Initiative for Policy Dialogue Working Paper Series

January 2009

Growth and Sectoral Policy

José Antonio Ocampo, Codrina Rada and Lance Taylor

Macroeconomic Policy

Chapter Eight

Growth and Sectoral Policy

Policies regarding growth and sectoral strategies to support long-term structural transformation are the focus of this chapter. A theory of growth for a developing economy is the first topic. It serves as the background for analyzing policy frameworks for industry and agriculture and their interactions with trade.

Growth Dynamics

Kaldor's (1978, chapter 4) model introduced in Chapter 1 is the template for analysis of growth in the "modern" sector of the economy. We then turn to a "dual economy" extension simplified from Rada (2007).[1] The model is used to illustrate the implications of external liberalization packages à la the Washington consensus. A sketch of the supporting mathematics is given in Appendix 8.1.

A basic assumption of this model is that there is a significant underutilization (underemployment) of labor. Variations in the degree of underemployment together with the dynamic links between labor productivity and output as established by the Kaldor-Verdoorn technical progress function play the central role in growth dynamics. The Kaldor-Verdoorn mechanism which ties overall productivity growth to output expansion is essential to the model and it captures both technical change that is "embodied" in

[1] Simple, non-formalized versions of a similar model are also available in Ocampo and Taylor (1998) and Ocampo (2005).

new equipment as well as the increasing returns to scale of static and dynamic character that can be exploited or induced as the modern sector expands.

Under these conditions, *demand* plays a determining role in long-term growth, an issue generally ignored in the literature, which essentially focuses on supply-driven growth processes. The major exception are, or course, the Keynesian growth models developed in the 1950s and 1960s by Nicholas Kaldor (1978, chapters 1 and 2) and Joan Robinson (1963), among others. Most of the macroeconomic dynamics analyzed by Taylor (2004) falls under this tradition, taking particularly into account the links between the functional distribution of income and macroeconomic dynamics pioneered by Michal Kalecki.[2]

The model captures three essential features of growth processes in developing countries presented in Chapter 3. The first is that productivity growth is closely associated to dynamic structural change towards industry and modern services. The second is that variations in underemployment play an essential role in providing the labor force that facilitates the dynamic growth in the modern sector, but also serve to absorb the excess supply of labor when growth is weak. Variations in low-productivity informal services are the dominant mechanism of absorption of underemployment, as reflected in sharply diverging performance of labor productivity in service activities in different economies, but the rural sector still plays a role as an absorber of underemployment in many countries. The third feature is that capital accumulation is largely determined by demand –including in developing countries by external demand or constraints on domestic demand generated by the availability of external financing. It

[2] See, in particular, the essays collected in Kalecki (1971).

must be pointed out, however, that in dual economies, where a modern sector develops along with a low-productivity informal sector, productivity growth is always determined by the relative growth of the former, even if its growth is entirely supply driven (as in Ros, 2000).

Growth in the Modern Sector

The modern sector basically comprises industry along with parts of agriculture and services. It will be contrasted below with a “subsistence” or informal sector with production assumed to rely on (low wage) labor only. Following the discussion in Chapter 1, the modern sector is characterized by increasing returns while constant or decreasing returns dominate subsistence.

The essentials of the model are presented in Figure 8.1. There is an empirically well-supported relationship tying the rate of labor productivity growth to the rate of output growth, usually credited to Kaldor (1978, chapter 4) and Verdoorn (1949). The rationale is that more rapid output expansion leads to introduction of more productive technologies and the realization of economies of scale of both of static and dynamic character (learning-by-doing and induced innovations in the latter case). The Kaldor-Verdoorn elasticity of productivity growth with respect to output growth is usually estimated to be in the vicinity of 0.5. A natural extension of the relationship, not pursued here, is to assume that productivity also responds to the real wage, as firms react to rising labor costs. This linkage is empirically supported in industrialized economies (Storm and Naastepad, 2007) but has not been explored in the development context.

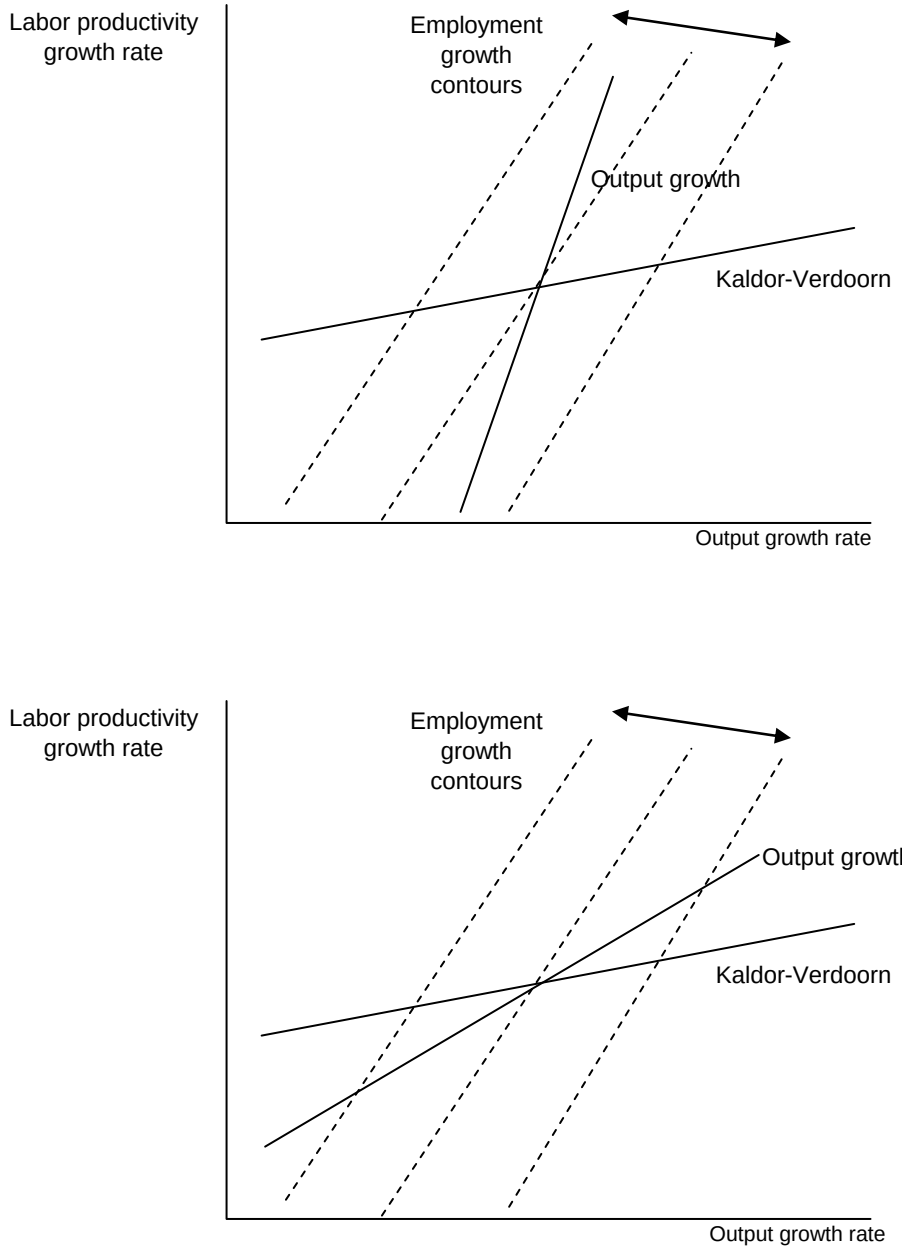

Figure 8.1 Kaldor model with weak (upper) and strong (lower) profit-led demand

Kaldor also proposed that output growth would respond positively to productivity growth, as in the relevant schedules in diagrams. The usual justification follows from the definition:[3]

Unit labor cost = Real wage/Labor productivity

(given the level of aggregation, unit labor cost is also equal to the labor share in output). In a Keynesian economy in which output is determined by effective demand, what will be the effect of higher productivity? As emphasized by recent literature in structuralist macroeconomics (Taylor, 2004), the answer can go both ways. It cuts unit labor cost and increases profitability, presumably stimulating exports and promoting capital formation. On the other hand, a lower labor share might be expected to reduce consumption and thereby effective demand. If the former effects dominate, the economy is said to be "profit-led." If growth goes down with a reduction in the wage share, it is "wage-led." Note that we are talking here about *sufficient* conditions for an impact of productivity on demand and output growth. Other linkages are possible but have not been widely discussed.

The upper diagram in Figure 8.1 shows a case in which effective demand is *weakly* profit-led. That is, with the steep "Output growth" schedule, a big change in the productivity growth rate (vertical axis) does not stimulate much growth in demand. Demand is strongly profit-led in the lower diagram in which the Output growth schedule has a shallow positive slope. Wage-led demand would generate an output growth curve with a negative slope.

[3] We will use a slightly restated definition of unit labor cost in discussing industrial policy below.

An alternative (not formalized in the appendix) is to assume that the Output Growth relation is determined by foreign exchange constraints. In this case, the links between output and productivity growth operate through the effects that the latter has on the trade balance. To the extent that productivity growth in the modern sector leads to export expansion or the development of domestic import substitution industries, the slope of the Output Growth schedule is clearly positive, with the slope depending in this case on the response (elasticity) of the trade balance to productivity growth. The demand links formalized in the appendix will then enhance this effect (if the economy is profit led) or weaken it (if the economy is wage led).

The implications of different possibilities for employment can be visualized with the help of the “Employment growth contours” along which the employment growth rate stays constant. They are based on the identity:

Employment growth = Output growth – Labor productivity growth .

The definition implies that a given rate of employment growth can be generated by different combinations of output and productivity growth rates. Along each contour line (with a slope of unity or 45 degrees) if the output growth rate is high, then productivity growth must be low and vice versa. Contours further to the southeast correspond to faster output expansion and therefore higher employment growth rates.

Now consider an upward shift in the Kaldor-Verdoorn schedule. In the upper diagram the equilibrium point where the two schedules cross will move up from its initial position, signaling a slowdown in employment expansion or “jobless growth” with

associated Luddite fears.[4] In the lower diagram, faster technical change gives rise to employment expansion as the equilibrium point moves below the initial output growth contour. The difference is that the elasticity of output growth with regard to productivity growth in the lower diagram is greater than one, so that the slope of the Output growth schedule is less than 45 degrees. In other words, effective demand is strongly profit-led when the elasticity exceeds unity; it is weakly profit-led with an elasticity between zero and one, and wage-led otherwise.

The Kaldor model strongly emphasizes potentially favorable effects of expansionary policy which shifts the Output growth curve to the right. Regardless of the schedule's slope, the outcome is more rapid growth of both productivity and real (modern sector) GDP. The effects will be stronger insofar as domestic firms are open to innovation as signaled by a steep Kaldor-Verdoorn curve.

We will use to model to explore likely impacts of liberalization packages, but to do so we have to bring in an informal sector.

The Dual Economy

There is a long tradition of studying a "dual" economy with two sectors having distinctive patterns of production. The approach has its roots in classical economics (especially Ricardo), as emphasized by W. Arthur Lewis (1954) in the most important modern contribution. It makes sense to combine Kaldor with a Lewis-style model in which labor *not* employed in the modern sector finds some sort of economic activity in

[4] The term refers to the groups of workers in early nineteenth century England who destroyed industrial machinery in the belief that its use diminished employment. The term was coined after (the possibly mythical) Ned Ludd, a Leicestershire worker who originated the idea.

"informal" or "subsistence" activities. A particular version of Say's Law thereby applies, as labor is "fully" employed, but its effects are attenuated by decreasing or at best constant returns in informal activities and an institutionally based gap between real incomes in the two sectors.[5] In reality, a large part of the labor force is *under*-employed or, in Marxist language, the "reserve army" somehow finds the means for keeping itself alive.

How do they do it? Sharing subsistence level production activity relying mostly on labor power is the obvious possibility. But then the question arises as to whether subsistence output will decline when some of the underemployed workers enter modern sector employment. Following Lewis, whether poor economies have reserves of "surplus labor" was hotly debated in the 1960s. Sen (1966) proposed that subsistence output would change by very little as labor moved in and out of the sector. In effect his suggestion is that:

Subsistence productivity = Subsistence output/Subsistence labor

goes up in inverse proportion to the quantity of labor withdrawn, or that the elasticity of productivity with respect to the labor force is equal to minus one. This assumption boils down to a strong case of decreasing returns. Making use of a "Sen elasticity" ranging between zero (constant returns to scale) and minus one, we can now sketch a simplified version of the Kaldor-Lewis model put together by Rada (2007). The presentation here and in Appendix 8.1 is simplified because we do not explicitly model shifting terms-of-trade between the two sectors. Implications are pointed out informally.

[5] Neoclassically inclined development economists like to rationalize the gap using efficiency wage models and similar constructs, but here we simply take its existence for granted.

The framework is illustrated in the “four quadrant” diagrams in Figures 8.2 and 8.3. Along each of the four axes, the relevant variable is assumed to increase as indicated by the arrows. To concentrate on employment effects, the “Kaldor” part of the model is set up in the northeast quadrants of the diagrams with employment (instead of output) growth measured along the horizontal axes. Figure 8.2 illustrates the strongly profit-led case in which employment rises with faster productivity growth; the alternative scenario is shown in Figure 8.3.

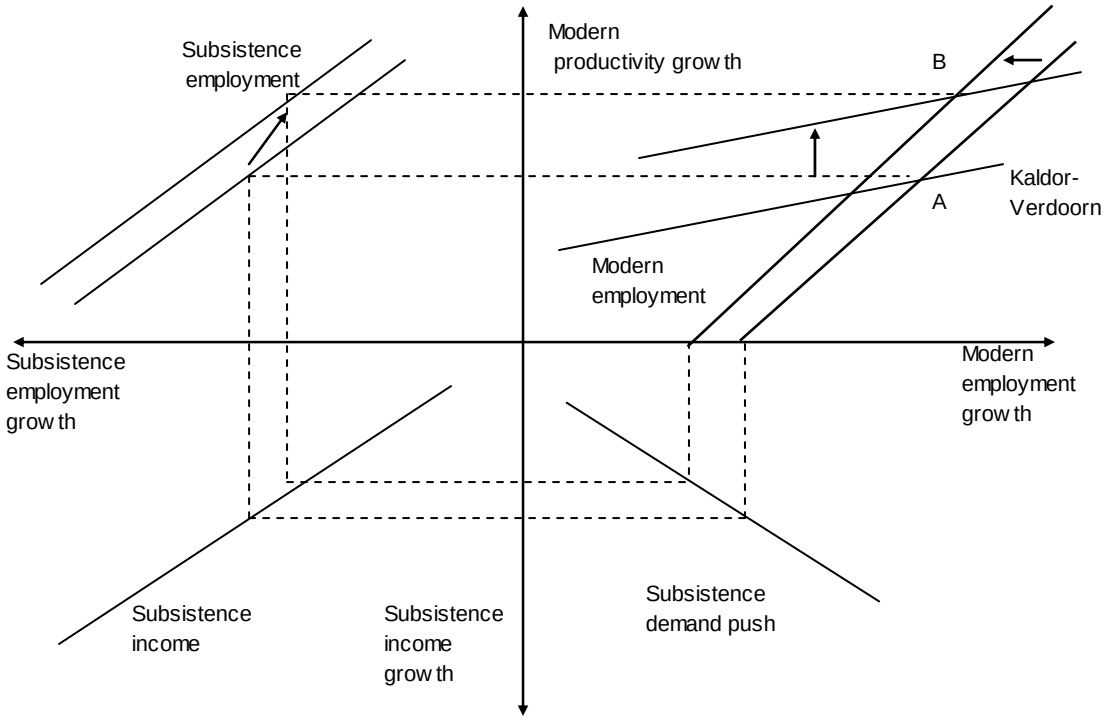

Figure 8.2: Kaldor-Rada model with strongly profit-led

The task at hand is to trace the effects of shifts in employment growth on the subsistence sector, and then close the loop back to the modern side of the economy.

Modern sector equilibrium between employment and productivity growth rates is determined in the northeast (subject to the complication that demand for modern goods and associated jobs is likely to shift with subsistence income). The next step is to derive subsistence sector employment growth in the northwest. A weighted average of the two employment growth rates must sum to the overall labor force rate of growth (the weights are the shares of the two sectors in total employment), which is assumed to be exogenous. The implication is that the subsistence employment growth rate falls when the modern sector rate rises.

The picture in the northwest involves a bit of algebraic manipulation (details in Appendix 8.1) in that it links subsistence employment growth to modern sector *productivity* (not employment) growth. The trick works because employment and productivity growth rates in the modern sector are tied directly to one another in the Kaldor-Verdoorn relationship. The result is the “Subsistence employment” schedule in the northwest quadrants which show that subsistence employment growth speeds up when modern sector productivity growth drops off. As discussed below, this dynamics works because the curve shifts outward when the Kaldor-Verdoorn schedule in the northeast shifts up.

Next, observe that *in terms of the subsistence product*, subsistence income growth is the sum of the sector’s employment and productivity growth rates, as indicated by the “Subsistence income” schedule in the southwest quadrants. The curve will be horizontal in the (extreme) Sen case in which income growth does not change in response to shifts in employment growth. It will have a slope of 45 degrees when there

are constant returns to scale. For the curves sketched in the diagrams, the Sen elasticity is somewhere between zero and minus one.

Finally, assuming constant terms of trade, higher subsistence income growth will increase demand for modern sector goods as shown by the “Subsistence demand push” in the southeast quadrant. The effect is apparent in the position of the intercept of the “Modern employment” curve as it is determined by subsistence income growth.

Taking into account possible shifts in the terms of trade makes the analysis more complicated. Higher own-productivity in the subsistence sector, for example, would increase own-income but also bid down the price of its product. In Rada’s model, depending on the price-sensitivities of demand for modern goods from incomes in the modern and subsistence sectors, the slope of the Subsistence demand push schedule can have either sign.

The diagram as drawn – with higher subsistence income stimulating demand despite the adverse shift in the terms of trade – is certainly plausible. But it runs counter to Malthus’s position in the early nineteenth century English Corn Law debates. He thought that grain price decreases induced by removing import quotas would be strong enough to drive down demand from the countryside for manufactures produced in the cities, leading to a “general glut” or overall stagnation. Malthus’s position has resurfaced in a great deal of discussion about the impacts of agricultural productivity growth. As Houthakker (1976) pointed out in another model with explicit terms of trade, a sector (or an economy) selling its products into a price-clearing market with low elasticities of demand and supply enjoys no guarantee of rapid income growth,

The shifting curves in Figure 8.2 show the effects of an upward movement of the Kaldor-Verdoorn schedule in the northeast quadrant from an initial equilibrium at point A. With a positively sloped Modern employment schedule, the productivity gain stimulates labor force growth in the sector. Tracing the effect in the northwest, subsistence employment expansion slows (despite the outward shift of that curve, the growth rate of subsistence employment moves to the right on the horizontal axis). Subsistence income growth slows in the southwest, and tracing the repercussion through the southeast leads to a small leftward shift of the Modern employment schedule in a final equilibrium at point B. In effect, the subsistence sector dampens the favorable impact of the modern sector productivity gain on employment growth.

Faster productivity growth in subsistence would shift the schedule “downward” in the southwest, increasing income growth. Tracing the effect along the Subsistence demand push curve shows that the Modern employment curve would move outward, triggering faster modern sector job growth, which would be scaled back a bit in a final equilibrium for the reasons just discussed. If adverse terms of trade effects create a “subsistence demand sink,” these results on the impacts of productivity growth would reverse.

A Low Level Trap?

Figure 8.3 shows what happens when growth in the modern sector is weakly profit-led or wage-led, so that the employment schedule has a negative slope. An upward shift in the Kaldor-Verdoorn schedule from the initial equilibrium at A leads to slower employment growth in the modern sector. Tracing the effects through the

subsistence sector shows a partially offsetting shift in the Modern employment curve (weaker insofar as the Sen elasticity is closer to minus one) as the system arrives at a new equilibrium at B.

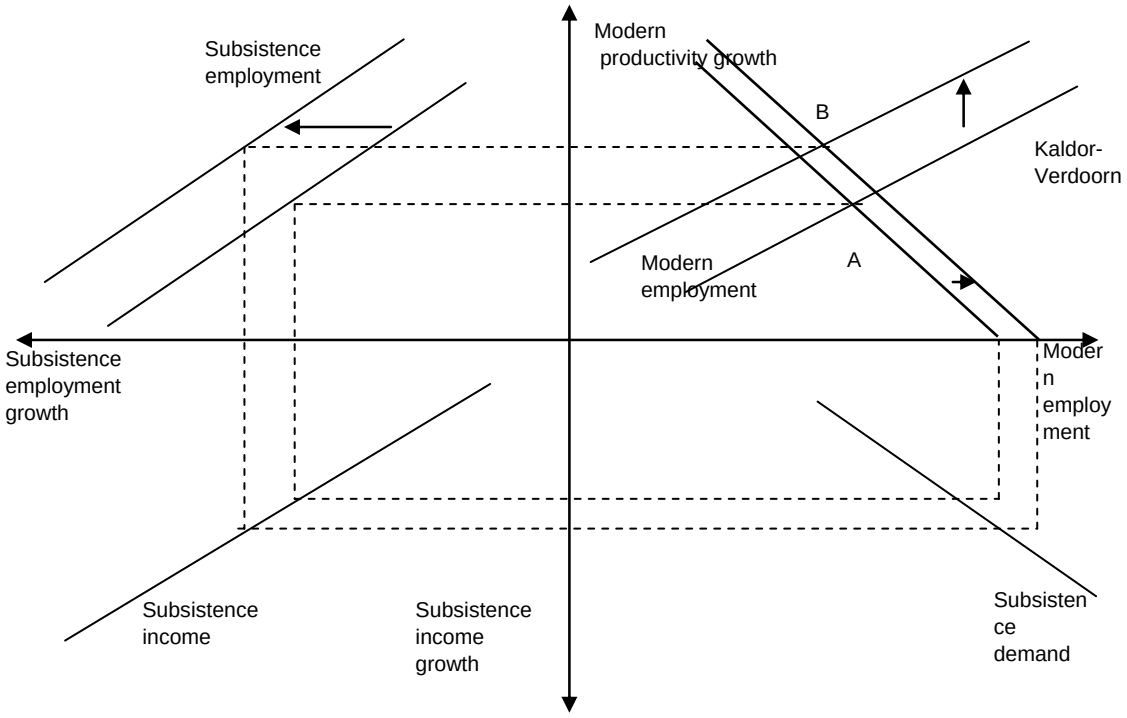

Figure 8.3: Kaldor-Rada model with weakly profit-led or wage-led demand

Figure 8.3 has implications for development policy. When productivity growth leads to slower employment growth in the modern sector, the economy can easily fall into a low level equilibrium trap dominated by subsistence activities.[6] A coordinated policy package may be needed to get modern sector growth underway. China's gradualistic approach beginning in the late 1970s is an intriguing example. It began by supporting agricultural productivity growth through market manipulation to rig prices in

[6] Rada (2007) works through the dynamics of how an economy can be caught in a low level trap.

favor of previously collectivized peasant producers. Joint ownership of land was retained with household-based operation of small and fragmented parcels. Mixed enterprises of various forms enabled mechanization and economies of scale. Producers responded strongly to the price incentives combined with institutional changes which in effect amounted to a land reform.

Subsequently, expansionary modern sector interventions combined with direct foreign investment to support export growth took the center stage. A low level trap was avoided, but distributive tensions are rising with modern sector incomes now growing much more rapidly than real earnings in the countryside.

In another example, if the modern sector mostly produces traded goods and subsistence produces non-tradables, then the model sheds light on the liberalization experiences spurred by the Washington consensus. A de-industrialization trap can open.

As discussed in previous chapters, capital account deregulation was in many cases associated with real appreciation and domestic credit expansion. Together with trade liberalization, the stronger exchange rate boosted demand for imports and penalized exports (also hit by removal of subsidies in some cases). In Figure 8.3 the impact was to shift the Modern employment curve to the left. Offsetting influences were the credit expansion and rising private net borrowing during upswings. But even taking these factors into account, on the whole liberalization was not associated with a strong increase in demand for traded goods.

Traded goods firms were basically faced with a choice between cutting costs or going out of business. Boosting labor productivity was the most important way to keep

production underway. On both counts there was job loss as mirrored in an upward shift of the Kaldor-Verdoorn schedule. The scenario was like the one in Figure 8.3, in some cases worsened by a leftward shift of the Modern employment curve.

Unskilled workers bore the brunt of labor force reduction in traded goods, and shifted into informality and a range of subsistence activities. Distributive dynamics were driven by institutional circumstances in partly segmented labor markets, with details differing country by country. In many cases, stable or rising unemployment and unresponsive wages caused the overall income distribution to become more concentrated. As has recently occurred in China, the differential between skilled and unskilled (and urban and rural) wage rates tended to rise.

The modern/traded goods sector in many developing economies across the world could have been supported by counter-cyclical policy, but for reasons discussed in Chapter 7 this option was not aggressively pursued. Directed sectoral support policies could have been deployed, but were ruled out by the non-interventionist prejudices of the Washington consensus. Nevertheless, policies oriented toward supporting production are still on the table.

Industrial Policy

Historically and without exception, countries that have industrialized have, in a broad sense, pursued industrial policy. The American experience was briefly sketched in Chapter 1, and the discussion could easily be expanded. For Britain, there is a long-standing tradition among economic historians that emphasizes the role of fiscal

expansion in support of military spending as the driving force behind post-Stuart output growth. An eminent practitioner observes that:

> For more than a century, when the British economy was on its way to maturity as the workshop of the world, its governments were not particularly liberal nor wedded ideologically to laissez-faire. Like the proverbial hedgehog of Aeschylus, the Hanoverian governments [1688-1815] knew some big things, namely that security, trade, Empire, and military power really mattered. In fruitful (if uneasy) partnership with bourgeois merchants and industrialists, they poured millions into strategic objectives which we can see (with hindsight) formed pre-conditions for the market economy and night-watchman state of Victorian England…..By that time men of the pen, especially the pens of political economy, had forgotten, and did not wish to be reminded, what the first industrial nation owed to men of the sword (O'Brien, 1991, pp. 33).

Chang (2002) and more fundamentally Polanyi (1944) argue that the Victorian state was not a night watchman but in fact quite interventionist. For present purposes that is not the principal concern. The real interest lies with the pens of political economy, which on the whole have writ damnation on government interventions in industrial (and agricultural) economic activity, even though they are practiced universally. By advising endlessly about how to practice laissez-faire economic development which in fact has never been observed, mainstream economists ignore practical policy considerations altogether. It makes sense to ponder what really happened on the ground. To make sense of the specific form of industrial policy pursued in many developing countries

following World War II, it helps to start with a simple diagram proposed by Alice Amsden (2003). In Figure 8.4, the definition of labor cost per unit output (slightly restated from above) is:

Unit labor cost = Real wage X (Labor input/Output) .

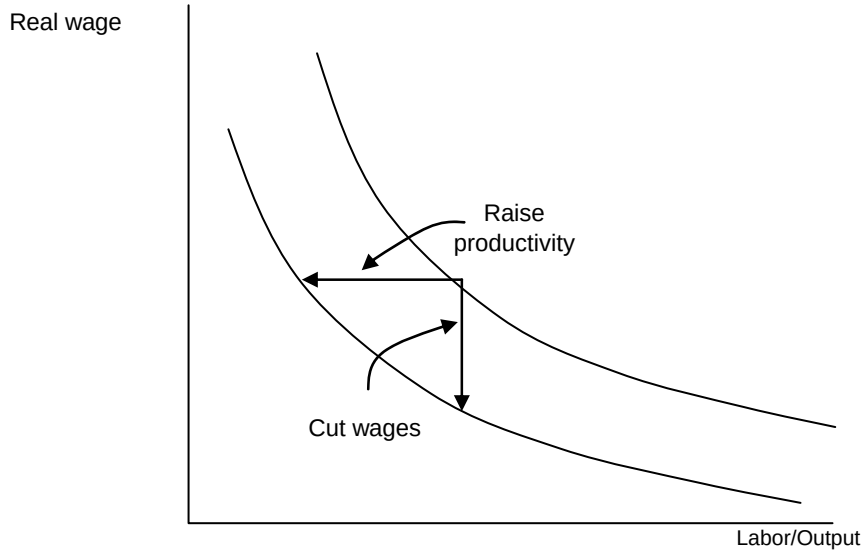

Figure 8.4 Reducing unit labor costs by higher productivity or cutting wages

The curves represent the product of the real wage (vertical axis) and the labor/output ratio (horizontal) and are known as rectangular hyperbolae. A hyperbola lying further from the origin represents a higher level of unit cost. A firm or an economy operating at a high level of cost and striving to reach one that is lower has two extreme alternatives (or combinations thereof) open to it. One is to cut wages and move cost vertically downward. The other is to increase labor productivity (decrease the labor/output ratio) and move horizontally to the left.

At a national level, a real devaluation (which could be accompanied to some extent by domestic inflation, due to the effects of the nominal exchange rate on domestic prices) is an effective means for reducing costs of exports as seen from abroad. Wage repression at home serves a similar function. But there may be social limits as to how far these measures can be pursued. If, given its *absolute* level of costs, a country is still unable to undersell its foreign rivals (as say, South Korea could not undersell Japan in textiles in the 1950s), then the only option available is to stimulate productivity, usually through state intervention in the form of rigging internal import and export prices, directed and subsidized credit, and similar maneuvers (Amsden's famous recommendation to "get the prices wrong") in combination with performance standards dictated by the government to firms. "Administrative guidance" of industrialization is a useful summary phrase.

A major institutional innovation in support of these polices was the creation of development banks. The banks were often funded "off" the fiscal budget by earmarked allocations or foreign borrowing, and at their worst engaged in over-lending. At their best, they were run by technocrats with the objective of building up technically advanced productive capacity. In economies lacking long-term capital markets, development banks became essential providers of funds for industrial investment.

The goals shared by the banks and other policy-makers in a dozen or so middle income countries in the 1950s were to induce firms to "learn" or acquire "specific assets" so that they could compete internationally, substituting imports and/or moving into export markets. Economies of scale were typically involved, raising a key issue of market regulation. There is an old idea in mainstream industrial economics that free

entry of firms into an industry characterized by economies of scale is inefficient because too many potential producers come in to try to share the market, leading to a sub-optimal level of investment by each one and prices too low to cover costs. Marxists use the label “excess competition” to describe this situation.

The implications are readily visualized in Figure 8.5, similar to a diagram invented by the Swedish economist Eli Heckscher in 1918 to analyze the impact of tariff changes on industrial structure (Hjalmarsson, 1991). Total production is measured toward the right on the horizontal axis, and time toward the left.

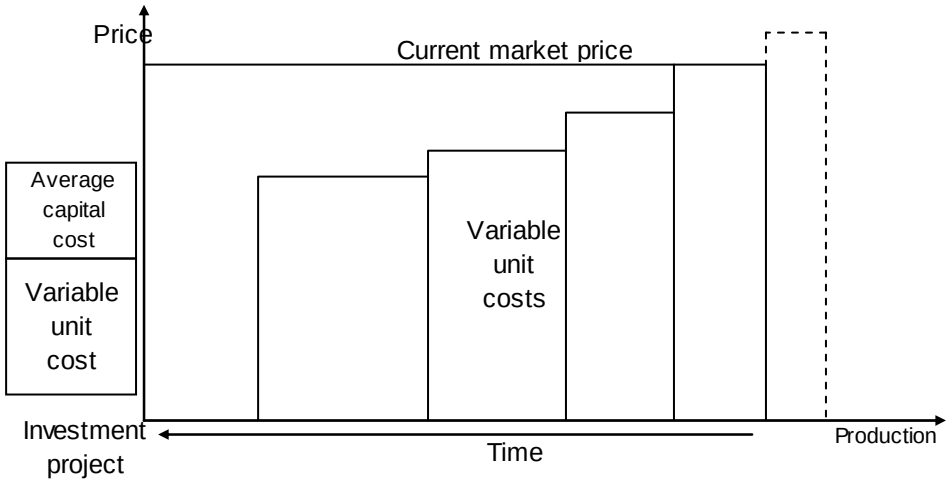

Figure 8.5 Heckscher model of falling unit variable cost in newer production units

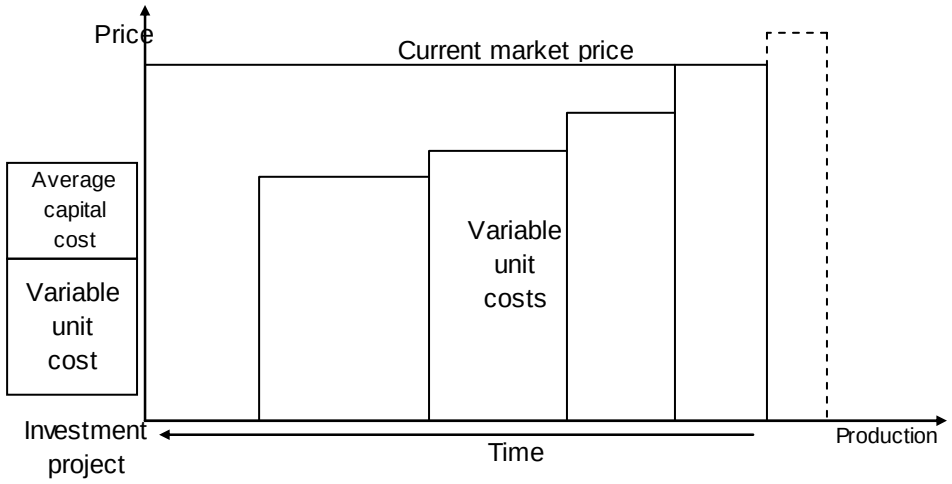

Figure 8.5 Heckscher model of falling unit variable cost in newer production units

At the far right, the dashed lines indicate the capacity (horizontal axis) and cost vertical) of a production unit that recently has been scrapped. The unit is old. It is no longer in operation because its cost exceeds the current market price, determined by the cost of the still-functioning unit immediately to the left. Further to the left comes a sequence of newer, larger, and less costly production units, with an even bigger one waiting as an “investment project” at stage left. If that project were activated on the basis of variable cost, it could undersell all pre-existing units at a volume sufficient to cover its cost of capital. If *two* such units were to be put into production at roughly the same time, the industry in question would fall into excess competition, with older units forced out of production and perhaps with the new ones cutting price below variable cost to keep producing and covering capital costs.

In Sweden, Europe’s industrial laggard until late in the nineteenth century, excess competition was mitigated by a “pro-trust” policy orientation, with tools such as

tax exemptions used to encourage horizontal mergers between firms and vertical integration. Companies were actively encouraged to expand their market shares abroad, supported by Swedish direct foreign investment in many cases. One consequence is that Sweden now has a disproportionate share of successful trans-national corporations.

In Asia 75 years later, competition policy was more hands-on. Planners set up devices such as investment regulation across firms, organization of cartels to keep firms in operation during periods of recession and downward international price excursions, and (when necessary) negotiated exit and capacity-scrapping (Chang, 1994). The more aggressive Asian policy is consistent with Gerschenkron's (1962) insight that state intervention tends to be more open and proactive, the more backward an economy attempting to industrialize is relative to the most developed countries.

Successful policy initiatives in "late (and late-late) industrializers" focused on *firms*, which were supposed to build up internal capabilities while attaining at least a minimum efficient scale of production. In the private sector, national leaders tended to be affiliates of a diversified industrial group with established government connections or a state spin-off. With direct public support, there was always a possibility of corruption and diversion of public funds into private pockets to the detriment of productive capacity in firms that may have become too large to be allowed to fail. In practice, governments could sidestep such problems of "moral hazard" by allowing *owners* of firms to go bankrupt, meanwhile keeping productive assets intact and transferring ownership rights to other entities.

Such maneuvers illustrate the basic nature of middle income industrial policy as practiced in East and South Asia, Latin America, and Turkey but now, under the influence of the Washington consensus, largely abandoned outside Asia. Amsden (1989), Chang (1994), Wade (2003) and others describe a policy model based on mutual interactions – “reciprocal control mechanisms” to use Amsden’s terminology — between selected firms as guided by the state’s industrial bureaucracy. Firms received support for production in the form of import quotas and tariffs, export subsidies, direct allocation of cheap credit, etc. In exchange they had to satisfy specific performance criteria including quantitative targets for exports and volume of production and technological upgrading (monitored via indicators such as domestic content of the gross value of output, etc.). The goal of industrial policy-makers was to make national production profitable, often at prices which were rigged toward that end. In Evans’s (1996) phrase, these bureaucrats had enough “embedded autonomy” to be able to push their policies through. They were socially respected and upon retirement could expect an “ascent into heaven” paid for by firms they had helped create and build.

The interventions could be targeted quite specifically. Criteria for selection of industries to be supported included high income elasticities of demand, strong production and technological linkages, economies of scale, and potential for productivity growth. Import protection was used to preserve the local market for national producers to finance the higher initial costs of the acquisition of technologies and associated learning processes. Export subsidies then promoted sales abroad from newly established production capacities and operated as a way to guarantee that producers were able to compete in international markets and manufacture world-class products.

The fact that tariffs and subsidies to an extent were mutually offsetting did not mean that policy-makers simply replicated a “level playing field” (as mainstream critics of industrial policy assert). Rather, the two instruments were used in tandem to enhance their distinct impacts. They also had the effect of promoting the production of import substitutes and exportable goods relative to non-tradable goods and services, under the implicit assumption that growth and productivity effects were stronger in the tradables .

With on-going productivity growth, real wages trended upward in the economies that kept up industrial growth over an extended period (in the recent period they were mostly in Asia, as we saw in Chapter 3). Consequently, new technologies and lines of production had to be brought in. Beginning in the 1980s, pro-trust policies began to be utilized to support industrial concentration and national research and development efforts were expanded. In an interesting contrast, Asian economies focused more on building up national technological capability than did the Latin Americans, which relied more heavily on direct foreign investment in bringing in sophisticated lines of production. China, with its giant population with diverse levels of skill, is coming out somewhere in between but with increasing emphasis on building its own technological capability.

This distinction between strategies is relevant for countries with per capita incomes now in the range of hundreds or a few thousand dollars that have built up some manufacturing experience and have fairly sizable populations or good entrée into external markets. (The argument being that access to sufficiently large markets is essential to support production when there are economies of scale.) If successful, these economies will adopt some combination of the “Asian” and “Latin” models. Smaller countries always have more limited room to maneuver, but they can also develop

different forms of intervention in their export sectors, to guarantee that in the long run they become an instrument for technological upgrading.

To a large extent, the traditional industrial policy tools described above were dismantled in the developing world during the hegemony of the Washington consensus and would now have to be redesigned to fit the new restrictions imposed upon policy by the World Trade Organization. Tariff levels have been significantly reduced; quantitative import controls and “Trade-related investment measures” (TRIMs) forbidden; export subsidies severely constrained for middle-income countries (but subsidies for research and development and similar activities are still permitted). Intellectual property rights have become more stringent, closing the avenues long used by successful industrial and developing countries to copy technology, including reverse engineering. Low income countries represent something of an exception because they have been granted the latitude to adopt active industrial and trade policies, though many or even most do not use them, partly because they are constrained by conditionalities imposed in connection with international development assistance.

The idea behind Washington consensus/WTO policy was that free trade would do a better job at generating dynamic growth than industrial interventions. As we have argued extensively in this book, the evidence of development experience in recent decades does not support this claim. In a formal analysis of the econometric exercises used in the past to defend orthodoxy, Rodriguez and Rodrik (2001) and Rodriguez (2007) have shown that there is no empirical association between rapid economic growth and trade liberalization. Interestingly, this conclusion has been implicitly accepted in the World Bank’s (2005, ch. 5) evaluation of trade reforms, which claim that

openness to trade has been an ingredient of successful growth strategies. Note the subtlety: it is not trade *liberalization* that has done the job but *openness to trade* which, as the evaluation makes clear, can be the result of different trade strategies, many of them with strong elements of state intervention. In Chapter 9 we will return to the debate on the design of industrial – or better, structural transformation policies — today.

The Agrarian Question

The political economy of agriculture has vexed farmers, consumers, and the state since time immemorial. As noted above, the sector's supply and demand elasticities are almost always low, meaning that prices can jump up and down rapidly, harming one or another important social group when they move either way.[7] Modern industrial development generates a big push to urban centers, leaving many rural areas behind, many of them dominated by existing or remnants of old social structures. The government gets caught in between, and for that reason always intervenes heavily in agriculture.

For developmentalist purposes, it is helpful to think of agriculture as passing through three stages. The first two are of direct relevance to poor countries today.

The first is when land and labor productivity are very low, often accompanied in practice by highly exploitative forms of land tenure and extraction of "rents" or "surplus" from peasants and landless laborers. The issue at hand is how to get the sector moving, with ongoing productivity growth and rising incomes. In some historical cases – Japan after World War II and in effect China and Vietnam with their revision of collectivized

[7] The price responsiveness of Chinese agricultural supply in the 1980s was exceptional, and surely linked to the institutional reforms put into place at the time.

systems in the 1970s and 1980s – land reform has been an important stimulus to growth.

During the second stage, with productivity growth underway, the crucial question is how the sector can be managed to support output and labor force growth throughout the economy, particularly to avoid large urban-rural and inter-regional inequalities from expanding.

The third stage is characterized by the fall of the share of food products in consumer budgets below (say) 30%, usually accompanied by a rapidly shrinking share of the labor force in agriculture. The most relevant question is then how to set the stage for a final “industrialization” of agriculture. The sector may not support the same standards of income as do urban industrial and service activities, and may thus become heavily subsidized, as is the rule in rich members of the OECD.

Insofar as such comparisons over vast reaches of time and space make sense, many poor countries today have agricultural productivity levels well below those of the prosperous OECD economies on the eve of their industrialization – no “agricultural revolution” has occurred. A 20% share of agricultural capital formation in the total might be a reasonable norm for those countries; the observed share in many is well less than 10%.

Further challenges to domestic agriculture are food aid and/or direct competition with heavily subsidized, highly efficient foreign producers under free trade agreements. The introduction of new, high cost technologies by the state in alliance with foreign trans-nationals can push small landowners against the wall. Farmers around the world

have been driven out of business by such pressures and, worst, driven to suicide, as has been the case for tens of thousands of Indian farmers beginning in the 1990s.

As with macroeconomics and industrial strategy, there are two broad approaches to agrarian policy – price fundamentalist and structuralist. The modern patron of the fundamentalist school was T. W. Schultz (1964), who wrote more or less directly in opposition to Arthur Lewis and provoked Sen's analysis of surplus labor discussed above. In this mainstream view, the main causes of poor agricultural performance are distorted prices and lack of access to productive technology. The success of the Green Revolution thus came from generous price supports (on both inputs and output) for producers and the new high yield technology.

Unmentioned are pre-conditions for the adoption of the seed/fertilizer/irrigation package and its side-effects. The historical situation included a differentiated class structure in agriculture which allowed big "farmers" (almost in the American Middle Western sense of the word) to take advantage of decreasing costs implicit in mechanization, water control, and bulk deliveries of fertilizers and pesticides. State-provided irrigation infrastructure played an essential role.

Side effects included a worsening income distribution in the countryside, labor expulsion from farms, and the risks implicit in the adoption of monocultural cropping and dependence on ecologically damaging inputs. The main point is that agriculture is based on complex, well-established social structures which purely technocratic policy cannot take into account.

A more nuanced approach must confront this multitude of confounding factors:

Technologically, extension of the area of cropped land will be difficult in many countries. Bangladesh, for example, now produces three crops of rice per year supported by widespread irrigation. In effect, its land area has been dramatically extended but similar innovations will not be feasible in arid lands. The implication is that crop *yield*s will have to rise to increase rural incomes. Higher yielding dry-land crops, livestock disease control, small-scale water control, and other new technologies will be necessary but they may be difficult to introduce. In an influential paper, Bhaduri (1973) pointed out that potential technological improvements may be thwarted by landlords who extract both rent and interest payments from their tenants.[8] Introduction of tubewells for irrigation in eastern India may well have been held back by such factors. Stagnation in backward agriculture is not limited to that corner of the world.

There are fiscal issues. Expanding public investment in rural infrastructure and providing subsidies where they are sensible is essential. But can agriculture be taxed to help underwrite expenditures to improve its performance? Few countries are able to tax the sector effectively, though on the other hand higher crop production may enable a reduction in food subsidies.

External complications arise, especially with regard to trade. As mentioned above, opening up low productivity producers to external competition can be devastating. Probably 1.5 million Mexican maize farmers have been forced out of business since trade in the crop was opened under NAFTA in the mid-1990s. Ecological

[8] In a nutshell, technological innovation may raise a tenant's income enough to allow him to pay off loans from the landlord. The potential loss of interest income induces the landlord to resist the innovation. Bhaduri's theory of agricultural stagnation remains highly controversial. Basu (1997) provides a useful summary from a sympathetic mainstream perspective.

diversity has undoubtedly diminished in maize's homeland. Worldwide, local producers will be under threat if significant agricultural trade liberalization occurs under the ongoing but moribund Doha round of negotiations.

As discussed above, shifts in terms-of-trade and sectoral demand patterns can be crucial. Was Malthus correct in assuming that demand from agriculture supports industrial production, or would higher terms-of-trade choke it off by cutting real incomes in urban areas? The linkages can be quite complicated. Higher food prices harm landless laborers in India but help landed peasant producers in Anatolia.

In the long run, rising agricultural productivity must force the sector to adjust to falling terms-of-trade. A smooth decline would be desirable, avoiding destabilizing price shocks insofar as possible. Market intervention in the form of food storage and price regulation becomes almost inevitable. Non-price incentives in agriculture also matter — e.g., good rural access to farm inputs and manufactured consumer goods, infrastructure, and other amenities.

Putting successful agrarian development packages together under all these constraints is not easy, but it has been done. Getting prices "right" (though not necessarily dictated by an unfettered market) can be an important component but by no means the only one. At times, technological advances are possible, as recently in Brazil where extensive liming and use of phosphorous fertilizers has permitted rapid yield increases in the previously barren *Cerrado* region in the Center-West of the country. As of mid-2008, with world food prices spiraling putting together effective packages to raise agricultural productivity has assumed urgent importance.

Appendix 8.1: The Kaldor Model and Extensions

Following Kaldor (1978, chapter 4), we set up a three equation model for a "modern" sector of the economy (subscript *M*). Then following Rada (2007) we bring in a "subsistence" sector (subscript *S*) and consider how the two interact. For simplicity we work in continuous time, with a "hat" over a variable signaling a rate of growth:

$\hat{X}_M = (\frac{dX_M}{dt})/X_M$.

As discussed in the text, the first equation states that the growth rate of output $\hat{X}_M$ in the modern sector responds inversely to the growth rate of the wage share $\hat{\psi} = \hat{\omega} - \hat{\xi}_M$ with ω as the sector's real wage and ξ_M as its rate of labor productivity growth. The rationale is that higher profitability as signaled by the lower value of ψ will stimulate investment and export growth,

$$\hat{X}_M = \hat{A} + \alpha(\hat{\xi}_M - \hat{\omega}). \quad (1)$$

A negative α means that the aggregate demand is "wage-led." For $\alpha > 0$, it is "profit-led" with productivity growth stimulating output growth. Demand is strongly profit-led for $\alpha > 1$ in which case employment grows as well. The intercept term $\hat{A}$ captures all other contributing factors to output growth, including growth of subsistence sector real income $\hat{Y}_S$. To keep down notation, wage growth $\hat{\omega}$ is set to zero in the following discussion.

As suggested by Kaldor (1978, chapter 4) and Verdoorn (1949) productivity growth is likely to respond to output growth,

$$\hat{\xi}_M = \bar{\xi}_M + \gamma \hat{X}_M \quad . \quad (2)$$

The Kaldor-Verdoorn elasticity γ usually takes a value of around 0.5 when it is estimated econometrically. The intercept term $\bar{\xi}_M$ stands for a "base" rate of productivity growth.

Finally, we have an equation for the definition of productivity growth,

$$\xi_M = \hat{X}_M - \hat{L}_M \qquad (3)$$

With $\hat{L}_M$ as modern sector employment growth.

In Figure 8.1, equation (1) is the "Output growth" schedule, and (2) is the "Kaldor-Verdoorn" curve. The "Employment growth contours" are based on (3).

Figures 8.2-8.3 for the Rada model are based on a rearrangement of (1)-(3) to set up modern sector dynamics in terms of employment and productivity growth rates. An initial equation for "Employment growth" (in the northeast quadrant of the diagrams) is:

$$\hat{L}_M = \hat{A} + (\alpha - 1)\xi_M \quad . \qquad (4)$$

Faster productivity growth increases employment growth only when aggregate demand is strongly profit-led, or $\alpha > 1$. Zero productivity growth implies that $\hat{L}_M = \hat{A}$ so the intercept of the Employment growth curve is on the horizontal axis in the $(\hat{L}_M, \xi_M)$ plane.

The Kaldor-Verdoorn schedule itself becomes

$$\xi_M = \frac{1}{1-\gamma}(\bar{\xi}_M + \gamma \hat{L}_M) \quad . \qquad (5)$$

If we let $\sigma_M = \gamma/(1-\gamma)$, then $\sigma_M > 0$ signals increasing returns to labor use in the modern sector.

Let the total labor force be $L = L_M + L_S$, growing at a rate *n.* If $\lambda = L_M/L$ then growth rates of modern and subsistence sector employment trade off according to the equation

$$\lambda \hat{L}_M + (1-\lambda)\hat{L}_S = n \quad .$$

Via (5) ξ_M and $\hat{L}_M$ are related monotonically, so we can solve for employment growth in the subsistence sector as a function of ξ_M,

$$\hat{L}_S = \frac{1}{1-\lambda}\left[n + \frac{\lambda}{\gamma}\bar{\xi}_M - \frac{\lambda(1-\gamma)}{\gamma}\xi_M\right] \quad . \qquad (6)$$

This equation is the "Sectoral employment growth" schedule in the northwest quadrant of Figures 8.2-8.3.

The subsistence sector is subject to decreasing returns to scale, with labor as its only input. In the sector's analog to the Kaldorn-Verdoorn equation we have

$$\xi_S = \bar{\xi}_S + \sigma_S \hat{L}_S \qquad (7)$$

with $\sigma_S < 0$ signaling decreasing returns to scale (σ_S is called the "Sen elasticity" in the text). Because the sector's real income growth is

$$\hat{Y}_S = \hat{L}_S + \xi_S = \bar{\xi}_S + (1+\sigma_S)\hat{L}_S \quad , \qquad (8)$$

there would be strong decreasing returns for $\sigma_S = -1$ (the value proposed by Sen in the course of the 1960s debate over the meaning of subsistence agriculture). There would be constant returns for $\sigma_S = 0$. Equation (8) is the "Subsistence income growth" curve in the southwest quadrant of Figures 8.2-8.3.

Finally, subsistence income growth feeds back into modern sector employment according to a relationship such as

$$\hat{A} = B + \eta \hat{Q}_S \tag{9}$$

which is the “Subsistence demand push” curve in the southeast quadrants.