Public Opinion and the Dynamics of Reform

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Abstract

Why do economic reforms that are proceeding successfully often run aground? A number of observers have expressed surprise that public opinion regarding the continuation of a reform process often runs directly counter to the performance of the reform itself. This is especially surprising if one thinks of voters as forward-looking. If anything, a reform that is proceeding successfully might be expected to see burgeoning political support, as voters learn something about the underlying reform, or about the incumbent government's ability to implement it smoothly. In this paper we show that there might arise circumstances where the initial success of reform might result in it running into a political impasse. We suggest that the key might lie in the effect that the reform process has on the balance of political power. In particular, if initially successful reforms change the balance of political power in such a way as to make future redistribution less likely, then public opinion may turn against reform. Thus, in some sense, an initially successful reform may well end up sowing the seeds of its own destruction.

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JEL classification: D72, O20, P16.

1 Introduction

In this paper, we examine the often puzzling dynamics of public opinion over the course of adoption of economic reform. Why do economic reforms that are proceeding successfully often run aground? A number of observers have expressed surprise that public opinion regarding the continuation of a reform process often runs directly counter to the performance of the reform itself. Given that all reform packages consist of a series of discrete measures taken over a long period, the erosion of political support threatens the viability and continuation of economic reform in democratic societies (see, for example, Pereira, Maravall and Przeworski (1993)). It is therefore important to understand the dynamics of the interaction of public opinion with the reform process. In this paper we claim that there might arise circumstances where the initial success of reform might result in it running into a political impasse.[1]

There is little disagreement that economic reform, by causing major structural changes, typically results in unemployment, dislocation and considerable hardship for a large part of the populace. Not only economists but even the bulk of the populace typically understands this and is still willing to support economic reform. What is somewhat puzzling to the economist is why a majority of 'rational' citizen-workers change their mind about the very reform that a majority of them had supported after it has proceeded part of the way, especially when the initial impact of the reform is favorable (Rodrik (1996)). This is especially puzzling if one thinks of voters as being forward-looking, because then the performance of the reform should presumably provide some indication of the shape of the future.

As is well-recognized, the reform process itself might reveal new information, about at least two aspectsof the reform. One, voters might learn something about the characteristics of the reform package itself. For example, if the reform initially does 'badly', in the sense of creating fewer jobs, lower growth in output, etc., voters (and the government) might accurately negatively update their expectations about the reform package being implemented,

[1] The available evidence suggests that this is in fact the more empirically relevant case - i.e., that reforms tend to run aground, rather than being reversed (Rodrik (1996), Werner (1999)).

and choose to halt it midway. Second, the initial performance of the reform might allow voters to extract some signal about the government's ability or competence to implement the reform package, and this obviously might affect the political dynamics of public support. (For a discussion, see Tommasi and Velasco (1996)). If, once reform has been adopted, the early evidence suggests that the reform is likely to do 'badly', then in that case, political support for the reform (or at least the incumbent government's implementation of it) might erode fairly rapidly, since voters blame government incompetence for the degree of economic hardship and dislocation they have to endure during the period of adjustment. This indeed is the view underlying Tommasi and Velasco's(1996) interesting discussion on the political sustainability of costly reform.[2]

We propose an alternative explanation: even if there is no revelation of the government's 'type', the pattern of revelation of winners and losers might affect public support in unexpected ways. We suggest that the key might lie in the effect that the reform process has on the balance of political power. In particular, if initially successful reforms change the balance of political power in such a way as to make future redistribution less likely, then public opinion may turn against reform. Thus, in some sense, an initially successful reform may well end up sowing the seeds of its own destruction.

Such apparent anomalies are of more than theoretical interest. As Stokes (1993) and Remmer (1991) document for a variety of mostly Latin American countries, public opinion about the reform process, and the government implementing the reform, frequently varies negatively with the performance of the reform. Drawing on evidence about changes in public opinion in Peru and Poland in particular, Stokes (1996) suggests that the public's responses frequently suggest that they hold "...the belief that if things get worse they will later get better... [I]f the economy improves early on, the public may believe that reforms are failing

[2] Their discussion is entitled 'If reform is costly can it last'. However, much of the discussion seems to assume that citizens are either ignorant of the costs of economic reform, or are myopic. Our own reading of the evidence is quite different.

and turn against the government" (p. 505). For example, she argues that "...Peruvians drew from the recent experience...the lesson that rising wages spelled bad news about future inflation. Politicians, academics, and the press reinforced this interpretation...." (p. 514). Finally, she summarizes some findings of Remmer's (1991) empirical analysis of the political impact of economic crisis in 12 Latin American countries from 1982-1990: "[I]ncumbent parties suffered larger losses at the polls when inflation went down (significant), the incumbent party's share of the vote was larger when inflation rose and when GDP fell (not significant), and the party system was less stable when the exchange rate depreciated." (p. 515)

As another example, consider the Polish experience with economic reform in the past decade, which might be said to be typical of several country experiences. Przeworski (1993) in his summary of the public support for the Balcerowicz Plan summarized his data as follows:

> "In sum, reforms enjoyed overwhelming support from the time they were announced through the first four months of their implementation. This support declined sharply after a few months but remained stable and sizable for the rest of the year. During the subsequent six months, confidence in reforms fell sharply again, and after eighteen months a clear majority of public opinion turned against them for the first time."

We now know that by 1993 the former communists were back in power. Przeworski (1993) in his analysis of the dynamics of public support over the reform process claimed that his

> "...findings may indicate individual myopia, albeit with a twist: Continuation of reforms is threatened when the economy shows the first signs of recovery."

We offer an explanation for this 'irrationality' of the voters, by extending the theoretical framework developed in our previous research (Jain and Mukand (forthcoming)). In that earlier research, we showed that, in the presence of 'individual-specific uncertainty' (Fernandez and Rodrik (1991)), those reforms that are expected to benefit a small minority, or a

very large majority of the population, will pass. (We call these reforms 'minoritarian' and 'super-majoritarian' reforms respectively). By contrast, however, reforms in the intermediate ('majoritarian') range will be voted down, even though the expected beneficiaries outnumber the expected losers.

We construct a two period extension of our benchmark model, in which economic reform are modeled as a sequential process that takes place over the first two periods. Consider an incumbent government which faces a two-stage sequence of reforms. At the end of the first phase of the reform, some voters learn whether they are winners or losers from the reform. For other voters, however, the 'individual-specific uncertainty' persists for another period. Elections are held at each stage, so that voters can choose whether to implement the second stage of the reform after observing the outcome of the first stage of the reform. Suppose that the two-stage reform, if it were fully implemented, would have the popular support of a majority. Further, suppose that there is some uncertainty with regard to the first stage of the reform. With some probability, the outcome of the first-stage reform can be a 'good' one, in the sense that a large part of the overall grand reform is accomplished, and a large number of winners is realized. Alternatively, the reform might have proceeded slowly, so that the benefits realized at the end of the first stage are fairly small. There are at least two reasons that a good initial outcome might turn voters against continuation of the reform. One, an unexpectedly high number of winners in the first stage might mean that the remaining population is less optimistic that they will turn out to be winners, and will vote against completion of the reform sequence. Suppose that, if reforms go badly initially, the remainder of the reform falls in the super-majoritarian range, so that voters would choose to continue the process if the first-stage reform proceeded slowly. By contrast, it is possible that the 'good' outcome in the first stage means that the remainder of the reform falls in the majoritarian range, so that when the electorate weighs whether or not to continue with the reform, it chooses not to do so. In other words, if the first-period reform realization is 'low', then the remainder of the reform sequence still falls in the super-majoritarian range,

while if the first-period reform realization is 'high', the remaining reform size falls in the majoritarian range. Thus, if the first stage of the economic reform does better than expected and there are more winners than expected, then this might actually throw the reform process into jeopardy, and follow-up reforms will not be implemented.

But even if one keeps the probability of being a second stage winner constant across the two possible realizations of the first stage reform, there is another factor that voters must consider in deciding whether to continue with the reform: the political feasibility of implementing redistributory compensation after the second stage. If the second stage of the reform would shift the political balance of power toward the winners, then voters are less likely to vote for continuation if the redistributive compensation at stake is large - which is more likely if there if there is more to redistribute, i.e., if the first stage reforms 'went well'. In this sense a reform might be 'too successful' in its initial stages. So we might have a situation where a majority would support the reform sequence if it could feasibly be implemented in one shot, but it may not be implemented sequentially. Observe that the dynamics of public opinion in our proposed model would mirror that of the Polish case - support for continuation of the reform collapses after the completion of the initial phase of reforms, even though that phase of the reforms has been successful.

We now attempt to show by means of an example that a two period extension of our benchmark model can help explain the above-mentioned irrationality of the voters. Economic reform is no longer one shot, but is sequential in that it takes place over the first two periods. Given that in practice even Big Bang reform strategies have required more than one electoral cycle to complete, the assumption is reasonable.[3]

[3] We have not attempted to tie in our results to the debate over 'big bang' and 'gradualist' economic reform which is extensively discussed in Tommasi and Velasco (1996) and Roland (2000). It should be obvious, however, that any reform package which is implemented within one electoral cycle will not run into a political impasse for the reasons discussed here.

2 A Model of Economic Policy Reform

The model is a somewhat simplified and expanded version of the model laid out in more detail in Jain and Mukand (forthcoming). We simplify the political structure by having voters vote directly on reform, and on redistribution, whereas earlier we had formally modeled the electoral process in terms of the representative democracy framework of Besley and Coate (1997, 1998) and Osborne and Slivinski (1996). We extend our earlier model by considering reforms that take place in two stages, so as to examine the dynamics of public support over the process of the reform.

We consider an economy with two sectors, denoted by M and X, whose productivity and wages depend on the amount of government expenditure (for example, on infrastructure) on each sector. Suppose that, for an equal level of government expenditure, productivity in the X sector is always higher than that in the M sector. However, as a consequence of a pre-existing distortion in the pattern of government expenditure, wages across the two sectors are equal, pre-reform. We model the reform as comprising a reallocation of government expenditure away from the less productive M sector and toward the more productive X sector. This reallocation takes two periods to realize. At each stage, the reform will also change the returns to labor in the two sectors. Wages in the X sector rise, and those in the M sector fall, and there is some intersectoral labor reallocation, with workers who end up in the X sector gaining from the reform, and those who remain in the M sector losing, due to the fall in their wages. Specifically, using θ to denote the impact of the reform, (which may be a stochastic function of the extent to which government expenditure is reallocated), winners in the first stage (i.e., workers in the X sector) see their wages rise to $w + \theta w$, while losers get $w - \delta\theta w$, where w is the pre-reform wage in both sectors, and $\delta, \theta \in (0, 1)$, which ensures that even the losing sector's wage is always non-negative. The proportion of M sector workers who gain from the first stage (respectively, second stage) reform is a function of θ_1 (respectively, θ_2) and is denoted by $\alpha(\theta_1)$ (respectively, $\alpha(\theta_2)$). We assume that all workers

in the M sector face individual-specific uncertainty, i.e., that while all M sector workers know that a proportion $\alpha(\theta_t)$ of them will move sectors as a consequence of a state t reform, each individual worker is uncertain about whether that proportion includes him specifically. (Fernandex and Rodrik, 1991; Jain and Mukand, forthcoming). Hence, $\alpha(\theta_t)$ can also be interpreted as the probability that a given M sector worker will emerge as a winner from the reform at stage $t = 1, 2$.

We impose an efficiency condition to ensure that all reforms under consideration are efficient, i.e., the national output expands, and that a higher value of θ implies a bigger increase in national output, so that we can refer to θ as the 'size' of the reform, synonymous with greater efficiency gains. In the Appendix, we show that a condition that ensures this is that $\frac{\alpha(\theta)}{1-\alpha(\theta)} \geq \delta$. For simplicity, we can also set $\alpha(\theta) = \theta$. In that case, the efficiency condition is simply: $\frac{\theta}{1-\theta} \geq \delta$.

We next describe the political structure of the model. As described earlier, the reform takes place over two periods. At the start of stage 1, workers vote on whether to launch the reform. If they vote not to launch the reform, and maintain the status quo, then all workers continue to earn their status quo wage w. However, in voting on whether to launch the reform, workers face some uncertainty about the outcome of the first stage reform. If they vote to launch the stage 1 reform, two outcomes are possible in the first period - a successful, or 'High', outcome, versus a less successful 'Low' outcome, respectively, θ_1^H and θ_1^L where obviously, $\theta_1^H > \theta_1^L$. At the end of each stage, voters can choose a tax-transfer scheme to tax or compensate a worker i with wages w_{it} with a tax of τ_{it} in period t (a negative value denotes a transfer). We impose some restrictions on this vector: workers with identical wages cannot be taxed at different rates and a regressive tax on wages is ruled out. At the start of stage 2, voters choose whether to continue with the reform, i.e., implement the second stage, or not. However, for simplicity, there is no uncertainty about the size of the reform at this stage. If the second stage reform is implemented, then a proportion $\alpha(\theta_2)$ of the workers in the M sector at the beginning of the second stage are revealed to be winners, and see their

wages rise to $w + (\theta_1 + \theta_2)w$ (along with those workers who had moved to the X sector in the first stage), while those who remain in the M sector will see their wages drop (further) to $w - \delta(\theta_1 + \theta_2)w$. Each worker makes his voting decisions at each stage to maximize his net income $w_{it} - \tau_{it}$, over the two periods. There is no discounting.

For simplicity, suppose that initially, all workers are in the M sector at the start of stage 1. Consider now a sequence of reforms that has the following properties. The first stage reform, irrespective of whether it achieves a 'High' or 'Low' outcome, results in the M sector retaining its majority at the end of stage 1, i.e.,

$\alpha(\theta_1^L) < \alpha(\theta_1^L) < \frac{1}{2}$

Further, suppose that if the total reform (over both periods) is implemented, then it is large enough that, regardless of whether the first stage reform has a 'High' or 'Low' outcome, the M sector becomes a minority after the 'grand' reform. In other words, if both stages of the reform are implemented, then

$\alpha(\theta_1 + \theta_2) > \frac{1}{2}$,

i.e.,

$\alpha(\theta_1^L) + \alpha(\theta_2).(1 - \alpha(\theta_1^L)) > \frac{1}{2}$

$\alpha(\theta_1^H) + \alpha(\theta_2).(1 - \alpha(\theta_1^H)) > \frac{1}{2}$

It is easy to check that more winners are realized after two stages if the first stage has a high outcome, than if it has a low outcome, i.e, $\alpha(\theta_1^H) + \alpha(\theta_2).(1 - \alpha(\theta_1^H)) > \alpha(\theta_1^L) + \alpha(\theta_2).(1 - \alpha(\theta_1^L))$.

These conditions make the political structure of this model exceedingly simple. At the end of the first stage, since the M sector retains its majority, there will always be full redistribution, i.e., each worker's post-tax wage will be the average wage for the society. (See, for example, Dixit and Londregan (1995)). Hence, looking ahead, in considering whether to continue with the reform or not, we need only consider the expected payoffs to those workers who are still in the M sector at the beginning of stage 2. At the end of the second stage, however, the balance of political power swings toward the X sector workers, so that at the

end of the second stage there is no redistribution. Hence, at the beginning of stage 2, the continuation of reforms hinges on whether the M sector workers (who are still in the majority) think that the expected gain from continuation justifies the risk associated with the loss of the power to redistribute at the end of the second stage.

We need to show that there exist parameters such that (1) the stage 2 reform will be launched (will not be launched) if the first stage outcome is 'Low' ('High') - i.e., that a more successful reform may run aground, where a less successful one would win continued passage; and (2) although voters anticipate this, they still choose to launch the first stage of the reforms. Formally, using $\overline{w}_1^H$ and $\overline{w}_1^L$ to denote the average societal income after a 'High' and 'Low' first stage outcome respectively, two sets of conditions are needed:

(1) Stage 2 reform: we need to show that

(i) $Eu(\theta_2 \mid \theta_1^H) \leq \overline{w}_1^H$

(ii) $Eu(\theta_2 \mid \theta_1^L) \geq \overline{w}_1^L$

(2) Stage 1 reform: we need to show that

$Eu_1(\theta_1 > 0) \geq 2.w$

In other words, the expected two-period payoff from launching reforms (the subscripted 1 is to remind ourselves that the expectation is being considered at the start of stage 1) must be greater than the status quo payoff, which is the average wage in each of the two periods. Since we have assumed that all workers are M sector workers at the start of stage 1, the average wage is trivially w, the M sector wage.

The paradox that successful reforms run aground where less successful ones win continued passage is sharpened by the observation that, in our model, there a positive correlation between the efficiency benefits from the first period reform and those from the second period

reform. Formally, relegating the proof to the Appendix, note that $Eu(\theta_2 \mid \theta_1^H) > Eu(\theta_2 \mid \theta_1^L)$ for all efficient reforms, i.e., the expected benefit *(to the workers still in the M sector at the start of stage 2)* of continuing the reform are greater after a High stage 1 reform, than after a Low stage 1 reform. In other words, there is a positive correlation between reform outcomes - at least for the workers still in M sector at the beginning of stage 1. Further, this is true for society as a whole too. Hence, there is a positive correlation between the benefits of the two reforms - i.e., if the first stage is High, then the benefits of continuation are higher than if the first stage is Low, both for those left behind in the M sector at the end of the first stage, and for society as a whole.

Conditions for stage 2 reform

(i) $Eu(\theta_2 \mid \theta_1^H) \leq \overline{w}_1^H$

(ii) $Eu(\theta_2 \mid \theta_1^L) \geq \overline{w}_1^L$

In the appendix, we show that there exist parameters for which conditions (i) and (ii) both hold. Here, we just provide an intuitive outline of the steps required to show that. Conditions (i) and (ii) boil down to a requirement that:

$$\{\alpha(\theta_1^H) - \alpha(\theta_2)\}.(1+\delta)\theta_1^H w \geq [\alpha(\theta_2) - (1-\alpha(\theta_2)).\delta]\theta_2 w \geq \{\alpha(\theta_1^L) - \alpha(\theta_2)\}.(1+\delta)\theta_1^L w$$

Now, note that the expression in the middle is positive, by the efficiency condition. The expression on the right can be made as small as needed, and even negative, by assuming that $\alpha(\theta_1^L) \leq \alpha(\theta_2)$. And the expression on the left can be made as large as necessary by making $\alpha(\theta_1^H)$ much larger than $\alpha(\theta_2)$ (subject, of course, to $\alpha(\theta_1^H) < 1/2$).

(2) Stage 1 reform: we need to show that

$Eu_1(\theta_1 > 0) \geq 2.w$

Intuitively, this condition must be true - each worker (and at the start of period 1, they are all in the M sector) is faced with a reform that could result in the national pie expanding once, or possibly twice. Since they are risk-neutral, the efficiciency condition alone should be sufficient to guarantee that they vote for the reform to go forward, knowing that it can always be stopped after the first period. Essentially, if the first stage reform is carried out, there are four possible states: $(\theta_1^H, \theta_2), (\theta_1^L, \theta_2), (\theta_1^H, 0)$, and $(\theta_1^L, 0)$, corresponding to whether the first stage outcome is High/Low, and whether reform is implemented or not in the second stage. And there are three possible outcomes for the worker: he ends up as a stage 1 winner, as a stage 2 winner, or as a loser throughout. Depending on which state prevails, one will consider different outcomes for the worker - for example, in the state $(\theta_1^H, 0)$, one need only consider the payoffs from being a stage 1 winner, or being a loser. We relegate the formal proof to the Appendix, but intuitively, there are only two possible political equilibria: in one, the first stage outcome is 'Low' and the second stage reform is implemented, and in the other, the first stage outcome is 'High' and the reform is halted, but the (larger) national income is redistributed evenly. In either case, the worker is better off than with the status quo, hence he will vote to launch the first stage reform.

3 Conclusion

In some sense, the initial success of a reform might sow the seeds of its own destruction: the success of reform in the first period (in terms of changing wages and reallocating workers) ensures that the reform process runs into a political impasse and remains incomplete. So we might have a situation where a majority would support the reform sequence if it could feasibly be implemented in one shot, but it may not be implemented sequentially. Observe that the dynamics of public opinion in our example mirror that of the Polish case - support for continuation of the reform collapses after the completion of the initial phase of reforms,

even though that phase of the reforms has been successful.[4]

The essential contribution of this research is to show that if one is interested in studying the political sustainability of economic reform, then it may not be enough to look at the overall proportions of winners and losers. Rather, the order of revelation of winners and losers creates political constituencies, sometimes in unexpected ways. There is no particular reason to believe that winners and losers are revealed in identical proportions in each period, and as Blanchard (1997) documents for Eastern Europe, reform entailed substantial sectoral reallocation, whose impact over time was far from uniform. In these circumstances, as a number of recent papers have argued, public opinion matters a great deal (see, for example, Fidrmuc(2001) and Hayo and Shin (2002)). More generally, we believe that a political economy approach to policy questions surrounding economic reform appears to be a rich area for future research, both in terms of providing explanations for what appears to be irrational or myopic behavior by economic agents, but also in narrowing the interdisciplinary gap between the economics and the politics of policy reform.

[4]It should be pointed that there is no unanimity among observers on whether, and to what extent, the first phase of Polish reform was successful. Our use of this case study is intended only as an example to illustrate our point that perfectly rational voters may block continuation of apparently successful reforms.

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Appendix

Efficiency condition

This condition requires that $\frac{\alpha(\theta)}{1-\alpha(\theta)} \geq \delta$, or equivalently, that $\alpha(\theta) \geq \frac{\delta}{1-\delta}$.

Derivation: Efficiency requires that:

$\alpha(\theta).(w + \theta w) + (1 - \alpha(\theta)).(w - \delta\theta w) \geq w$ (**E.1**)

$\iff \alpha(\theta).\theta w - (1 - \alpha(\theta)).\delta\theta w \geq 0$

$\iff \alpha(\theta) \geq (1 - \alpha(\theta)).\delta$

$\iff \frac{\alpha(\theta)}{1-\alpha(\theta)} \geq \delta \iff \alpha(\theta) \geq \frac{\delta}{1-\delta}$

When we assume that $\alpha(\theta) = \theta$, then this condition becomes:

$\frac{\theta}{1-\theta} \geq \delta$, i.e., that $\theta \geq \frac{\delta}{1-\delta}$

It is also easy to check that the left-hand side expression in (E.1) above is increasing in θ. In other words, the efficiency benefits of a reform are increasing in θ.

Second stage benefits are larger after a High first stage

$Eu(\theta_2 \mid \theta_1^H) > Eu(\theta_2 \mid \theta_1^L)$ for all efficient reforms, i.e., the expected benefit (to the workers still in the M sector at the start of stage 2).

Proof:

$Eu(\theta_2 \mid \theta_1^H) = \alpha(\theta_2).[w + (\theta_1^H + \theta_2)w] + (1 - \alpha(\theta_2)).[w - \delta(\theta_1^H + \theta_2)w]$

and similarly for $Eu(\theta_2 \mid \theta_1^L)$. Intuitively, this must be true: essentially, we are comparing the benefits of a reform of size $\theta_1^H + \theta_2$ with a reform of size $\theta_1^L + \theta_2$, so simple efficiency should guarantee that the High reform has a higher overall payoff than the Low one. Check:

$Eu(\theta_2 \mid \theta_1^H) > Eu(\theta_2 \mid \theta_1^L)$

$\Leftrightarrow \alpha(\theta_2).[w + (\theta_1^H + \theta_2)w] + (1 - \alpha(\theta_2)).[w - \delta(\theta_1^H + \theta_2)w] > \alpha(\theta_2).[w + (\theta_1^L + \theta_2)w] + (1 - \alpha(\theta_2)).[w - \delta(\theta_1^L + \theta_2)w]$

$\Leftrightarrow \alpha(\theta_2).[(\theta_1^H - \theta_1^L)w] > (1 - \alpha(\theta_2)).[\delta(\theta_1^H + \theta_2)w - \delta(\theta_1^L + \theta_2)w]$

$\Leftrightarrow \alpha(\theta_2).[(\theta_1^H - \theta_1^L)w] > (1-\alpha(\theta_2)).[\delta(\theta_1^H - \theta_1^L)w]$

$\Leftrightarrow \alpha(\theta_2) > (1-\alpha(\theta_2)).\delta$

$\Leftrightarrow \frac{\alpha(\theta_2)}{(1-\alpha(\theta_2))} > \delta$

which is just the efficiency condition. Intuitively, this can also be seen as follows: For the workers who emerge as winners in stage 2, the wage gain is much larger after a stage 1 of θ_1^H than after θ_1^L (their wage jumps from $w - \delta\theta_1^H w$ to $w + (\theta_1^H + \theta_2)w$, rather than from $w - \delta\theta_1^L w$ to $w + (\theta_1^L + \theta_2)w$).

This claim - that second stage benefits are larger after a High first stage than after a Low first stage - is true for society as a whole too. For society as a whole, the proof is a little more complicated - the claim is that:$\alpha(\theta_1^H)[\theta_2 w] + (1-\alpha(\theta_1^H)).[\alpha(\theta_2).\{(\theta_1^H + \theta_2)w + \delta\theta_1^H w\} + (1-$

$\alpha(\theta_2)).\{-\delta\theta_2 w\}] > \alpha(\theta_1^L)[\theta_2 w] + (1-\alpha(\theta_1^L)).[\alpha(\theta_2).\{(\theta_1^L + \theta_2)w + \delta\theta_1^L w\} + (1-\alpha(\theta_2)).\{-\delta\theta_2 w\}]$

Note that the term in the second square bracket is greater on the LHS than on the RHS. Use A to denote it, assuming that it's equal on both sides.

$\Leftrightarrow (\alpha(\theta_1^H) - \alpha(\theta_1^L))[\theta_2 w] > (1-\alpha(\theta_1^L)).[A] - (1-\alpha(\theta_1^H)).[A]$

$\Leftrightarrow (\alpha(\theta_1^H) - \alpha(\theta_1^L))[\theta_2 w] > (\alpha(\theta_1^H) - \alpha(\theta_1^L))[A]$

Hence, if we can show that $\theta_2 w > A$, then that is sufficient.

$\theta_2 w > A$

$\Leftrightarrow \theta_2 w > \alpha(\theta_2).\{(\theta_1^H + \theta_2)w + \delta\theta_1^H w\} + (1-\alpha(\theta_2)).\{-\delta\theta_2 w\}$

$\Leftrightarrow \theta_2 w - \alpha(\theta_2).\theta_2 w > \alpha(\theta_2).\{\theta_1^H w + \delta\theta_1^H w\} + (1-\alpha(\theta_2)).\{-\delta\theta_2 w\}$

$\Leftrightarrow (1-\alpha(\theta_2)).\theta_2 w + (1-\alpha(\theta_2)).\{\delta\theta_2 w\} > \alpha(\theta_2).\{\theta_1^H w + \delta\theta_1^H w\}$

$\Leftrightarrow (1-\alpha(\theta_2)).[\theta_2 w + \delta\theta_2 w] > \alpha(\theta_2).\theta_1^H w[1+\delta]$

$\Leftrightarrow (1-\alpha(\theta_2)).\theta_2 w[1+\delta] > \alpha(\theta_2).\theta_1^H w[1+\delta]$

$\Leftrightarrow (1-\alpha(\theta_2)).\theta_2 > \alpha(\theta_2).\theta_1^H$

$\Leftrightarrow \frac{\theta_2}{\theta_1^H} > \frac{\alpha(\theta_2)}{(1-\alpha(\theta_2))}$

Now, if we assume that $\alpha(\theta) = \theta$, then this boils down to:

$\Leftrightarrow \frac{\alpha(\theta_2)}{\alpha(\theta_1^H)} > \frac{\alpha(\theta_2)}{(1-\alpha(\theta_2))}$

$\Leftrightarrow (1 - \alpha(\theta_2)) > \alpha(\theta_1^H)$

Now, since we have assumed that all reforms θ are such that $\alpha(\theta) < 1/2$, therefore the LHS must be greater than RHS. Thus, we have proved that there is a positive correlation between the benefits of the two reforms - i.e., if the first stage is High, then the benefits of continuation are higher than if the first stage is Low, both for those left behind in the M sector at the end of the first stage, and for society as a whole.

Conditions for stage 2 reform

(i) $Eu(\theta_2 \mid \theta_1^H) \leq \overline{w}_1^H$

(ii) $Eu(\theta_2 \mid \theta_1^L) \geq \overline{w}_1^L$

Now, $\overline{w}_1^H = \alpha(\theta_1^H).[w + \theta_1^H w] + (1 - \alpha(\theta_1^H)).[w - \delta\theta_1^H w]$

So condition (i) requires that:

$\alpha(\theta_2).[w+(\theta_1^H+\theta_2)w]+(1-\alpha(\theta_2)).[w-\delta(\theta_1^H+\theta_2)w] \leq \alpha(\theta_1^H).[w+\theta_1^H w]+(1-\alpha(\theta_1^H)).[w-\delta\theta_1^H w]$

$\Leftrightarrow \alpha(\theta_2).[w+\theta_1^H w]+(1-\alpha(\theta_2)).[w-\delta\theta_1^H w]+\alpha(\theta_2).\theta_2 w-(1-\alpha(\theta_2)).\delta\theta_2 w \leq \alpha(\theta_1^H).[w+\theta_1^H w] + (1 - \alpha(\theta_1^H)).[w - \delta\theta_1^H w]$

$\Leftrightarrow \alpha(\theta_2).\theta_2 w - (1 - \alpha(\theta_2)).\delta\theta_2 w \leq \{\alpha(\theta_1^H) - \alpha(\theta_2)\}.[w + \theta_1^H w] + \{(1 - \alpha(\theta_1^H)) - (1 - \alpha(\theta_2))\}.[w - \delta\theta_1^H w]$

$\Leftrightarrow \alpha(\theta_2).\theta_2 w-(1-\alpha(\theta_2)).\delta\theta_2 w \leq \{\alpha(\theta_1^H)-\alpha(\theta_2)\}.[w+\theta_1^H w]-\{\alpha(\theta_1^H)-\alpha(\theta_2)\}.[w-\delta\theta_1^H w]$

$\Leftrightarrow \alpha(\theta_2).\theta_2 w - (1 - \alpha(\theta_2)).\delta\theta_2 w \leq \{\alpha(\theta_1^H) - \alpha(\theta_2)\}.[\theta_1^H w + \delta\theta_1^H w]$

$\Leftrightarrow [\alpha(\theta_2) - (1-\alpha(\theta_2)).\delta]\theta_2 w \leq \{\alpha(\theta_1^H) - \alpha(\theta_2)\}.(1+\delta)\theta_1^H w$

Similarly, condition (ii) requires that:

$[\alpha(\theta_2) - (1-\alpha(\theta_2)).\delta]\theta_2 w \geq \{\alpha(\theta_1^L) - \alpha(\theta_2)\}.(1+\delta)\theta_1^L w$

In other words, combining both conditions, we need parameters such that:
$\{\alpha(\theta_1^H) - \alpha(\theta_2)\}.(1+\delta)\theta_1^H w \geq [\alpha(\theta_2) - (1-\alpha(\theta_2)).\delta]\theta_2 w \geq \{\alpha(\theta_1^L) - \alpha(\theta_2)\}.(1+\delta)\theta_1^L w$

Now, note that the expression in the middle is positive, by the efficiency condition. The expression on the right can be made as small as needed, and even negative, by assuming that $\alpha(\theta_1^L) \leq \alpha(\theta_2)$. And the expression on the left can be made as large as necessary by making $\alpha(\theta_1^H)$ much larger than $\alpha(\theta_2)$ (subject, of course, to $\alpha(\theta_1^H) < 1/2$).

For example, set $\alpha(\theta) = \theta$. Set $\alpha(\theta_1^L) = \alpha(\theta_2) = 1/3$. Then the expression on the right is 0. The efficiency condition required to ensure that the expression in the middle is positive is: $\delta \leq \frac{\alpha(\theta_2)}{1-\alpha(\theta_2)} \Leftrightarrow \delta \leq \frac{1/3}{2/3} \Leftrightarrow \delta \leq \frac{1}{2}$. Assume it is equal to 1/4. Then the middle expression becomes $[\frac{1}{3} - \frac{2}{3}.\frac{1}{4}]\frac{1}{3}w = [\frac{1}{3} - \frac{1}{6}]\frac{1}{3}w = \frac{1}{18}w$. And the left expression is $\{\theta_1^H - \frac{1}{3}\}.(1+\frac{1}{4})\theta_1^H w = \{\theta_1^H - \frac{1}{3}\}\frac{5}{4}\theta_1^H w$. For this to be greater than the expression in the middle, (and keeping in mind that $\theta_1^L < \theta_1^H < 1/2$, i.e., $1/3 < \theta_1^H < 1/2$), we need that:

$\{\theta_1^H - \frac{1}{3}\}\frac{5}{4}\theta_1^H w \geq \frac{1}{18}w$
$\Leftrightarrow \{\theta_1^H - \frac{1}{3}\}\theta_1^H \geq \frac{4}{90}$
$\Leftrightarrow (\theta_1^H)^2 - \frac{1}{3}\theta_1^H - \frac{4}{90} \geq 0$
Solve the quadratic equation, and get roots of $\frac{\frac{1}{3} \pm \sqrt{\frac{1}{9} - 4*1*(-4/90)}}{2} = \frac{\frac{1}{3} \pm \sqrt{\frac{1}{9} + \frac{16}{90}}}{2} = \frac{\frac{1}{3} \pm \sqrt{\frac{26}{90}}}{2} = \frac{1}{6} \pm \sqrt{\frac{26}{360}} = \frac{1}{6} \pm .2687$

So one root is negative, and the other one is about .43 or so. This is an upward opening parabola, so values between the two roots are below the x-axis. So check with an example: set $\theta_1^H > .43$ or so. Let $\theta_1^H = .45 = 9/20$. Then $\{\theta_1^H - \frac{1}{3}\}\frac{5}{4}\theta_1^H w = \{\frac{9}{20} - \frac{1}{3}\}\frac{5}{4}\frac{9}{20}w = \frac{27-20}{60}.\frac{9}{16}w = \frac{7}{20}.\frac{3}{16}w = \frac{21}{320}w$, which is slightly over $\frac{1}{16}w$, which is slightly over the RHS of $\frac{1}{18}w$.