Small and Large Price Reforms

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Abstract: A simple model of an open exchange economy with two commodities is used to investigate the relative merits of small and large reforms: reforms are represented as movements in the relative price of the two commodities, achieved by tightening or relaxing quotas. Three approaches, based on majority voting, the costs of compensation, and social welfare, are used to compare the merits of small and large reforms. It is found that large reforms win more votes than small reforms, whatever the direction of change: that the ration of marginal gross burden of compensation to marginal net benefit is highest for small reforms: and that when distributional considerations are allowed to play a part, the shape of the social welfare function is wholly indeterminate. In particular, local minima in social welfare cannot be ruled out.

1 Introduction

Applied economists working on transitional economies are often faced by the following questions: What are the relative merits of small and large reforms? What are the merits of gradual and big-bang reforms? These question raise issues of limited information, political feasibility, administrative costs, adjustment costs, and credibility, as well as the fundamental economic properties of the equilibria before and after reform. Versions of all these considerations can in practice be used to advocate either large or small reforms.

This paper uses a simple model to investigate the class of reforms which change a relative price in the economy. Issues of uncertainty, limited information, administrative and adjustment costs are ignored in order to focus on the fundamental political and economic properties of small and large reforms. At this level of abstraction it might be expected that little can be said. Not so: there are some senses in which small reforms can be shown to be generally inferior to large reforms.

When a reform takes place, some people are hurt, and others benefit. In response, people substitute away from commodities or activities whose costs have risen. This substitution makes them less vulnerable to further reform. In some cases, people begin to benefit from reforms which initially hurt them. This is a straightforward implication of the concavity of cost functions in prices. This observation suggests that in some sense the benefits of reform should be convex. This intuition motivates the paper.

The paper identifies three precise senses which can be given to this intuition. First, large reforms win more votes than small reforms, whichever direction they are in. Secondly, for liberalisations, the ratio of the marginal gross burden of compensation to the marginal net benefit of the reform is maximised by small reforms. It is even possible that the gross burden of compensation is falling in the size of reform, though this will be unusual. Thirdly, when distributional considerations are introduced, nothing general can be said about the shape of the social welfare function in policy instruments; in particular, local minima cannot be excluded, so that large and small reforms may have effects of different signs. It is not claimed that these results will generalise to all policy contexts, but the simplicity of the model, which depends essentially on the shape of indirect utility and cost functions, suggests that similar results are likely to apply wherever policy takes the form of interventions in prices.

The question explored in this paper has not been addressed, so far as I am aware, by existing theory, perhaps because it is expected that the answer will be totally indeterminate. Two recent areas of public economics are relevant. One is the identification of global optima, (which may be constrained in various ways), typically using first-order conditions such as the Ramsey rule for commodity taxation or the Mirrlees rule for the non-linear income tax to characterise them. A second approach considers the marginal effects of changes outside equilibria. Within the latter category falls work on shadow prices for project appraisal, work on 'piecemeal' policy reform where one dimension of a bundle of instruments is changed while holding the others fixed, and work on 'radial' reform where all instruments are moved proportionately. Work on piecemeal and radial trade reforms is consolidated in Neary (1995). The motivation for this approach is clearly summarised by Bruno (1972): "the government can use the tax system, or a process of institutional change, to bring the market price system "closer" to the social optimum price, but is unable to do so all at once, either because of very high adjustment costs, or because of political and institutional constraints". Bruno is thus assuming an answer to the question at issue here. But the arguments used by Bruno to motivate the analysis of small reforms can also be used to justify large reforms: for instance, it is often argued that abolishing policy instruments is administratively easier, or more credible (because harder to reverse) than adjusting them. Explicit theoretical comparison of the properties of small and large reforms therefore seems worthwhile.

The reforms considered in this paper are unidimensional. It has long been familiar that the first-order properties of simultaneous adjustments in two instruments might be quite different from the properties of either reform in isolation. In this paper only one policy instrument (a quota) is available and the comparison is between large and small movements in this instrument.

Much work using first-order conditions uses a representative consumer approach which ignores income distribution. In some cases this is a helpful simplification. However, where second-order conditions are being considered, it is potentially seriously misleading; it does not make much sense to ignore distributional questions when the curvature of the utility function is precisely what is at stake. The paper therefore assumes an additive utilitarian approach, combined with concave utility, which is a simple way of representing distributional concerns. However, the analysis of social welfare is prefaced by an analysis summing compensating variations across the population, which ignores income distribution. Only in the results on social welfare do the differences from previous authors' results depend on the introduction of distributional considerations.

2 The Structure of the Model

I analyse a small open two-commodity exchange economy with one policy instrument, an import quota, and no government.

2.1 Consumer Behaviour

There are two commodities, indexed 1 and 2. Consumers, indexed by i, are endowed with endowments X_1 and X_2, and voluntarily trade at prices exogenous to themselves; their actions maximise utility defined over consumption of the two commodities, written x_1 and x_2:

(1) $$u_i\ (x_{i1},x_{i2})$$

where

(2) $$u_{i1}>0,\ u_{i2}>0,\ u_{i11}<0,\ u_{i22}<0,\ u_{i11}u_{i22}>(u_{i12})^2\ \textit{for all } i$$

It is best, in what follows, to regard the concavity of the utility function as a statement about society's preferences rather than a feature of behaviour, since neither risk nor intertemporal choice are modelled.

(1) is maximised subject to the budget constraint:

(3) $$p_1x_{i1} + p_2x_{i2} \leq p_1X_{i1} + p_2X_{i2}$$

It is useful to define wealth, $_{y,}$ by the following:

(4) $$y_i \equiv p_1X_{i1} + p_2X_{i2}$$

It will be assumed throughout that both 1 and 2 are normal goods:

(5) $$\partial x_{ij}/\partial y_i > 0,\ j = 1,2\ \textit{for all } i$$

Note that this implies that uncompensated demand cures slope downwards. Many of the paper's results would also apply to inferior goods, but the presence of Giffen goods would completely reverse the main results. These problems yield a cost function $c_i(p_1, p_2, u)$ and an indirect utility function $v_i(p_1, p_2, y)$ of normal form. Note that prices enter into the definition of y so that Roy's identity will be written in terms of total, not partial derivatives: and that a proportional increase in both prices, leaving endowments unchanged, does not affect indirect utility or commodity demands.

Subsequent analysis therefore examines the effects of changes in p_1, holding p_2 constant.

The cost function is increasing and convex in prices and the indirect utility function quasi-convex in prices, holding y_i constant, for standard reasons (Varian 1984). It is important to note that the indirect utility function is also quasi-convex in prices when the total derivative is considered so that y_i is allowed to vary in response to p_1. However, the convexity or concavity of the indirect utility function in prices is also of some interest. We can see immediately, from revealed preference, that if any set of relative prices is such as to induce autarchy on the part of an individual, it will minimise that individual's welfare (because autarchy is a possible choice no matter what prices prevail). Around such a point, therefore, if the utility function is continuous and smooth, it must be convex. Away from this point, we use Roy's identity to investigate convexity. Using total derivatives to imply holding $_{p2}$ and endowments constant but allowing y to vary, we differentiate Roy's identity

(6) $$dv_i/dp_1 = (X_{i1} - x_{i1})\partial v_i/\partial y_i$$

with respect to p_1. After some manipulation this gives

(7) $$\frac{d^2 v_i}{dp_1^2} = \frac{\partial x_{i1}}{\partial p_1}\frac{\partial v_i}{\partial y_i} - (X_{i1} - x_{i1})\frac{\partial x_{i1}}{\partial y_i}\frac{\partial v_i}{\partial y_i} + (X_{i1} - x_{i1})^2 \frac{\partial^2 v_i}{\partial y_i^2}$$

The assumptions that both goods are normal and that utility is concave allow us to sign every part of this expression. The first term (including the minus sign) is unambiguously positive, as is the whole expression at the point of autarchy. The first term represents the effect emphasised in the introduction, that people substitute away from x_1 as its price rises and hence reduce their vulnerability. The second term (including the minus sign) is positive for net buyers of commodity 1 but negative for net sellers; it represents the income effects of the change in prices on demand and hence on the importance of commodity 1 in the consumer's budget. The third term is unambiguously negative outside autarchy, representing the fact that as people lose (gain) from the change their marginal utility of income rises (falls).

If the marginal utility of wealth were not diminishing, the whole expression would definitely be positive for net buyers, for whom both income and substitution effects work together, and would be positive for net sellers if substitution effects outweigh income effects.

2.2 Trade and Policy

The model is closed by international trade. In the absence of policy intervention, it is assumed that both commodities are traded at given world prices. The model is then fully solved by solving every consumer's maximisation problem (1) subject to the budget constraint (3). Without loss of generality, it will be assumed that commodity 1 is imported under free trade. If economic policy is used, it takes the form of a quota on the import of commodity 1:

(8) $$\Sigma_i X_{i1} + \overline{X_1} \leq \Sigma_i x_{i1}$$

We will assume that the quota binds. Now p_1 and p_2 become endogenous. We lose no generality, however, by holding p_2 fixed and allowing p_1 to vary. Now the model is solved by making p_1 endogenous and adding the equation

(9) $$\Sigma_i X_{i1} + \overline{X_1} = \Sigma_i x_i$$

Because demand curves slope downwards and domestic supplies are exogenous, the economy's demand for imports of commodity 1 is a negative function of their price. We can therefore equally well think of the authorities choosing a price p_1, and this is how the policy will be represented in what follows. However, the price must lie between the autarchy price, where imports are zero, which will be written p^A_1, and the free-trade price, p^F_1. A reform is defined as a change in policy, i.e. either an increase or a reduction in p_1 within this interval. In what follows this will be termed the 'feasible range'. Equally, imports of commodity 1 must lie between zero and the free-trade level.

3 Comparing Small and Large Reforms

This section explores the comparative properties of small and large reforms in the model, using criteria based on majority voting, on compensation, and on social welfare.

Reforms take the form of moving from the old price, p^O_1, to the new price, p^N_1. It is convenient to define two prices for the consumer: p'_{i1}, which is the price at which the individual is in autarchy, and p^*_{i1}, which is defined by

(10) $$v_i(p_1*, y_i*) = v_i(p_1^O, y_i^O) \text{ and } p_1* \neq p_1^O$$

This is the price at which someone who has crossed over the market as a result of the reform is

indifferent to the reform. For each individual i, given p^O_1, there will be at most one value of p^*_{i1} (because of the quasi-convexity of the indirect utility function) and p'_{i1} (because demand curves slope downwards). If p^*_{i1} exists, so must p'_{i1}, and p'_{i1} must lie between p^O_1 and p^*_{i1}. Note that the value of p^*_{i1}, but not of p'_{i1}, depends on p^O_1. I term an individual a 'beneficiary' if they gain overall from the reform, i.e.

(11) $$v_i(p_1^N, y_i^N) > v_i(p_1^O, y_i^O)$$

and I say that individuals 'cross over' if p'_{i1} lies between p^{O1} and p^{N1}, so that the reform causes the consumer to switch from being a net seller to being a net buyer of one commodity. I make no assumption about the form of the distribution of p^*_1 or p'_1 across individuals.

3.1 Majority Voting

Assume that voting is determined by self-interested preferences, using the indirect utility function developed above. The quasi-convexity of this function implies single-troughed preferences. Like single-peaked preferences, these eliminate the possibility of cycles in voting over possible sets of relative prices: they do so, however, by encouraging extreme positions rather than compromise. In the terms of Sen (1970), these preferences satisfy the 'Value Restriction' because alternatives in the middle are not considered best by anyone.

Consider now liberalisation, which reduces p_1. There are four possible cases for each individual:

(Case i) $p'_{i1} > p^O_1$, or p'_{i1} does not exist and $x_{i1} > X_{i1}$ for all values of p_1.

In this case the individual is a net buyer of commodity 1 before and after the reform and supports the liberalisation, whatever its size.

(Case ii) $p^O_1 > p^N_1 > p'_{i1}$, or p'_{i1} does not exist and $X_{i1} > x_{i1}$ for all p_1.

Here the individual was a net seller of commodity 1 both before and after the reform, and opposes the reform.

(Case iii) $p^O_1 > p'_{i1} > p^N_1 > p^*_{i1}$.

Here the individual has become a net buyer, but remains a loser from the reform and will oppose it.

$$\text{(Case iv)}\quad p^{O}_{1} > p'_{i1} > p^{*}_{i1} > p^{N1}.$$

In this case, the individual has become a net buyer and a beneficiary of the reform.

Inspection of the inequalities in (i) to (iv) shows that as the price falls, people in category (i) remain there, but some people move from category (ii) to (iii) and some from category (iii) to category (iv). The first transition makes no difference to their vote; the second transition, however, changes them from opponents to supporters of the reform. Hence the number of supporters of liberalisation is increasing in the size of the liberalisation. An exactly symmetrical argument shows that the number of supporters of increased restrictions is increasing in the magnitude of the tightening.

> Proposition 1: More people will support a large reform than a small one, whatever the direction of the change.

The properties of the indirect utility function allow us also to say that:

> Proposition 2: Within the feasible range of prices, each individual will prefer either the free market price or the autarchy price to all others.

This follows from the quasi-convexity of the indirect utility functions, which rules out interior maxima. It follows immediately that:

> Proposition 3: For one of p^{F}_{1} and p^{A}_{1}, movement to this price will win a majority vote over any other alternative policy, starting from any price in the feasible range.

Finally, it is worth noting that opponents of a particular reform will be divided between those who lose both in total and at the margin, and those who lose in total but gain at the margin. This suggests some likelihood that opposition to reforms can easily disintegrate, depending on the way that agendas are set (developing this point formally would require specifying more structure in the political process). It is also interesting to note that advocates of the minority position may benefit

by giving away some of their endowment to others in order to win these others onto their side; this arises because there is a catastrophic change in welfare when the policy switches from one extreme to the other.

It should be noted that the results of this section depend on people crossing over between different sides of the market. By contrast, the results of the next section depend only on the presence of substitution effects.

3.2 Compensation and Net Benefit

This section considers the virtues of small and large reforms from the point of view of compensation. There are two reasons for using this approach. The first is that the relation between compensation and benefit gives some sense of the political feasibility of a reform. I represent this by considering the ratio of net benefit to gross burden of compensation of the reform. The second reason is that summing compensating variations is equivalent to examining social welfare under the assumption that income going to different individuals is valued equally at the margin. This allows easy comparison with the results of other authors on marginal reforms, most of whom have used representative-consumer approaches.

The measures used here are based on the compensating variation, which is the amount which would have to be paid to a consumer at the new prices to restore their former utility. Note that using the nominal compensating variation in the present model is equivalent to measuring the compensating benefit in units of commodity 2. Define the net benefit (NB) of the reform as minus the sum of the compensating variations, positive or negative, across individuals:

(12) $$\Sigma_i y_i^N - c_i(p^N, u_i^O)$$

where N indexes the new equilibrium and O the old, and p_N is the vector p^N_1, p_2). Define the gross burden (GB) of the reform as the sum of compensating variations over positive instances only. This is the amount that would have to be paid to losers if they were paid sufficiency compensation to make them indifferent to the situations before and after reform:

(13) $$\Sigma_{c_i(p^N, u_i^O) > y_i^N} \quad c_i(p^N, u_i^0) - y_i^N$$

We are interested in the behaviour of the net benefit and the gross burden as prices change. Both

functions obviously pass through 0 at p^O_1. The behaviour of the net burden is unambiguous; differentiation of (12) immediately shows it to be falling where commodity 1 is imported, and convex in the price.

(14)
$$\frac{dNB}{dp_1} = \Sigma_i(X_i - x_i)$$

Within the feasible range of prices, therefore, the first derivative is negative except at the point of autarchy. Since liberalisation involves reducing p_1, this is a case of the general result (Neary, 1995) that a proportionate reduction in all trade distortions increases welfare where income distribution is ignored.

The behaviour of the gross burden as p_1 changes is harder to establish, because it is the sum of a diminishing set of elements. I assume here that there is a finite number of individuals rather than a continuum (general results for the continuum would require integrating over all the dimensions in which individuals can differ, and unless preferences are further restricted there are infinitely many dimensions to be considered).

Consider a liberalisation, which reduces the price of p_1. In the neighbourhood of no reform, (13) is a summation over all net sellers. However, away from p^O_1, it is a summation over net buyers and those who have become net buyers but for whom either $p'_{i1} > p^N_1 > p^*_{i1}$ or p^*_{i1} does not exist. These people leave the summation at the point where $p^N_1 = p^*_{i1}$. In differentiating (13), we need to take account of the people who are leaving the summation at any point.

Where $p^*_{i1} = p^N_1$, the compensating variation is zero by definition. Hence the departure of these people from the summation does not affect the value of the sum at that point. The gross burden is therefore continuous in prices. At a point where $p^*_{i1} = p^N_1$ for no individual i, we can simply differentiate (13) to get

(15)
$$\frac{dGB}{dp_1^N} = \Sigma_{c_i(p^N, u_i^O) > y_i^N} \quad (X_{i1} - x_{i1})$$

Initially, this must be positive, but later when most of the individuals in the summation observe p'_{i1}

$> p^N_1$, it can become negative. Indeed, if all individuals eventually become buyers (as is possible under free trade), the first derivative must become negative. The second derivative of (13) is clearly negative; again, this can be taken only when $p^*_{i1} = p^N_1$ for no individual i.

Let $p^\wedge_1$ be a point a point where $p^*_{i1} = p^N_1$ for some i. Here the derivative does not exist and there is a kink in the curve. We can see that where p^N lies above this point, the first derivative (15) includes some who are net buyers who leave the summation at $p^\wedge_1$ and are not included for $p^N_1 < p^\wedge_1$ below this point. Since for them the gross burden is increasing in price (and falling in the direction of liberalisation), their inclusion in the summation increases the value of (15); hence (15) is higher for p^N_1 immediately above $p^\wedge_1$ than for p^N_1 immediately below it. We see, therefore, that the gross burden takes the form of a continuous function of p^1 with concave sections punctuated by convex kinks. Note, finally, that the first derivative is maximised where $p^N_1 = p^O_1$; this follows from the fact that (15) is a summation of elements which are all positive at p^O_1 and which are falling in p, and that no new element joins the summation as the price falls. The shape of the two functions is now shown in Figure 1.

The derivation of the shape of these two functions leads immediately to three propositions of interest:

> Proposition 4: For small liberalisations, the gross burden in terms of commodity 2 is increasing in the size of the liberalisation, but this need not be true for large liberalisations.
>
> Proposition 5: A marginal liberalisation at the point of autarchy gives no net benefit, but finite liberalisations at this point give positive net benefit
>
> Proposition 6: The absolute value of the ratio of the marginal increase in the burden of compensation to the marginal increase in net benefit is maximised at the point of no reform.

The first two of these propositions are simply a restatement of the properties of the functions derived above: the second follows directly from the convexity of the net benefit and the fact that the first derivative of the gross burden is maximised at p^O_1. Global statements about the relation between net benefit and gross burden require more specific assumptions about the distributions of p^*_{i1} across consumers, and about the shape of the demand curve. But proposition 6 gives a clear and robust sense in which marginal liberalisations are less attractive than large ones.

Finally, I consider the alternatives of achieving the same reform by a sequence of two small reforms, or by one big reform. The net benefits generated by these two processes are not formally identical, because different prices are used to make the comparisons, but it is clear that the utility gain achieved is exactly equal. In the case of gross burden, exactly the same pricing issue arises, but the summation in the case of the incremental process includes elements which are omitted from the one-stage process.

We can show this by considering a linear approximation. A first-order approximation to the compensating variation for the individual i is

(16) $$\left(\frac{x_{i1}^{O}+x_{i1}^{N}}{2}-X_{i1}\right)\left(p_1^{N}-p_1^{O}\right)$$

for the one-stage process and

(17) $$\left(\frac{x_{i1}^{N}+x_{i1}^{M}}{2}-X_{i1}\right)\left(p_1^{N}-p_1^{M}\right) + \left(\frac{x_{i1}^{M}+x_{i1}^{O}}{2}-X_{i1}\right)\left(p_1^{M}-p_1^{O}\right)$$

where $_{M}$ indexes the intermediate stage, for the incremental stage. These are equal. The gross burden, for the one-stage case, is simply (16) if it is positive and zero otherwise. For the incremental process, it will be the sum of the positive elements of (17). It is easy to see that if both elements have the same sign, this will be the same as (17); however, if one element is positive and one negative, it will be smaller. Hence we get:

> Proposition 7: to a first-order approximation, an incremental reform with compensation at each stage imposes a higher gross burden than a one-step reform for the same benefit

Whether proposition 7 matters depends to some extent on whether people require compensation at each stage ; this is likely to depend partly on their expectations about the future path of reform and partly on liquidity constraints. But it raises grave doubts about any conception that incremental reforms are in general easier than big-bang ones.

3.3 Social Welfare

The results of the previous section neglected income distribution. Since we are specifically concerned with second derivatives in this paper, it is important to include distributional effects. I assume that the authorities are additively utilitarian; social welfare is given by

(18) $$\Sigma_i v_i(p_1,p_2,y_i)$$

This is just the summation of the indirect utility function over the interval between free-trade prices and autarchy. Other prices are incompatible with market clearing. The form of social welfare is not particularly restrictive in the present context of single-period certainty, because the cardinalisation of the utility function can be chosen (as was noted in Section 2) to incorporate the distributional considerations of the policy maker. We therefore need only to consider the properties of the summation of the function analysed in Section 3.1.

If there were no distributional considerations, the previous section's arguments show that welfare is maximised over the interval p^A to p^F at the free-trade price. However, including distributional considerations, the maximum may be elsewhere. In particular, although the indirect utility functions have no interior maximum, this need not be true of their summation. For example, assume that there are just two kinds of individuals, one endowed only with commodity 1, the other endowed only with commodity 2, and that preferences are Leontief. In this case there are no efficiency gains from liberalisation: the only effect is an income transfer from those endowed with commodity 1 to those endowed with commodity 2. Welfare will then be maximised at the point where the marginal utility of income is equal for the two groups, and there is no reason why this should not lie in the feasible range.

It might seem that the existence of global minima of the indirect utility function guaranteed a minimum for the social welfare function. However, it can be shown that unless all individuals have the same p_1', there must be some individual for whom $p'_1 > p_1^A$. If this were not the case, then at p^{A1} there would be no individual for whom $x_{i1} > X_{i1}$, and the market would not clear, which violates the assumptions of the model. Hence the global minimum of some individual's indirect utility must lie outside the feasible range, and there is no guarantee that the social welfare function will have an interior minimum within the feasible range. Moreover, as in the previous example, it is possible that

some individuals will not cross over at any price.

Interior minima for the social welfare function, however, are perfectly possible. Consider, for instance, the case where a large number of agents cross over between being net buyers and net sellers at roughly the same point within the feasible range for prices: and assume that these agents are relatively poor and that distributional considerations are important, i.e. that dv_i/dy_i is particularly large for these individuals. In this case it become very likely that there will be a local minimum somewhere near the point where the individuals cross over, because the value of dv_i/dp_1 will shift dramatically from positive to negative for these individuals.

> Proposition 8: The social welfare function may exhibit local minima and local maxima: nothing general can be said about its shape.

If the indirect utility function is convex, as is guaranteed if (7) is positive, the social welfare function is a summation of convex functions, and is itself convex. However, this is only of limited interest because the reform might equally well be measured by the magnitude of the quota, and the relation between the quota and the price depends on the shape of the demand curve.

If we impose the assumption that there is no crossing-over, we eliminate the possibility of local minima in indirect utility functions. However, social welfare may still have a local minimum. The phenomenon of crossing-over and the resultant local minima in indirect utility functions do, however, make local minima in social welfare more likely, and hence increase the difficulty of policy design.

4 Conclusions

In this section I consider the scope of the results, and some possible extensions. The essential feature of the model is that it exploits the curvature of individual cost functions; similar results are likely to be found in any policy context which affects welfare by changing prices. In particular, it should be noted that the concavity of cost functions is a feature of production as well as consumption. The results will not apply to other forms of reforms such as institutional changes or changes in property rights unless these can be expressed as changes in relative prices.

One restriction on the generality of the results is that some of them involve the phenomenon of crossing-over: in particular, this is true of the results on majority-voting, but not of most of the other results in the paper. In some economies, crossing-over is a very important phenomenon. For instance, poor households in some economies will sell food in good years but buy it in bad years. Admittedly, this is most often the consequence of output shocks rather than price response, but it does suggest that crossing-over may need to be considered in examining the policy effects of intervention in food markets in these economies.

Another limitation of the results is that the existence of interior maxima or minima in the social welfare function depends on distributional considerations. But the results on majority voting and on the ratio between compensation and benefit are not affected by the view taken of income distribution.

A natural extension would be to consider the presence of sunk costs. For instance, the response of the economy to major changes in energy prices is well known to be a matter of adjusting the type of capital equipment used in production. The presence of irreversible investment of this kind tends to intensify the attraction of extremes; not only will the two extremes of policy be more important than the middle ground, but there will be an element of hysteresis in the choice between the extremes. The stickiness of energy prices in the former Soviet Union might reflect this problem.

Another natural extension is to the effects of multidimensional policy change. The idea that movement in several instruments might jointly produce Pareto improvement where there is no single instrument which can produce a Pareto-improvement is not new, and is very similar the results shown here in Section 3.2. Logrolling exploits this possibility. However, the one-dimensional case does not raise the possibilities of cyclic majority preferences which can easily emerge in two dimensions (and are closely related to logrolling, see Mueller 1989). Introducing more than one commodity into the model would also allow explicit consideration of general-equilibrium effects.

Clearly, there is much more to be said about the relative merits of large and small reform, including the role of limited information and administrative costs. Investigation of these factors, however, requires more specific modelling of political and administrative processes than has been attempted here.

The more general lesson of this paper is that to ignore the presence of substitution effects, and to concentrate on first derivatives, tends to overstate the obstacles to reforms and may induce unwarranted caution. However, it should also be borne in mind that possibilities for substitution tend to be positively related to education and income. In this sense, the poor are likely to be the most vulnerable to the consequences of policy change. Moreover, where there are costs of trade, we may observe a number of people who withdraw from the market over a finite range of prices. Most evidence from poor economies suggests that these are often among the poorest people; they are also the least affected by price reforms, at least marginal ones. The distributional consequences of price changes for people who trade in the market only in extreme circumstances are worthy of study, but lie outside the scope of this paper.

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Figure 1: the shape of net benefit and gross burden in the price of the imported commodity