *The State cannot perfectly monitor the job-search activities of the unemployed.*

Families now choose their own level of search effort, e , which determines the outflow rate from unemployment, $j(e)$. The family anticipates the effect of changes in the level of search effort by its members on the family unemployment rate, u , but not on the aggregate unemployment rate, U . Hence, a distinction now exists between these two variables that was not present in the previous section. Assume that the level of search effort by workers who defect from the family is chosen by these workers to maximise their own welfare outside the family. Let $j^A(e^A)$ be the unemployment outflow rate of the autarkic workers who expend effort, e^A , on job search. The function, j^A , may in general be defined differently from j if for autarkic workers, for example, it is harder to find jobs when they are not part of a family network.

This more general case combines the relative strengths of both families and government: whereas the State cannot perfectly monitor the activities of family members (which can lead to unemployment being a positive function of public

¹⁷ The discount rate is a parameter in the model affecting the potential generosity of informal family insurance.

transfers), the State has the advantage of enforcing contracts through the law. The problem for the family can be stated as

$$\max_{b^f, e} M = [uA + (1 - u)B] \quad (17)$$

such that

$$(i) \quad n^f = \frac{ub^f}{1 - u}$$

$$(ii) \quad F(b^p, b^f, U, e) \geq 0.$$

The family budget constraint is (i). The full expression for the enforceability constraint (ii) is

$$\frac{[j(e) + r]z\left(w - \frac{ub^f}{1 - u} - \frac{Ub^p}{1 - U}\right) + t[z(b^f + b^p) - c(e)]}{r[j(e) + r + t]} - \frac{[j^A(e^A) + r]z\left(w - \frac{Ub^p}{1 - U}\right) + t[z(b^p) - c(e^A)]}{r[j^A(e^A) + r + t]} \geq 0. \quad (18)$$

Substitute for the budget constraint in the objective function, M . The solution is then

$$M_{bf} + \mu F_{bf}(b^p, b^f, U, e) = 0 \quad (19)$$

$$M_e + \mu F_e(b^p, b^f, U, e) = 0 \quad (20)$$

$$F\mu = 0 \quad F \geq 0, \mu \geq 0 \quad (21)$$

where M_e and F_e are the partial derivatives of $M(\cdot)$ and $F(\cdot)$ with respect to e , and μ is the Lagrange multiplier associated with the enforceability constraint (ii). If $\mu = 0$, this constraint is not binding: $F(b^p, b^f, U, e) > 0$, $M_e = 0$ and $M_{bf}^f = 0$. Hence, there is full insurance. If $\mu > 0$ then the enforceability constraint binds: $F(b^p, b^f, U, e) = 0$. At such points, increasing family transfers further would collapse informal risk-sharing since the value from cheating would exceed the value from continuing paying transfer premiums. There are three equations, (19)–(21), in three unknowns: b^f , e and μ . They define search effort and family transfers as functions of public transfers. Hence they also determine the aggregate unemployment rate, U , which depends on search effort across all unemployed workers, as a function of public transfers.

PROPOSITION 5 (More than One-for-One Crowding Out, Part II) *Assume the enforceability constraint binds and $j^A(e^A) < c \forall e^A$. When there exists a moral hazard problem, increases in public transfers still crowd out family transfers more than one-for-one.*

Proof See the Appendix.

Two factors drive this result. Starting from a position of equilibrium, if public transfers are increased, the immediate effect is that it improves the life-time utility of a defector from the family by reducing the cost of falling unemployed.

For employed family members, the immediate effect is that they now find they have too much insurance. By offsetting the increase in public transfers through a one-for-one cut in family transfers, the employed can return to the same level of insurance they had before the State increased transfers. However, since defecting from the family is now a better option, the family must further reduce transfers so that employed members still wish to be part of future arrangements. This same factor also led to the more than one-for-one crowding out result in Proposition 3.

There is now a second factor, though, arising from the moral hazard problem that reinforces this result. When the increase in public transfers leads to lower job search effort and hence higher unemployment, employed family members bear a greater tax burden to support the unemployed and become even more willing to defect.¹⁸ In other words, the incentive to defect increases because higher taxes raise the marginal utility of income and hence individuals are less willing to pay the family insurance premium. As a result, the family must further reduce transfers to lower transfer premiums so that the employed members still wish to be a part of future arrangements. Once the enforceability constraint cannot be satisfied for $b^f > 0$, total transfers equal public transfers. Fig. 2 illustrates.

Let the relationship between search effort and public transfers be $e = E(b^p)$, and between family transfers and public transfers be $b^f = g(b^p)$. The State sets public transfers to maximise social welfare, given its budget constraint and the response of families:

$$\max_{b^p} S = [UA + (1 - U)B] \quad (22)$$

such that

- (i) $n^p = \frac{Ub^p}{1 - U}$
- (ii) $b^f = g(b^p)$
- (iii) $e = E(b^p)$.

PROPOSITION 6 (Optimal Size of the Welfare State, Part II) *Depending on the discount rate, at the social welfare optimum either the family, or the State, is the sole provider of transfers.*

Proof See the Appendix.

Consequently, in contrast to the case presented in Section 1.2, there exists in general only one level of public transfers that yields a social welfare optimum. If families are sufficiently strong to provide full insurance for their members when

¹⁸ Both in this case and when the enforceability constraint does not bind (and families are fully insured), higher public transfers can lead to lower outflow rates from unemployment for family members. As public transfers rise and family transfers fall, there is less benefit to each family from extra search efforts that only decrease family unemployment but have no effect on the aggregate rate of unemployment.

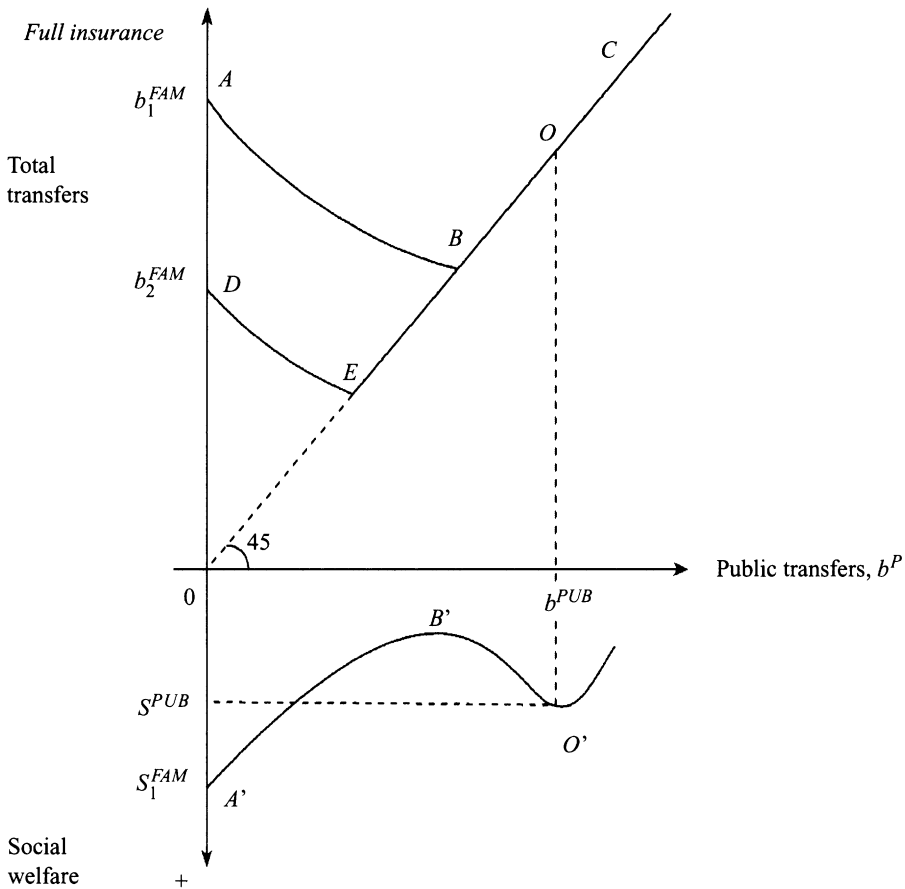


Fig. 2. *Total Transfers and Social Welfare as a Function of Public Transfers when Family Contracts are Non-enforceable and Moral Hazard Problems Exist*

the State provides zero transfers, then there can be no role for the State. Increasing public transfers serves only to lower welfare due to the moral hazard problem that arises when part of total transfers is paid by the State. Furthermore, even when families are not strong enough to be able to provide full insurance for their members, it may still be optimal for the State to withdraw from the provision of transfers. In Fig. 2, families set transfers equal to b_1^{FAM} (less than full insurance) and achieve welfare, S_1^{FAM} , if the State provides zero transfers. If the enforceability constraint binds, increasing public transfers leads to reductions in total transfers (along AB), lower outflows from unemployment and reductions in social welfare. Once families are completely destroyed, increasing public transfers further leads to increases in total transfers (along BC) but also increases in unemployment due to the moral hazard problem. If the highest level of welfare that the State can achieve along BC (equal to S^{PUB}) is less than S_1^{FAM} , then it is best to leave families as the sole providers of welfare. Social welfare is depicted by curve $A'O'$ in the second quadrant.

However, if families are sufficiently weak, there is not just a partial role for the State. In fact, the State should become the sole provider of transfers. Curve *DEC* shows how total transfers vary with public transfers for weak, families. When the State provides zero transfers, the maximum transfer level that can be enforced by families is b_2^{FAM} and they achieve welfare, S_2^{FAM} , which in the diagram could correspond to a point below S^{PUB} . Raising public transfers has the double effect of collapsing family transfers and reducing outflows from unemployment. If the highest level of welfare that the State can achieve (at point O') exceeds S_2^{FAM} then it should become the sole provider of welfare. Social welfare decreases when public transfers exceed b^{PUB} – the gains from better insurance are more than offset by losses due to higher unemployment.

2. Discussion, Extensions and Direct Evidence

2.1. Religion, Divorce and Birth Control

A reduced role for religion, as well as a more tolerant view of divorce and wider availability of birth control methods (eg the pill) may have all affected the temptation to defect from the family. This changes the level of unemployment benefits for which the enforceability constraint (12) binds. As the benefit level that can be informally enforced falls, it may become optimal for the State to intervene and take over responsibility for social insurance provision from the family. This provides a microeconomic rationale for the birth of the Welfare State.¹⁹ However, if strong family ties exist naturally, the State's best response is to keep these ties (with the associated gains from peer monitoring) and opt out of welfare provision altogether.

Another factor that could alter the cost of defection, in addition to the discount rate, is a social stigma or moral cost, s , of being excluded from the family. This would add a positive term to the left-hand side of the enforceability constraint (12), which would bind when $F(b^f, b^p, U, e) + s = 0$. Hence

$$\frac{db^f}{ds} = - \frac{[\partial F(b^f, b^p, U, e) + s]/\partial s}{\partial F/\partial b^f} = - \frac{1}{\partial F/\partial b^f} > 0$$

so reductions in the psychic costs of leaving the family are predicted to have the same effects (discussed above) as increases in the discount rate.

2.2. Single Mothers

The case of single mothers introduces the possibility that the cost of risk involves an indivisibility. If a pregnancy occurs, the mother may require a high minimum transfer (below which transfers are not valued by the recipient). It is possible that the amount of money/help the mother will need (eg in terms of lodging/food) is so high that becoming a single mother is not an insurable risk given the family's contract technology. Technically, transfers are not self-enforceable as (12) cannot hold to cover the high minimum transfer required in the case of the risk

¹⁹ Traditionally, the birth of the Welfare State has been explained mainly in political terms or as an instance of Keynesian counter-cyclical (macroeconomic) policy.

materialising (ie pregnancy). However, if the State provides some help to single mothers it can make the risk insurable. Just below that crucial level, increases in the generosity of the Welfare State can *increase* informal transfers.

2.3. *Politics*

The paper may provide a natural interpretation for different attitudes of political parties towards the Welfare State. As mentioned in the introduction, parties that emphasise the role of families in society seem also to have preferences for low spending on welfare programmes whereas political preferences for high welfare spending seem to go together with weaker concerns for 'strengthening' family ties. Our explanation is simply that these are the more efficient patterns in the sense that, for example, proposals for a less generous Welfare State without measures designed to strengthen families would be offering too little insurance.

2.4. *Extensions to the Model*

If families are small they would be at a disadvantage relative to the State from a risk-pooling point of view. It is clear that it would then become optimal for the State to be the sole-provider of insurance both in Case I for 'Enforceable Family Contracts' and in Case II for 'Non-enforceable Family Contracts'.

For Case III, with both moral hazard and non-enforceable contracts, Proposition 6 will hold only for a sufficiently large number of family members, m (ie m greater than some minimum level, m_0). The risk-pooling advantage of the State becomes small for large m , whereas the adverse crowding out effects from higher public transfers approach more than one-for-one. It is also clear, however, that when families have few members (or when families are large but risks are highly correlated) there is some role for the State to provide insurance for families in those bad events when all members become unemployed at the same time.

Although the only social benefits of families in our model come from the provision of insurance against unemployment, a richer model would allow for other benefits arising from families. Some examples include education and crime prevention. Another benefit of the family could be looking after the old. Whereas the model assumes that workers live forever, a more general set-up could allow for the presence of 'the young' who work and 'the old' who do not. As the young approach retirement from work, they would be tempted to cheat on their premiums as the chance of falling unemployed themselves drops. Consequently, a way for the family to maintain itself could be to include provisions for the elderly. Anyone who cheated on their premiums could be denied these benefits. If the young had a high discount rate, they may not wish to be part of such an arrangement. This may imply that some, but not complete, state-provided pension provision would be socially optimal by allowing the family to maintain its informal arrangements.

The model also assumes that workers' wages are not subject to risky variation. However, if wage income was risky and premiums paid by the employed were income-related, then the family may have a downside: members would have less incentive to take risks or invest in ways to increase their incomes.

2.5. *Direct Evidence*

There exists some evidence that the Welfare State displaces part of the functions of the family; see, for example, empirical work on army pensions by Costa (1997).²⁰ Bentolila and Ichino (2001) find that longer unemployment durations are associated with smaller consumption losses in southern European countries compared to northern ones, consistent with the view that the less developed welfare states in the south have relied more on the family. In England in 1901, 40% of the adult male population were informally insured against unemployment and sickness by 'Friendly Societies'. In some of these societies, failing with your subscriptions meant 'you either make it up afterwards ... or you forfeit your benefit altogether' (Lloyd George, 1908). Gladstone (1999) writes about

... the impact of a more comprehensive supply of State welfare on the voluntary sector. The traditional view is that it declined both in influence and supply of services. There is certainly much to support that interpretation: the majority of hospitals were taken into State ownership, while the Friendly Societies lost their role to the civil servants of the Ministry of National Insurance; the voluntary sector found it difficult to compete as an employer, and there were fears that, with a more comprehensive welfare state, voluntary funds would dry up.

Although formal statistical tests are difficult, it is important to provide evidence consistent with the mechanisms in the model. We believe that the standard reports of unemployment benefit programmes – eg the OECD Jobs Study (1994) – provide such evidence. The basic fact is that unemployment benefit replacement rates depend on family circumstances. The OECD Jobs Study provides data on unemployment benefit replacement rates for 21 countries, across three different family situations and benefit durations. Overall, for 32 out of 53 cases (or 60%) in which the State provides benefits, single people receive more State help than married people with working spouses. In the other 21 cases, they were equal. Perhaps the most extreme feature of our model is the result that the State should either opt out totally from the provision of social insurance, or provide such a generous level that insurance no longer becomes a motive for intra-family transfers. In 21 out of the 32 cases where there is less State help for people who can rely on their spouses, the State opts out completely from the provision of social insurance (ie the benefit replacement rate for married people is zero).

3. Concluding Remarks

In the absence of the Welfare State, families provide much of the social insurance available to an individual. Thus, to design the optimal Welfare State, we must first know the effect of public transfers on intra-family insurance. This paper uses the

²⁰ However, this does not imply it is accepted that exchange (ie not altruistic) motives are at play. Our working paper version found evidence that US residents of States with low unemployment benefits more often turned to help in times of need to their families than to banks, compared to residents of States with high benefits. The data from the US General Social Survey on social networks were only available for 1986, not allowing controls for fixed effects.

exchange model of the family (ie one based on non-altruistic preferences) to study unemployment insurance. Thus, all transfers within families occur because members expect, and receive, reciprocity when circumstances change. In the benchmark case, public transfers crowd out family insurance transfers one-for-one, so the existence of family insurance is irrelevant for the design of the optimal Welfare State. The model is then extended to capture the idea that family contracts are informal and not legally enforceable, whereas the State can use its power to tax the employed to support individuals on unemployment benefits. If families can only use self-enforcing contracts, increases in the level of public transfers crowd out family transfers by more than one-for-one. By changing the penalty for defection from the family network, increases in public transfers reduce the set of self-enforceable contracts available to the family. In other words, *total* transfers to an unemployed individual fall as the generosity of the Welfare State increases. This is a dramatic departure from the predictions of traditional models.

We consider the possibility that our results are driven by modelling families as inherently weak (ie inferior to the State in terms of contract technology). Hence we extend the model to assume that families have an advantage at monitoring the activities of family members. We assume the family can perfectly monitor the search activities of unemployed members but the State does not have this capacity, and hence cannot make transfer payments contingent on the level of search undertaken. Again, we find that public transfers crowd out family insurance transfers more than one-for-one. A direct application of the model lies in designing the optimal size of the Welfare State (in our case, of unemployment benefit programmes) when families also provide informal unemployment insurance. There are two possibilities, depending on the natural strength of families. If families are weak, in the sense that they cannot by themselves provide their members with a generous level of insurance, the State should intervene and provide all the insurance available to individuals. However, if families can provide a sufficiently high level of insurance to their members without State support, then the State should provide no unemployment insurance.

A simple message of the paper is that, even if total insurance transfers available to an individual fall as the State increases the generosity of its welfare programme (the more than one-for-one crowding out result), it does not imply that the State should not intervene in the provision of social insurance. The State can improve social welfare when families are inherently weak (and can sustain only low levels of insurance) and the unemployment derived from moral hazard is not too severe. We believe that the model shows a potentially fruitful way in which we can incorporate families into discussions about the optimal Welfare State.²¹

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Date of receipt of first submission: June 1999

Date of receipt of final typescript: November 2001

²¹ Work on the endogenous welfare state includes Wright (1986), Saint-Paul (1996), Hassler *et al.* (1999) and Di Tella and MacCulloch (1995*a*, 2000). For empirical work on preferences, see Luttmer (2001), Di Tella and MacCulloch (1995*b*) and Alesina and La Ferrara (2001).

Appendix

PROOF OF REMARK

For (i): If the enforceability constraint binds, $F(b^b, b^f, U, e) = 0$. The implicit function rule \Rightarrow

$$\operatorname{sgn}\left(\frac{db^f}{dr}\right) = \operatorname{sgn}\left(-\frac{\partial F}{\partial r} / \frac{\partial F}{\partial b^f}\right) \quad (\text{A.1})$$

which equals $\operatorname{sgn}(\partial F / \partial r)$ where

$$\frac{\partial F}{\partial r} = z\left[w - \frac{U(b^f + b^b)}{1 - U}\right] - z\left(w - \frac{Ub^b}{1 - U}\right) < 0.$$

Hence, the level of family transfers decreases with the discount rate.

For (ii): If $r = 0$ and $b^b = 0$ then full insurance is enforceable because the net benefit from not cheating, from (12), will be positive. It is given by

$$F(0, b^f, U, e) = \left[j(e)z\left(w - \frac{Ub^f}{1 - U}\right) - z(w)\right] + t[z(b^f) - z(0)]. \quad (\text{A.2})$$

Diminishing marginal utility \Rightarrow

$$z[w - Ub^f / (1 - U)] - z(w) > -Ub^f / (1 - U)z_w[w - Ub^f / (1 - U)]$$

and

$$z(b^f) - z(0) > b^f z_b^f(b^f)$$

where $z_w(\cdot)$ is the derivative of $z(\cdot)$ with respect to net wages. Hence

$$F(0, b^f, U, e) > -tb^f z_w\left(w - \frac{Ub^f}{1 - U}\right) + tb^f z_b^f(b^f). \quad (\text{A.3})$$

The right hand side of (A.3) equals zero for full insurance, since $w - Ub^f / (1 - U) = b^f$. In other words, the net benefit from not cheating is positive.

PROOF OF PROPOSITION 3

If the enforceability constraint binds,

$$V^F(b^b, b^f, U, e) - V^A(b^b, U, e) = 0.$$

When the family faces a binding constraint, it must be providing a level of insurance higher than its employed members would have chosen for themselves (due to the higher taxes) but is unable to insure its members fully. Increasing family transfers further would lower the value of being an employed member and cause defections. More formally, $\partial V^F / \partial b^f < 0$. Using the implicit function rule \Rightarrow

$$\frac{\partial b^f}{\partial b^b} = -\frac{\partial F}{\partial b^b} / \frac{\partial F}{\partial b^f} = -\left(\frac{\partial V^F}{\partial b^b} - \frac{\partial V^A}{\partial b^b}\right) / \frac{\partial V^F}{\partial b^f} = -1 + \frac{\partial V^A}{\partial b^b} / \frac{\partial V^F}{\partial b^f} < -1 \quad (\text{A.4})$$

since

$$\frac{\partial V^F}{\partial b^b} = \frac{\partial V^F}{\partial b^f} \quad \text{and} \quad \frac{\partial V^A}{\partial b^b} > 0 \quad \text{for } b^b < \arg \max b^b V^A.$$

The reason for $\partial V^A / \partial b^b > 0$ is simply that increases in public transfers provide autarkic workers with more insurance and so increase their welfare up to the point

where tax effects start to dominate. At the point where public transfers maximise V^A , autarkic workers have all the insurance they desire and there can consequently be no role for families, having been completely crowded out by public transfers.

The first term, -1 , in (A.4) captures the intuition that an increase in public transfers initially crowds out intra-family transfers one-for-one as families try to return to the initial level of risk-sharing. The next term captures the effect that the increased generosity of public transfers has also made defecting from the informal family risk-sharing contract more attractive. Hence, family transfers must be reduced even further to keep the informal risk-sharing contract incentive compatible, ie $db^f/db^p < -1$.

PROOF OF PROPOSITION 4

In the social welfare problem (16), an optimum occurs when the State fully insures family members, whose own transfers then equal zero, by setting $b^p = w(1 - U)$. If families are weak so they cannot enforce their own full insurance, then $b^p = w(1 - U)$ is the unique level of public transfers that maximises welfare. Now assume that the State sets public transfers equal to zero. If families are strong so they can enforce their own full insurance (ie the solution to the family problem (13) yields $\lambda = 0$, $F(b^f, 0, U, e) > 0$ and $M_{bf} = 0$) then families set $b^f = w(1 - U)$ and another welfare optimum obtains.

PROOF OF PROPOSITION 5

The (binding) enforceability constraint is given by

$$V^F(b^p, b^f, U, e) - V^A(b^p, U, e^A) = 0$$

where in equilibrium e , e^A and U are all functions of public transfers, b^p . The implicit function rule \Rightarrow

$$\frac{db^f}{db^p} = - \left[\frac{\partial V^F}{\partial b^p} + \frac{\partial V^F}{\partial U} \frac{dU}{db^p} + \frac{\partial V^F}{\partial e} \frac{de}{db^p} - \left(\frac{\partial V^A}{\partial b^p} + \frac{\partial V^A}{\partial U} \frac{dU}{db^p} + \frac{\partial V^A}{\partial e^A} \frac{de^A}{db^p} \right) \right] \bigg/ \frac{\partial V^F}{\partial b^f}. \quad (\text{A.5})$$

The search level, e^A , is determined by autarkic workers to maximise life-time expected utility

$$e^A = \arg \max_e \frac{j^A(e)z \left(w - \frac{Ub^p}{1-U} \right) + (t+r)[z(b^p) - c(e)]}{r[j^A(e) + r + t]} = \arg \max_e V^A. \quad (\text{A.6})$$

Let $G(b^p, U) = V^A(b^p, U, e^A)$ where e^A is determined by (A.5). The envelope theorem \Rightarrow

$$\frac{dG(b^p, U)}{db^p} = \frac{\partial V^A}{\partial b^p} + \frac{\partial V^A}{\partial U} \frac{dU}{db^p} + \frac{\partial V^A}{\partial e^A} \frac{de^A}{db^p} = \frac{\partial V^A}{\partial b^p} + \frac{\partial V^A}{\partial U} \frac{dU}{db^p}$$

Also, since $\partial V^F/\partial b^p = \partial V^F/\partial b^f$ (A.4) becomes:

$$\frac{db^f}{db^p} = -1 - \left(\frac{\partial V^F}{\partial U} \frac{dU}{db^p} - \frac{\partial V^A}{\partial U} \frac{dU}{db^p} + \frac{\partial V^F}{\partial e} \frac{de}{db^p} - \frac{\partial V^A}{\partial b^p} \right) \bigg/ \frac{\partial V^F}{\partial b^f}. \quad (\text{A.7})$$

When the enforceability constraint binds, $\partial V^F/\partial b^f < 0$ since increasing family benefits further would lower the value of being an employed member due to the higher taxes and cause defections. It is left to show that the sign of

$$\frac{\partial V^F}{\partial U} \frac{dU}{db^p} - \frac{\partial V^A}{\partial U} \frac{dU}{db^p} + \frac{\partial V^F}{\partial e} \frac{de}{db^p} - \frac{\partial V^A}{\partial b^p}$$

is negative. The last term, $\partial V^A/\partial b^p > 0$, captures the positive insurance effects of raising public transfers for autarkic workers. The remaining expression,

$$\frac{\partial V^F}{\partial U} \frac{dU}{db^p} - \frac{\partial V^A}{\partial U} \frac{dU}{db^p} + \frac{\partial V^F}{\partial e} \frac{de}{db^p}$$

can be written as

$$\begin{aligned} & - \left\{ \frac{[j(e) + r]z_W \left[w - \frac{U(b^p + b^f)}{1 - U} \right]}{r[j(e) + r + t]} - \frac{[j^A(e^A) + r]z_W \left(w - \frac{Ub^p}{1 - U} \right)}{r[j^A(e^A) + r + t]} \right\} \frac{b^p}{(1 - U)^2} \frac{dU}{db^p} \\ & - \frac{[j(e) + r]z_W \left[w - \frac{U(b^p + b^f)}{1 - U} \right]}{r[j(e) + r + t]} \frac{b^f}{(1 - U)^2} \frac{dU}{db^p} \\ & + \frac{\partial}{\partial e} \left\{ \frac{[j(e) + r]z \left[w - \frac{U(b^p + b^f)}{1 - U} \right] + t[z(b^f + b^p) - c(e)]}{r[j(e) + r + t]} \right\} \frac{de}{db^p}. \end{aligned} \quad (A.8)$$

On the top line of (A.8) diminishing marginal utility \Rightarrow

$$z_W \left(\frac{w - ub^f}{1 - u} - \frac{Ub^p}{1 - U} \right) > z_W \left(w - \frac{Ub^p}{1 - U} \right).$$

Hence this term is negative provided $j^A(e^A) < c < j(e) \forall e, e^A$. This captures the tax effect. The intuition is that more unemployment caused by higher public transfers increases taxes which has greater marginal disutility on employed family members than autarkic workers who do not have to pay the family premiums.

The next two lines of (A.8) capture two further effects. The first term captures the higher premiums the employed must pay to enable each unemployed person to receive b^f . This effect is more negative the higher the marginal utility of income for the employed, $z_W[w - U(b^f + b^p)/(1 - U)]$. The second term includes the effect of higher expected unemployment durations as $j(e)$ falls.

PROOF OF PROPOSITION 6

Let S^{FAM} be the level of welfare when there are no public transfers, so that families can provide their highest enforceable transfer level (see Proposition 5). Social welfare is greater at this point than at any positive level of both public and family transfers, since total transfers are higher and there are no moral hazard problems. Let S^{PUB} be the highest level of social welfare attainable when the State is the sole provider of transfers. If the discount rate is low then $S^{FAM} > S^{PUB}$ and families can achieve a higher level of welfare by being the sole provider of transfers for their members than the State achieves alone.

However, if the discount rate becomes large then family transfers must tend to zero, implying $S^{PUB} > S^{FAM}$. Formally, as $r \rightarrow \infty$,

$$rV^F \rightarrow z \left[w - \frac{U(b^f + b^p)}{1 - U} \right]$$

and

$$rV^A \rightarrow z \left[w - \frac{Ub^p}{1 - U} \right]$$

since the value of being either in a family or in autarky depends simply on the corresponding current period utility flow. To maintain the family these values must be kept equal so $b' \rightarrow 0$. Note also that $e \rightarrow 0$ since there is no point searching for work in the future under such circumstances but $U \rightarrow U^* < 1$ since $j(0) > c > 0$ by assumption. Hence, in this case, the State can achieve the highest level of welfare by being the sole provider of transfers.

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