Development Economics, B.Sc.
Summer exam
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Answer guide

Question A

A.1

The theory of linkages states that when certain industries are developed first, their interconnections, or linkages, with other sectors will induce, or at least facilitate, the development of new industries. *Forward linkages* are whenever the firm sells its output other firms; *backward linkages* are when the firm buys inputs from other firms. Linkages are especially important for industrialization strategy when one or more of the sectors involved have increasing returns to scale. Such an industrialization strategy would target investment in key linkage industries (i.e., sectors with a large number of strong links to other industries) as a way of setting in motion a positive feedback process of industrialization.

A.2

An import substitution development strategy centers around the creation of a domestic industrial sector. It entails an attempt to replace commodities that are being imported, usually manufactured consumer imports, with domestically produced goods. The typical strategy is first to erect tariff barriers or quotas on certain imported commodities and then try to set up a local industry to produce these goods. Typically this involves joint ventures with foreign companies, which are encouraged to set up their plants behind the wall of tariff protection and given all kinds of tax and investment incentives. Although initially the cost of production is higher than the former import prices, the economic rationale put forward for the import-substitution strategy is that eventually the domestic industry will learn and be able to reap the benefits of scale advantages in order to lower costs (essentially the *infant industry* argument) and/or the balance of payments will improve. That is, eventually it is hoped that the infant will grow up and be able to compete in world markets. Unfortunately, infants often remained juveniles.

A.3

The headcount index measures absolute poverty by the number, or "headcount" H, of people living below the absolute poverty line, Y_{p_N}. When the headcount is taken as a fraction of the total population, N, we define the headcount index, $\frac{H}{N}$. The key advantage of the headcount index is its simplicity. A main drawback is that it tells us nothing about what takes places below the poverty line. If the poverty line is set

at $Y_{p_N} = \$1$ per day, it makes a lot of difference whether most people below Y_{p_N} earn \$0.98 or \$0.28. The headcount index is silent about this issue.

A.4

In simple models with perfect information it is assumed that firms, and developing economies as a whole, are fully cognizant about their comparative advantage. But individuals must discover their comparative advantages in labor markets; no one are born knowing that they are well suited to become an economist. Something similar applies to nations. Moreover, for countries there may well be an important *information externality* at work.

More specifically, telling a developing country to specialize in "labor-intensive products" is not enough. The reason is that there are many types of labor-intensive products that can be specialized in, and the underlying costs of the specific products can differ greatly from country to country, even within the same product category. For this reason, it is socially valuable to discover that the costs of producing a given product is low in a given country. It is valuable in part because once it has been discovered by one entrepreneur, others may (after a while) imitate it, in effect spawning a new industry. Outsourcing of IT services, which created an IT services export sector in India, is one example. However, this information externality implies that imitators take away potential profit from the entrepreneur who made the discovery in the first place. Since searching is costly for the individual entrepreneur, the information externality then implies that there will be too little searching going on for a nations comparative advantages. Put differently, too little time will be devoted to the nations "self-discovery".

A.5

If a scarce resource (such as arable land) is publicly owned and thus freely available for all to use (for, say, grazing livestock), as is the case of *common property resources*, any potential profits or scarcity rents will be competed away. Economic theory suggests that this will entail an inefficiency (*tragedy of the commons*). In the case of grazing, if a single farmer owned the land, cows, say, would be grazed until marginal product (of milk) of a cow equal the cost of buying a cow. If the land is common property, cows will be grazed until the average product equals cost. That is, under common property there will be overgrazing.

Question B

The big push model explains why it is so difficult to start economic growth. The model utilizes the notion of a coordination failure. The simplest version of the model is based on six assumptions:

Assumption 1. There is only one factor of production: labor. It has a fixed total supply L.

Assumption 2. The labor market has two sectors: modern and traditional. Workers in the traditional sector receive a wage of 1. Workers in the modern sector receive a wage $W > 1$.

Assumption 3. There a N types of products being produced. In each market in the traditional sector, a worker produces one unit of output (constant returns to scale, CRS). The production function becomes $Q_T = L$. In the modern sector there are increasing returns to scale. This is formalizes in the following simple way. In the modern sector, production can only take place upon incurring a fixed cost, $F > 0$, in terms of workers. That is, F workers must be employed before the technology can produce anything at all. Having incurred this fixed cost, firms face a linear technology which is more productive than the traditional sector's technology. The production function becomes $Q_M = \max\left\{\frac{1}{c}L - F, 0\right\}$, where $0 < c < 1$.

Assumption 4. Each good receives a constant fraction of national income Y. That is, demand for each good is Y/N.

Assumption 5. The economy is closed.

Assumption 6. There is perfect competition in the traditional sector. This means that price equals marginal cost. At most one modern firm can enter each sector, due to the CRS technology. Naturally, the modern firm cannot raise the price above 1; if it did, traditional firms would undercut it. Yet, if a modern firm enters the market, it would monopolize the market.

With these assumptions, the conditions for a big push can be outlined. To begin, suppose that the economy is traditional, i.e. with no modern firms. Consider Figure 1, where the production functions of the two types of firms are represented. For a modern firm, the wage bill line has slope $W > 1$. At point A in the figure, a modern firm will take up production *if* it enters, even when all other firms are traditional. Whether it enters depends profits earned, however. Consider wage bill W_1. With this relatively low wage, revenue exceeds cost, and so the modern firm will pay the fixed cost and enter. Since firms are symmetrical, all modern firms will enter a sector and the economy industrializes. Hence, under the shown constellation of parameter values, no big push is needed.

Now consider instead a scenario where the wage scedule is W_2. In this case, a modern firm will not enter since cost exceeds revenue. If, however, modern firms enter each market, wages are increased to the modern wage in all markets. This means that national income, and with it demand, expands. Modern firms can now sell their expanded output (at point B) produced by using available labor allocation (L/N), because they have sufficient demand from workers in the other industrialized (modern) sectors. This *demand spillover* is the crucial *positive externality* in the model.

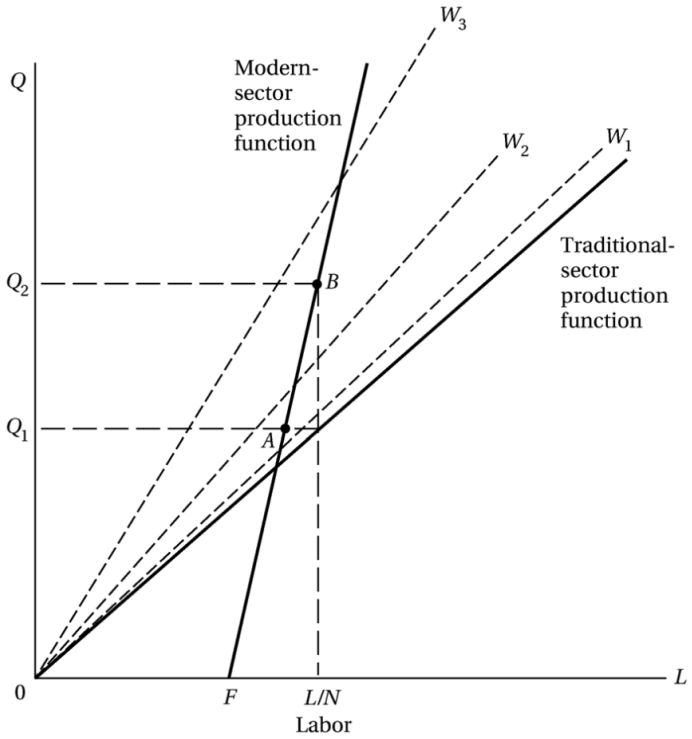

Figure 1: Big Push

Importantly, with wage schedule W_2 the model has two equilibria: one in which a modern firm enters each market, and one in which no modern firms enter any market. In the former "modern" equilibrium, profits, wages and output are higher than in the latter "traditional" equilibrium. This means that the modern equlibrium *Pareto dominates* the traditional equilibrium. The market, however, will not bring about the modern Pareto dominant equilibrium by itself; for that we need a concerted *big push* by the state, say. In other words, there is a market failure which can be used to justify state-coordinated industrialization.

Finally, with wage schedule W_3 the traditional equilibrium will always prevail.

Other types of prominent market failures that have been used to justify government intervention include inter alia: infant industry type arguments (as outlined in the previous question), directed credit to industries with strong linkage effects, certain infrastructure projects and natural monopolies.

Question C

In principle all inter-governmental transfers should be regarded as foreign aid. However, the working definition of foreign aid among economists is “all official grants or concessional loans in currency or in kind that are aimed at transferring resources from DCs to LDCs on developmental, distributional or poverty grounds”.

There are three major problems when it comes to actually measuring aid flows. First, we cannot simply add up the dollar value of grants and loans. Loans must be repaid, so we somehow have to extract/isolate the grant element of a loan. Second, aid can be tied either by source (has to be spent on purchasing goods from the donor country) or by project (funds have to be spend on a specific project). In either case, the real value to the recipient is reduced. Finally, we need to distinguish between the nominal and the real value of aid.

Donor countries give aid primarily because it is in their political, strategic, and/or economic self-interest to do so. Some aid may of course be motivated on purely altruistic grounds, but there is no evidence to suggest that this is the normal state of affairs. The best example of aid given for political/strategic reasons is probably aid given during the Cold War. Economic motivations include aid given to reduce a savings gap and/or a foreign exchange gap. Technical assistance, leading to diffusion of technological knowhow is another example. Tied aid can sometimes by a type of trade policy, and may therefore in the donor's economic self-interest.

The reason why donor countries have been eager to give aid, even in the most stringent and restrictive form, has not received much attention. Yet the major reason is likely to be economic. LDCs have typically accepted the proposition that aid is a crucial ingredient in development success.

However, whether aid does lead to growth and development has been disputed by and increasing number of people. Critics argue that aid may in fact retard development. It is not difficult to write down theoretical models that show that aid may or may not foster growth and development, for which reason it is essentially an empirical question. Unfortunately, it is an empirical question that we cannot answer. The reason is that we give aid to countries that are in deep economic trouble, so aid may be associated with economic malaise. On the other hand, if aid works it may tend to increase growth, thus suggesting a positive correlation with growth. In effect, we face an endogeneity problem that has no credible solution. We must look at case study evidence; and this will probably tend to paint a mixed picture. So what we should ask instead is probably: When and under what conditions will aid work/fail?