

HOW TO THINK ABOUT THE POST-SOVIET OUTPUT FALL

Clifford G. Gaddy
The Brookings Institution

Barry W. Ickes
The Pennsylvania State University

Draft: March 30, 2001
COMMENT WELCOME

Understanding the evolution of output in the post-socialist period is perhaps the most important issue in studying transition. Whether transition has been a success or failure depends on how one assesses the measured fall in output and GDP during the transition. As with many issues in transition, opinions vary widely. One view is that the output fall during transition is the most significant collapse that has been observed during peacetime.¹ Others argue that the output fall is, in fact, a myth (Aslund 2001).

That analysts looking at similar data can arrive at such widely disparate conclusions suggests that there is conceptual confusion. Part of this stems from a lack of precision with terminology. Output is an ambiguous term; it can refer to physical output (industrial production, for example) or national income, which is a value measure. Yet these two variables may – and quite likely do – move in opposite directions during transition. Understanding why that happens is key. Declines in physical output are easy to quantify and record, but they are not of primary relevance to economic well-being. It is the value measure – GDP or national income – that is critical. But valuation makes analysis more complex. Moreover, what really matters is what happens to economic welfare, and especially during transition this is not necessarily synonymous with movements in GDP.²

That measured output has fallen in all transition economies is not disputed.³ This is evident, for example, in figures 1 and 2 which show the evolution of GDP since 1989 in Central Europe and the FSU, respectively. Industrial production has fallen even faster than GDP in

¹ Robert Mundell, for example, has written that: "The first and most obvious conclusion is that output contracted by a cumulative percentage never before experienced in the history of capitalist economies (at least in peacetime). Early denials that the contractions were occurring have proved to be incorrect. We observe that cumulative contractions over the 1990-94 period ranged widely, from a low of 18% to a high of more than 80% (Mundell 1997: 97-98)."

² Consider, for example, the effect of reduced queues. With price liberalization shopping time is reduced. Hence, welfare is enhanced even if no extra output makes it to the shelves. Of course this also involves a redistribution across households – primarily from those heavily endowed with the time to queue to those for whom time is more scarce.

³ We ignore China, as it remains under the control of the Communist Party.

most of these economies. One could similarly look at what has happened to the production of isolated commodities and to public consumption. In Russia, for example, it is evident (see figure 3) that public infrastructure investment has declined steadily in transition, a process that started in the late Soviet period. That this process did indeed start prior to transition is an important point that we emphasize below.

But the issue is not whether measured GDP has fallen but rather how to interpret this. In particular, we need to know whether measured GDP is accurately reflecting true value produced in the economy. If output was produced in the previous regime in an entirely wasteful manner, then economic welfare will rise if this production is halted. Since GDP is just the sum of value added, it is clear that GDP can increase even if physical output falls. In fact, GDP can rise even if the value of industrial production falls.⁴ Though apparently obvious, failure to keep this in mind produces conceptual confusion.

Even the concept of value added is murky in transition. This is due to the dramatic shift in valuation that is brought about by two processes: liberalization (both internal and external) and the end of Communist central planning. Internal liberalization alters the relative prices of goods in the economy. External liberalization brings new trade opportunities and prices that dramatically alter valuation criteria. The demise of the Communist party also drastically alters the nature of relative prices and valuation. One reason why measuring the effect of liberalization on value added (on GDP) is so difficult is that these two processes occur simultaneously. In the shift from central planning the economy moves from valuations based on planners' preferences to valuations based on market preferences – that is, the choices of free consumers and free producers.⁵ In the Soviet Union production was organized to meet the preferences of the Communist party. The party preferred a very specific output bundle, one dominated by defense and heavy industry production. It turns out that this bundle was quite different from that preferred by society as a whole. (We see clear evidence of that in post-socialist expenditure patterns.) This makes comparisons across regimes problematic. To understand this latter point it is useful to begin with the “camellia effect.”

I. THE CAMELLIA EFFECT

Consider a flower shop that specializes in the sale of extremely rare camellias. Cultivating these plants is inordinately expensive, but this activity is profitable because the shop has a

⁴ This can happen because industrial production measures inputs as well as output. Suppose that auto producers alter production to make lighter, more fuel-efficient cars. The value of autos may rise while steel production drops. As value destroying activities are reduced industrial production and GDP likely move in opposite directions.

⁵ To some extent this is similar to the familiar index number problem that plagued comparisons of US and Soviet defense expenditures. Using Soviet prices US defense expenditure appeared much higher because of the higher relative prices of technology compared with labor in the Soviet Union. Similarly, the dollar price of Soviet defense expenditure was higher than when Soviet prices were used.

customer willing to pay very high prices for camellias. Now suppose this customer passes away. The shop can no longer sell rare camellias at a price that covers the cost of production. So camellia cultivation ceases. Resources that were previously devoted to camellia production will now be used for something else, say roses. Profits at the flower shop fall because camellias were very profitable as long as their special customer lived. But given that there is no market for rare camellias anymore (while there *is* a market for roses), everyone is better off with rose cultivation than if they continued to cultivate camellias as if nothing had changed.

Now change camellias to “defense output” and the special customer to the Politburo of the CPSU. In the Soviet regime defense output was demanded despite the enormous cost. It had value as long as the CPSU had command over resources. Just as with the camellias, the special customer of Soviet times made it “valuable” to produce defense output. When the Soviet system collapsed so did the special customer. Output thus falls – valued at Soviet prices – because at those prices defense output was valued far above cost. After the fall this output is not valued sufficiently and production declines. This is an output fall, but welfare is certainly higher with lower defense production given that the CPSU is no longer the measure of value.

Notice that if the resources devoted to camellia production are highly specialized then when the demand shift takes place it may be very hard to find alternative uses for these inputs. Output may remain depressed for quite a while. There may also be interesting behavioral issues to think about. Suppose that the florist believes that the wife of the camellia connoisseur will continue to purchase the rare flowers. Then he may continue camellia production even though the market for the good has effectively been eliminated. It may take a while to notice that the wife prefers to spend her wealth in other ways. This is analogous to a Russian defense enterprise director thinking that the government will soon restore orders and that cuts were temporary. Similarly, the florist may consider anything but camellia cultivation beneath him. (“Camellias are exciting and challenging; roses are boring”). This would lead to inertia in shifting to new activities. Both of these behavioral changes could prolong the decline in output.⁶

The importance of the Camellia effect for thinking about the output decline is especially important in comparative terms. The “Camellia effect” explains why transitional recessions are observed. But the size of this drop will be proportional to the share of “camellias” in GDP, and this clearly differs across the post-communist world.⁷ In a country like Russia the size of the defense sector was especially large. This exacerbates the size of the output drop that is due to transitional factors. To measure the pure transition effect we should compare what would have been produced under central planning had Politburo preferences not determined production decisions with what happened during transition. Ignoring the camellia effect mixes the two sources of output fall.

⁶ Finally, note also what happens to measurement. Did or did not the flower shop have high sales when the old buyer was alive? It did. Now you could go back, if you liked, and recompute the sales revenue, profits, etc. of the shop on the assumption that the camellia buyer didn’t exist. But would that really make sense? Would the shop have behaved like that if he hadn’t been there? Of course not.

⁷ Even for the former Soviet Union the differences are dramatic, as Russia had a much larger than average share of Soviet defense industry. See Gaddy (1996).

II. RELATIVE PRICES AND PERCEPTIONS

In the Soviet period resources were under-priced and manufacturing was over-valued.⁸ These pricing distortions masked the actual distribution of value in the Soviet regime. Soviet pricing made it appear that more value was produced in manufacturing than was actually the case. This created a distorted perception of the economy that Russia inherited from the Soviet regime. When prices were liberalized resource prices rose relative to manufacturing prices. Hence, production enterprises could no longer cover their costs. Without subsidies manufacturing enterprises had to cut production.

Liberalization revealed the true magnitude of the pricing distortion in the Soviet economy. This revelation is apparent in the declines in manufacturing output and industrial production. It is easy for people to see, and it is this fall which makes many observers certain that economic performance collapsed with liberalization.

The fall in manufacturing output is only half of the story, however. The other half is the increase in the value of resources. As energy and other primary resources are diverted from low- (negative-) value added uses in domestic manufacturing to exports, the value of Russian national income increases. Yet perception does not accord with this primarily because the resources are exported, and not all the incomes are repatriated. The decline in output is there for everyone to see, yet the realization of higher value is much harder to notice.

Increases in the value of (net) exports are just as much a part of national income as any domestic activity. But if the revenues from exports are not repatriated – that is, if there is capital flight – then that gain in Russian wealth brought about by improved resource allocation is almost surely not perceived by the average household. Capital flight, after all, reflects a change in the timing of when the income will be realized. It represents a deferral of consumption from the present to the future. It means that the realization of the benefits of improved allocation are postponed. It thus impacts greatly on the perception of what has happened to welfare, and thus warrants further investigation.

III. VALUE DESTRUCTION, RATIONALITY, AND CAPITAL FLIGHT

Now we turn to the relationship between economic liberalization, the elimination of value destruction, and capital flight in a post-Soviet economy. This is crucial because it enables us to understand how value added can rise in the economy even as domestic consumption, investment, and standards of living appear to decline.

⁸ See Ericson (1999) for an analysis of Soviet pricing and its implications for understanding the sources of value and the implications of liberalization.

Initial condition.

Consider an economy in which all wealth production is owned by the state. Hence, income streams (derived primarily from resource sectors which produce most of the value in the economy) are also owned by the state. Public consumption is financed out of these state-owned income streams.

Because of value destruction (and other inefficiencies, such as wrong product mix, etc.) output (GDP) in the Soviet period is lower than with liberalization. Initial GDP is given at y_1^{SU} in figure 4. With no reform, output in the future would be y_F^{SU} , and consumption would be at point A (a consumption bundle consisting of current and future consumption).

Liberalization

Now suppose that liberalization results in the elimination of activities that destroy value. For simplicity, assume that all value destruction occurs in the manufacturing sector. Thus the manufacturing sector contracts, and the resources that were wasted there are now exported. This raises, *ceteris paribus*, GDP by the amount that value destruction is reduced. Notice that if the state still owned the resource sector, its (the state's) resources would be enhanced as would its ability to support public expenditure.

Suppose, however, that liberalization is accompanied by privatization of the assets that produce value added. Notice that this does not have to be *de jure* privatization. All that is really required is *de facto* privatization of the income streams. With privatization of the income streams the government no longer has control over these flows; it must now resort to taxation. Hence, privatization of the income streams will reduce the amount of resources available to the government,⁹ and will result in a redistribution of consumption from public to private.

The elimination of value destruction due to liberalization increases current and future GDP. In figure 4 this is given by y_1^L and y_F^L and the new consumption point B.¹⁰ GDP rises in the current period by the savings from reduced value destruction, equal to $y_F^L - y_1^{SU}$.

Now consider the effect of taxation. There are two aspects. First, because of *de facto* privatization of income streams the government has less control over value. It cannot set 100% marginal tax rates, and even if it did agents would avoid paying such rates, primarily via capital

⁹ In principle, privatization could improve the efficiency with which assets are used. Hence, the potential tax revenue for the government would be higher than with continued ownership. This is, after all, one of the main arguments in favor of privatization. But the consequences for the government's budget depend on whether the incomes will actually be taxed and whether restructuring will actually take place.

¹⁰ As we have drawn it, $y_F^L > y_1^L$, on the assumption that liberalization raises income by eliminating value destructive activities, but that restructuring – which takes time – raises future income additionally.

flight. Second, the existence of the virtual economy means that keeping value domestically leads to value destruction – wasted investment and production of unneeded products. This is in effect also a “tax” on the economy. Notice that these two “taxes” are conceptually distinct. Conventional taxation is a redistribution.¹¹ It may reduce private consumption while augmenting public consumption. If the revenues are used effectively, it is a pure transfer, and there is no effect on consumption. If the revenues are wasted it is a pure loss. Hence, the effect of conventional taxation on aggregate consumption depends on the uses of the revenues. With virtual economy taxation, on the other hand, the results are unambiguous – this taxation represents a deadweight loss to society.

In the analysis that follows we will ignore that portion of conventional taxation that is redistributed and focus on the sum of wasted tax revenue and virtual economy taxation. This type of taxation is purely destructive of resources. We denote by τ the tax rate of value destruction. Then the amount available for domestic consumption if there is no capital flight is $y_1^L - t_1$ in period 1, where $t_1 = \tau y_1^L$. To repeat, we assume that all of this is wasted.¹² Hence, with no capital flight the consumption basket would be at point C in figure 4, under the assumption that there is no virtual economy in the future period.

In the presence of such virtual economy taxation, however, rational agents will try to avoid it. Hence, we assume that capital flees the economy to avoid this taxation. To simplify, we assume that there is no deadweight loss to tax avoidance. Hence, assume that all of t_1 is flight capital. Then the new consumption bundle is given by point D.¹³ Suppose that the world interest rate is given by r_w . Future consumption is enhanced, because the flight capital in the future is worth $t_1(1 + r_w)$. Total future consumption is now $y_F^L + t_1(1 + r_w)$.

Capital flight preserves value by preventing its current taxation by the virtual economy. Returned in the future, when the tax rate is lower (in other words, when the virtual economy has shrunk), future consumption is higher by the amount of the preserved capital, plus interest. In our example, the virtual economy “tax” rate in the future period is zero – that is, the virtual economy has been completely eliminated. Had capital not fled the virtual economy, the consumption bundle would be at C. With capital flight the bundle is at point D, which is clearly preferred to C. In the presence of virtual economy taxation capital flight clearly is a Pareto improvement because fewer resources are destroyed.

¹¹ Of course tax revenues can be wasted as well.

¹² If the tax revenue accrues to the government then it can support public consumption. If it is wasted then current consumption drops by the amount of the tax. In general the loss may be less than 100% but the point would still be similar.

¹³ This is the consumption point under the assumption that Russia cannot borrow to finance current consumption (a safe assumption at present). Hence, the budget set is a corner at point D. If Russia can borrow to finance current consumption, then the consumption bundle could lay anywhere along BD.

The more interesting comparison is between the allocation with capital flight, D, and the pre-transition bundle, A. This is precisely the comparison between the Soviet consumption bundle (i.e., the unreformed system) and the current liberalized situation with the virtual economy and capital flight. So in other words, to answer the question of which is preferred, D or A, is to answer the question of whether the Russian economy is better off with liberalization. A comparison of these two allocations reveals that current consumption (which we can view more broadly as domestic absorption) may actually fall even though current GDP increases. Clearly, whether this occurs or not depends on how large is the tax on current income compared with the gain in current output from greater efficiency, i.e., whether

$$t_1 \begin{matrix} > \\ < \end{matrix} y_1^L - y_1^{SU} .$$

But which consumption point, D or A, is better depends on consumers' rates of time preference. If future consumption is discounted heavily enough the consumption point A can be preferred to that of D. That is, if households are very impatient welfare may actually fall even though GDP increases. Most likely, though, consumption at D is preferred to A, and welfare increases, even though current consumption falls.

Of course agents do not discount future consumption at the same rate. It is convenient to treat the economy as if it were made up of identical households with a common discount factor, for this assumption allows us to focus on the intertemporal comparison. But this is an abstraction. Indeed, differences in the evaluation of liberalization may be traced precisely to differences in the discount rate applied to future consumption. Poor households will likely discount the future more heavily than more well-off households. A similar contrast would hold for the elderly compared with the young.¹⁴

The way to interpret this is really in terms of publicly provided consumption. It is the government that really loses control over income streams. Hence, publicly provided consumption – schools, hospitals, etc., – receive less budgetary support. And investment declines because net returns on domestic investment are less than the (safe) world interest rate given the tax rate, τ .

Notice that the move from point A under the Soviet regime to point D in the liberalized regime is consistent with full rationality. Only if the liberalized regime does not tax current income will the economy move to point B.

It should also be noted that when the government loses control over income streams due to *de facto* privatization, the composition of consumption will shift. Private consumption replaces public, as the owners of the income streams increase their own consumption. If the government tries to prevent this, the owners move their capital abroad.

¹⁴ A related issue would be differences in perceptions of *whether* and *when* the capital will return. Uncertainty over this issue will also divide households in their perception of the success of liberalization.

IV. NOTE ON CONTROL OVER RESOURCES

If we consider capital flight as a response to the virtual economy it is evident that this is an efficient means of preserving Russian wealth. Considering aggregate wealth this is an optimal way to preserve what would otherwise be destroyed. Substituting future for present consumption is the best that can be done until the virtual economy can be undone. Notice that if the resource-producing sector were still nationalized then this would only be a question of inter-temporal trade.

With the privatization of resource producing assets, however, there is a distribution question to consider. While Russia's wealth is preserved via capital flight, the consequences for the population depend on what the *owners* of this capital decide to do with these assets. If the capital is repatriated, then some of it can be taxed to support future public consumption. But the more repatriated capital is taxed, the more likely flight capital remains abroad. Meanwhile, domestic consumption and investment are reduced by the amount of flight capital. To the observer it appears that living standards have fallen. Of course, what has happened is that there has been a change in the distribution of utility from the average household to the owners of the relevant income streams.

The key point is that transition alters the ownership of income streams, and hence alters the ability of the government to raise revenue. The relevance of this point is evident in figure 3. Notice that the collapse in public sector infrastructure predates transition in Russia.¹⁵ And if these processes started prior to transition, then it cannot be argued that liberalization-cum-privatization is the reason for this public sector collapse.

Why did public infrastructure collapse prior to transition? This collapse was part of the general process of deterioration in the Soviet economy. But it was especially the result of the processes set in motion during *perestroika*. In particular, the loss of control over income streams accelerated as the center lost authority. The cooperative movement and the Law on State Enterprise both weakened central control. Agents began to *de facto* privatize income streams long before privatization of assets took place. It was this diversion that weakened the budgets of the Soviet state, and it is this weakening that caused the collapse in infrastructure investment.

References

¹⁵ This is not the place to analyze whether these declines are warranted. One could argue, for example, that for hospital beds a decrease in investment is a rational response. In 1996 Russia had 11.7 hospital beds per 1000 population compared with 8.2 per 1000 for high income OECD countries. See Ofer (1999: table 6). The key point is that the dramatic decline not only started prior to the demise of the Soviet Union, but the rate and extent of decline was also greater during *perestroika* than later.

Aslund, Anders, "The Myth of Output Collapse After Communism," Working Paper, Carnegie Endowment for International Peace, March 2001.

De Broeck, Mark, and Vincent Koen, "The Great Contractions in Russia, the Baltics and the Other Countries of the Former Soviet Union: A View From the Supply Side," IMF Working Paper, WP/00/32, March 2000.

Ericson, Richard E., "The Structural Barrier to Transition Hidden in Input-Output Tables of Centrally Planned Economies," *Economic Systems*, V.23, 3, September 1999, pp. 199-224.

Gaddy, Clifford G., *The Price of the Past: Russia's Struggle with the Legacy of a Militarized Economy*, Brookings, 1996.

Mundell, Robert A., "The Great Contractions in Transitions Economies," in Mario I. Blejer and Marko Skreb (eds.), *Macroeconomic Stabilization In Transition Economies*, Cambridge University Press, New York, 1997.

Ofer, Gur, "Development and Transition: Distinct or Complementary," Working Paper, Department of Economics, Hebrew University, 2000.

Figure 3: Collapse in Public Sector Infrastructure Investment in Russia, 1988-2000
[Annual construction of new capacity. Schools and pre-schools:
'000 pupils; hospitals: '000 beds; clinics: '000 visits per shift.]

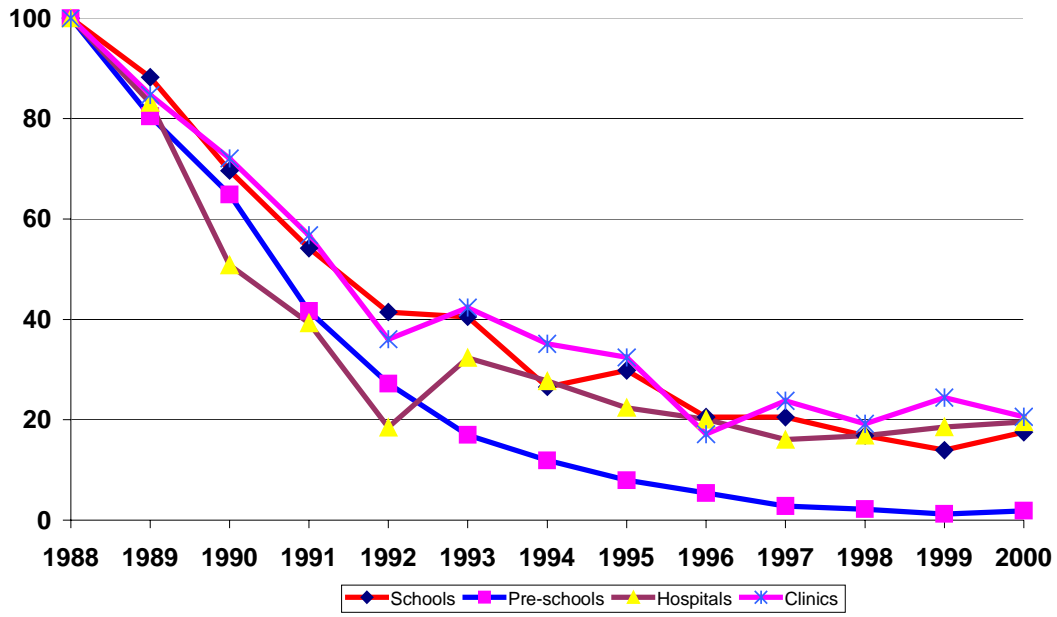
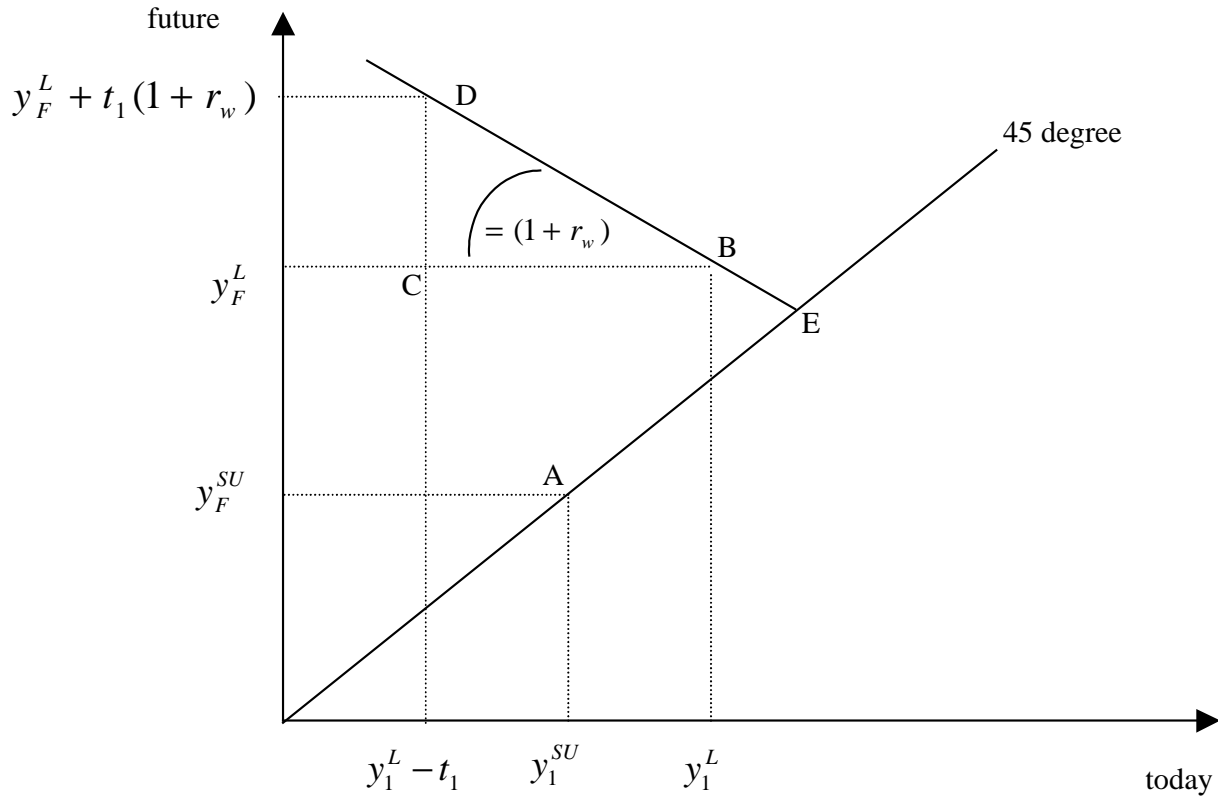


Figure 4

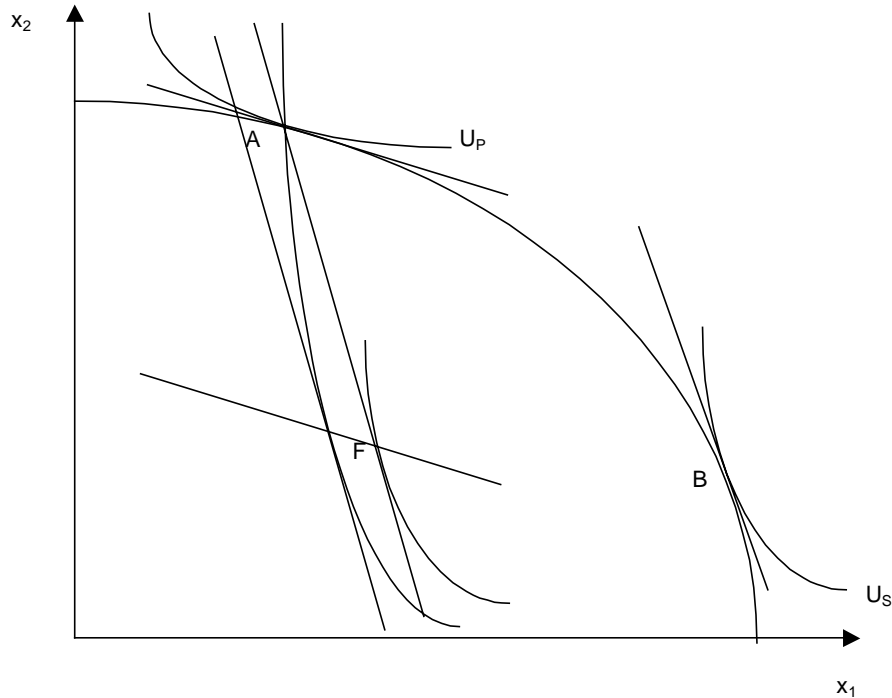


Appendix: A Graphical Analysis of the Camellia Effect

Consider figure 1 which gives the pre-transition allocation, point A, and the post-transition allocation, point B. At point A there is large military production and little civilian production, reflecting politburo preferences (U_p). The new production bundle is at point B, based on society's preferences.

Now suppose that liberalization causes the production bundle to move to point F. This is the most pessimistic outcome – demand for x_2 declines with almost no increase in x_1 . Measured in real terms, at the old prices, output falls approximately by the distance AF in units of x_2 .¹⁶ But this greatly overestimates the welfare change.

It is more interesting, in fact, to compare point F with point A. At point F GDP has not fallen compared with point A, measured at the new prices. But measured at the old prices GDP is much lower than at point A. Yet, given society's preferences welfare is in fact higher at point F



than at point A. This suggests that using post-transition prices gives a very different impression than standard measures.

¹⁶ We could also measure it in terms of x_1 without any effect on the argument. Or more generally, letting x_2^A be production of x_2 in the pre-transition and let p_1^D be the post-transition price of good 1, then the change in output is given by $\sum_i p_i^A x_i^A - \sum_i p_i^D x_i^D$.

It is also useful to think about the difference between point F and point B. Notice that at point F we are inside the production frontier. There is still a loss, due perhaps to disorganization and lack of restructuring, compared with what is attainable at point B. But the fact that we are at point F does not mean that welfare has fallen. It can easily have risen.

Notice that measurements of the output fall approximate welfare changes of the form:

$$e(p_0, U_A^P) - e(p_0, U_F^P) \quad (1)$$

This measures the cost, at the old prices to maintain the same level of welfare, *using planners's preferences*. This is clearly quite large. But our concern should really be with comparisons of the form:

$$e(p_0, U_A^P) - e(p_0, U_F^P) \quad (2)$$

Expression (2) measures how much it would cost to maintain the same level of welfare using society's preferences. This is clearly much smaller; in fact it is negative as I drew the figure.