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                                                                                            Spring 2007

Midterm Exam II: Answer Sheet

Instructions: Read the entire exam over carefully before beginning. The value of each question is given. Allocate your time efficiently given the price schedule that is imposed. There are no trick questions. Try to be concise and use graphs wherever possible.

1. *(20%) Carefully explain the meaning of negative value added (NVA) at domestic prices and at world prices. How can the same industry produce value added at domestic prices but destroy value at world prices?*

   brief answer NVA^d (at domestic prices) means that the revenue from sales is less than the domestic cost of purchased inputs, which we can write at $VA_i^d \equiv p_i^d z_i - p_m^d M_i < 0$, where z_i is output of firm i, p_m^d is the domestic price of purchased inputs, and M_i is its purchases of inputs from other firms. NVA at world prices would then be defined by $VA_i^* = p_i^* z_i - p_m^* M_i < 0$, where the asterisk refers to world prices. The reason we can have $VA_i^* < 0 < VA_i^d$ is that domestic and world prices may differ. This is the essential point. In planned economies enterprises did not trade directly with the outside world – there was a foreign trade ministry. This allowed domestic and world prices to differ. If the domestic price of output is above the world price and the domestic price of purchased inputs (read resources) is below the world price then this is clearly possible, since it makes domestic value added appear larger.[1]

   (a) *Why are transition economies likely to have problems with negative value added producers? Would you expect this problem to be as prevalent in market economies? Explain.*

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[1]Recall that one can show this by defining the implicit and explicit tariffs. Let the explicit tariff on good i be t_i. Then $p_i = (1 + t_i)p_i^*$. In addition to tariffs on imports, the price of material inputs may be distorted. Let t_m be the implicit export tax on material inputs. Then we can write $p_m(1 + t_m) = p_m^*$. Now if we divide goods prices by material prices we get:

$$\frac{p_i}{p_m} = (1 + t_i)(1 + t_m)\frac{p_i^*}{p_m^*} \equiv (1 + \tau)\frac{p_i^*}{p_m^*} \tag{1}$$

where τ is the coefficient of protection. We can now compute value added at world prices:

$$V_i^* = p_i^* z_i - p_m^* M \tag{2}$$

and if we use the expressions for p_i^* and p_m^* in terms of the domestic price we get:

$$\begin{aligned} V_i^* &= \frac{p_i z_i - (1 + t_i)(1 + t_m)p_m M}{1 + t_i} \\ &= \frac{p_i z_i - (1 + \tau)p_m M}{1 + t_i}. \end{aligned} \tag{3}$$

It is clear from (3) that even if $V_i > 0$, V_i^* can be negative if τ is large enough. A condition for this would be that the implicit tariff on materials is too large. This is not farfetched for STE's.

brief answer Under Soviet planning enterprises were not created, favored, or selected based on market prices (or profitability). Entry and exit was not determined by market conditions, and there was a soft-budget constraint. There was only the weakest mechanism for production to conform to world prices – the preferences of planners not to waste resources, but this was tempered by many factors, most important the lack of information. This explains why whole sectors could be destroying value, not just individual firms that are badly run. With prices distorted and soft-budget constraints and output targets, it is certainly possible for NVA to be a significant problem. In market economies it would be less of a problem because it requires explicit subsidies to maintain such activity. It may be that Amtrak destroys value, but it has explicit political support. If I start a foolish company pretty soon I will be bankrupt and my lossmaking firm is history. Only subsidies can allow me to persist. Without such subsidies the firm would go bankrupt. In market economies lossmakers eventually exit. But in a command economy price distortions are so pervasive that the subsidies are hidden from view. In planned economies lossmakers do not exit.

(b) *Suppose that production structure in transition economies are very rigid. Will the presence of NVA producers be more or less of a problem than if production structures were flexible? Explain.*

brief answer The more rigid the production structure the harder it is to substitute away from the more (at world prices) expensive input. Hence, the harder it is to adjust to world prices. It is easiest to think of rigidity – flexibility in terms of the elasticity of substitution (the shape of the isoquant in figure 1). In figure 1 production is relatively flexible. So if we move from point d to point g we eliminate the problem. But if the isoquant was more "L-shaped" it would be more difficult to escape the NVA region. We would need a whole new production process, or abandon production of this good.
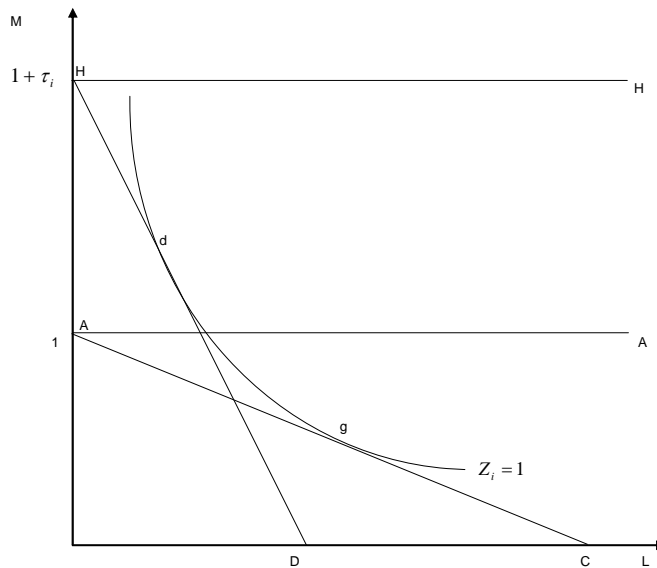

Figure 1: NVA at World Prices

(c) *What are the consequences for a transition economy of external liberalization with NVA? What policies, if any, can be used to deal with these problems?*

brief answer If $VA_i^* < 0$ is prevalent then external liberalization would lead to a large loss in GDP and threaten employment. Output would shrink in those sectors if subsidies were removed. One could impose tariffs to shield the producers from world prices, but this defeats the purpose of external liberalization and it invites corruption. Currency depreciation provides some protection (and it is likely to be temporary as real exchange rates appreciate over time in transition), but this has the negative consequence of making inflation stabilization more difficult. There may be no great solutions since such production is a negative legacy of planning and must be eliminated. Best thing to do is compensate losers, but how?

2. *(30%) Suppose that reforms impact three groups of the society differentially. Suppose that there are two reforms that are being considered, and that the gains and losses from the two reforms are distributed as follows:*

	Group 1	Group 2	Group 3
Reform 1	g_1	l_1	g_1
Reform 2	g_2	g_2	l_2
Reforms 1 + 2	$g_1 + g_2 > 0$	$l_1 + g_2 < 0$	$g_1 + l_2 < 0$

$$(4)$$

(a) *Given the payoffs in figure (4) would a package that combined both reforms pass a majority vote? Explain.*

brief answer No. Groups 2 and 3 would vote against the package.

(b) *Given the payoffs of the combined reforms can it ever make sense to pass them? How large must the gains be relative to the losses for each of the reforms to be efficient (raise welfare)?*

brief answer Yes, if $2g_1 + l_1 > 0$ and $2g_2 + l_2 > 0$, the reforms are efficient and should both be passed.

(c) *Suppose that the reforms are voted on sequentially? Will the reforms pass? Explain.*

brief answer Yes. If we vote first on reform one, groups 1 and 3 will vote in favor. Then in the next period group 2 will vote in favor of reform 2. Notice that group 2 would like to promise group 3 that they will vote against reforms in period 2 if group 3 votes against them in period one. But this promise is not credible. Once you get to period two group 2 has nothing to gain by sticking to that commitment. Group 3 knows this, so they vote yes in period one.

(d) *If reforms are socially efficient how would the possibility of compensation impact the likelihood of passage? Explain.*

brief answer If compensation is possible we could tax group 1 and compensate some of the other groups to pass both reforms in period one. This must be possible given part (b).

(e) *Why is it difficult to use compensation in the transition? Explain*

brief answer First, transition economies may lack budgetary resources to pay compensation. Taxes are distortionary and they reduce the overall welfare gains, leaving less to redistribute. Moreover, it is hard to identify who are the winners and losers. If we offer compensation members of group 1 may pretend to be in groups 2 and 3 (we could perhaps hire an army of economists – always a good idea – to identify winners and losers, but how do we pay for the economists?). We also may have a commitment problem: potential losers may not believe that they will be compensated – they may lack trust in the government. Moreover, once the reforms pass, why should the government carry out the expensive promises if it has a fiscal problem.

3. *(25%) The process of structural adjustment involves the movement of resources from the state sector to the private sector. Suppose that labor productivity in the private sector, α, is greater than labor productivity in the state sector, β. Further assume that at the start of transition all labor is employed in the state sector.*

   (a) *Suppose that there is no unemployment, what would the path of output look like in transition?*

   brief answer per-capita output looks like the blue line in figure 2. Since employment is shifting to higher productivity employment total output must rise continuously. Per-capital output is given by $y_t = \alpha \frac{L_t - L_t^S}{L_t} + \beta \frac{L_t^S}{L_t}$.
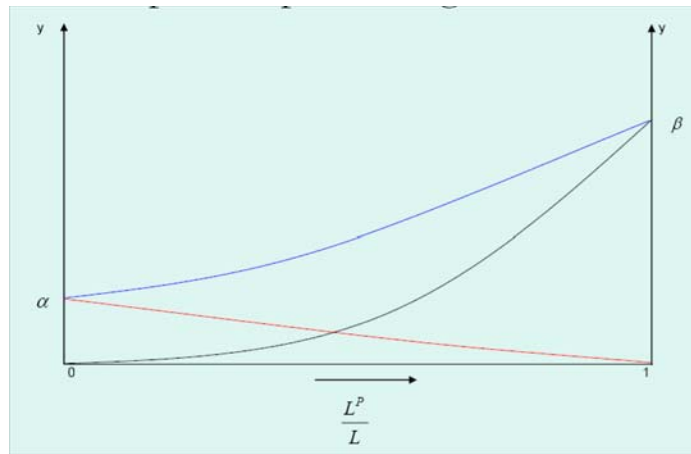

Figure 2: Adjustment with no unemployment

   (b) *If capital is immobile in the short run and wages are rigid what will happen to output in the transition? Explain.*

   brief answer If capital is immobile the private sector cannot expand rapidly. If wages are rigid then employment in the private sector cannot expand. There will be unemployment, and $y_t = \alpha \frac{L_t - L_t^S - L_t^U}{L_t} + \beta \frac{L_t^S}{L_t}$, where L_t^U is unemployed workers at time t. If L_t^U is large then y_t can fall because the first term does not offset the decrease from the decline of the state sector.

   (c) *Why might capital be immobile in the early periods of transition? Explain.*

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brief answer Lack of property rights. Capital is owned by the state, till it is privatized it cannot be legally sold or leased. Lack of financial development means that capital cannot be easily purchased even if property rights existed.

(d) *Why might wages be rigid given that price liberalization has taken place? Explain.*

brief answer If subsidies (soft budget constraints) are not eliminated then state firms may maintain wages at initial levels. But this is not sufficient. We would also need unemployment insurance to prevent the unemployed from bidding down the wage in the private sector. Given the threat of layoffs it may be politically important to have such unemployment benefits to maintain popularity of reforms.

4. *(25%) How does welfare change when prices are liberalized given an initial condition of excess demand? If measured real income falls does this mean that welfare must be falling as well? Analyze this in terms of the model with excess demand and queuing.*

brief answer Welfare rises. Excess demand means that good are rationed by queues. As queues decrease welfare goes up. If all that happens is excess demand is eliminated there is no fall in consumption, only a rise in leisure. Welfare rises even though measured real income falls since the price level has risen. Agents obtain utility from consumption and leisure. Queuing time comes from leisure. Suppose nominal demand rises and output is fixed. Excess demand rises, as does the queue length. So consumption remains the same but leisure falls. Hence, welfare falls. Now suppose that prices are liberalized. Excess demand will be eliminated and queuing falls to zero. Consumption remains the same but leisure rises. So welfare must increase. So we obtain the relationship in figure 3, where S is the supply of goods and Y/P is measured real income. When $Y/P > S$ there is excess demand, and welfare is decreasing in measured output. So if prices were liberalized, Y/P falls. As $Y/P \to S$ welfare rises.
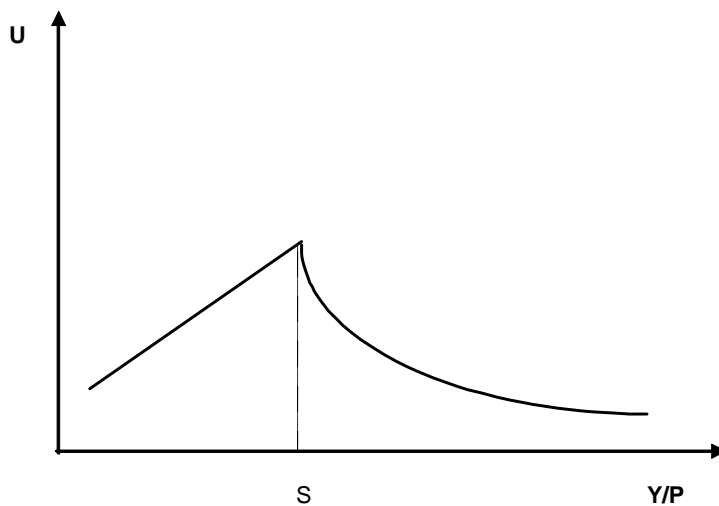

Figure 3: Measured real income, Excess demand and welfare

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(a) *What are the distributional consequences of price liberalization?*

brief answer Those who have a lower opportunity cost of time benefit from queue-rationing. They can turn their time into money by purchasing goods and reselling in the black market. Those who have a high opportunity cost of time benefit. But overall consumption is still S, so the old have lost and the younger people have won. Similarly, women gain relative to men if women are the ones who actually shop. The cost of shopping has fallen, but household consumption is the same.

(b) *In general, who gains and who loses from price liberalization? Why?*

brief answer Welfare is redistributed from the elderly who have a large endowment of time to those whose time is more costly. It is also redistributed from those who consume without waiting in line to those who previously had to stand in line (typically from men to women). Of course the latter effect depends on no redistribution of consumption within the household. If women queued, for example, because men had all the power, men could react to the decrease in queues by redistributing household consumption away from the women (or by redistributing leisure – changing the distribution of within household chores towards women) to leave welfare unchanged. If household consumption shares were unchanged, however, the former queuers clearly gain. In addition those who previously had access to shortage goods lose and those who have marketable skills rise. The former could be officials and their relatives who use special access to get goods. Or people who work in shops and steal (divert) goods in short supply. The young may win relative to middle aged people who have learned how to cope with shortage. Overall, welfare may rise, but without compensation there still may be winners and losers.

(c) *Suppose there is no excess demand before price liberalization. Show that measured output can fall and welfare can still rise due to the Camellia effect. Explain how this works.*

brief answer The simple analytics are given in figure 4. We start at point A with planners preferences given by the red indifference curve tangent to the production frontier. Liberalization means prices of good x_2 fall relative to x_1 the good that the people (blue indifference curves) prefer. We could think of good x_2 as defence weapons and the other good as food. Because of disorganization or adjustment frictions we move to F rather than B. At point F real output measured at base-year prices (the red price lines) show a large fall in output. But the indifference curve that is tangent to the new price line at point F lays above the indifference curve that passes through point A. This implies that the public prefers bundle F to bundle A. So welfare is clearly higher. But measured output has fallen, because the production of good x_2 has fallen dramatically, and at base-year prices this was highly valued.
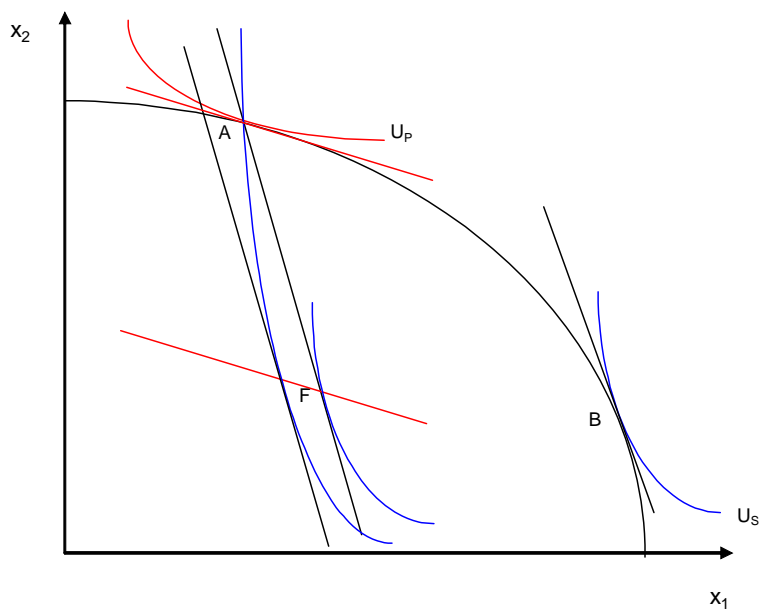
Figure 4: The Camellia Effect