The Left-Behind Debate
by Anne Emerson

Yes, some people do get "left behind" in the booming U.S. economy.

The issue is that what works for some people does not work for others, and IT IS NOT (always, or even often) their fault. The discussion below is technical. See Essays page, for general readers.

Three Technical Questions Regarding Interactions Among Sectors, with Productivity Advance

January 17, 2024. These questions were given to a professor emeritus of economics, who had an interest in the challenges facing higher education today (including the "cost disease of services"). The original file is dated November 1, 2022, and was prepared with his presentation in mind. I understand that a) he has other interests now and b) dual-economy theory was not his expertise. Nevertheless, he took the paper with analysis and questions away with him and promised to get back to me. Unless there was a miscommunication, he did not get back to me, not even to say he was too busy. I have now updated the paper, clarifying any points that may have been unclear.

Of particular note to University presidents, lawyers, and medical doctors, these are service industries likely to lose their primary missions (educating students, serving justice, and curing the sick) under the encouragement of manufactures and other high-technology industries. The latter industries are where money tends to flow under our current system. I can explain why. The reasoning below is just the beginning of the argument.

Technical question one: Would you agree with the discussion in Section Two below, regarding relative *sectoral* incomes in the comparative statics of the closed neoclassical two-sector model with two consumption goods?

Technical question two: Given the discussion in Section Two below, do you agree with the discussion in Section Three? That is, a two-consumption-goods (or two-consumption-sectors) growth model MUST include money.

Technical question three: Is this approach new? Emerson submits that the present sectoral emphasis highlights "dual-economy" aspects of the growth process that are different from mainstream analysis, and is of considerable interest. For example, the behavior of prices, and of employment in service industries, after massive infusions of money into the global system during the pandemic, may have surprised some analysts. Emerson's neoclassical two-sector-model with money explains it quite well.

Section One: Summary of the Typical Two-Sector Analysis, Exploring Prices for Two Goods and Two Factors:

Emerson's challenge was to turn the two-sector neoclassical comparative static result into a dynamic growth model. As explained below, there were some unexpected results from focusing on relative sectoral incomes (or revenues) rather than relative factor incomes – intersectoral interactions being of particular interest for rural-urban migration analysis.

In a typical closed neoclassical two-sector model, we can say that the labor-intensive sector represents an agricultural sector, and elasticities of demand for the agricultural good are less than unity (both own-price and income elasticities). The capital-intensive sector represents manufactures, and elasticities of demand for the

manufactured good (both own-price and income elasticities) are greater than one. (E_d, in the present discussion, is the demand elasticity in general, representing the combined impact of both price and income elasticities.)

Following the conventional analysis[1] of the closed two-sector model with two consumption goods, other things equal, neutral productivity increase in the agricultural sector (the labor-intensive sector) causes the relative price of the agricultural product, and the wage to each unit of labor, to fall. ($E_d < 1$)

As the second part of the conventional analysis, the above-mentioned productivity increase in the agricultural sector (the labor-intensive sector) causes the relative price of the capital-intensive good (manufactures) to rise, the factor payment to capital to rise, and the income to each unit of the factor, capital, to rise.

That is, because in the conventional analysis, there is a monotonic correspondence between the price of the product and the price of the factor used most intensively in the sector (Johnson 1973, 54). It may be inferred that when that factor-price falls, the product price falls. We argue here, further, that, if the elasticity of demand is less than one, in such a case, then the income (or revenue) to the sector will also fall, if the conventional analysis applies. Similarly, when the price of a product falls, if the elasticity of demand for the product is greater than one, the sectoral income (or revenue) will rise, if the conventional analysis applies. Needless to say, we are, in this piece, inviting the reader to question the conventional analysis, for intersectoral interactions.

Section Two: The "Sectoral Income" Approach to the Two-Sector Model:

Consider sectoral, rather than factor, income. Sectoral income (or revenue) is generated from selling the sector's product. We can visualize the whole sector as one large "production-entity," for which total product sales generate total sectoral income, or revenue. Following a productivity-increase in the agricultural sector, we can expect a decline in the income (or revenue) of the whole agricultural sector. ($E_d < 1$, and the price of the agricultural good has fallen.)

Similarly, following a productivity-increase in the agricultural sector, we can expect a decline in the total income of the manufacturing sector. ($E_d > 1$, and the price of the manufactured good has increased).

Thus, referencing the conventional analysis with regard to sectoral price and income changes, it appears that relative income (or revenue) in both sectors appears has declined, although productivity in the agricultural sector has increased. Without money and nominal prices in the model, this paradox is hard to resolve[2]. See Section Three below, where we elaborate on the matter.

Results are similar for an equivalent thought-experiment when productivity increase occurs in the manufacturing sector. (See Section Four: Appendix, below.) As in the case of productivity advance in agriculture, relative incomes (or revenues) in both sectors appear to have declined although productivity in the manufacturing sector has increased. Again, without money in the model, this paradoxical result is hard to explain.

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1. The basic result is that, if neutral technical progress occurs in one industry, the relative price of the factor used intensively in that industry rises, remains the same, or falls depending on whether the uncompensated elasticity of demand for the product of that industry, is greater than, equal to, or less than, unity. (Johnson 1973, 69)

2. The enterprise-focused impact of demand elasticity on enterprise income (or revenue) may be discussed without stating specifically whether the prices are real or nominal, but it is not usually suggested that the prices in question are relative prices.

Section Three: Why a Two-Consumption-Goods Two-Sector Growth Model Should Include Money

Let us move from comparative statics to a growth model. Remember, the comparative-static model does not include money; its prices are relative prices. If the model would include money, then, as productivity (and output) increases and the same money (before we expand the money supply) chases more goods, the nominal prices of *all* goods can decline. Relative prices cannot all decline. Adam Smith (Smith in Heilbroner, 1986, 194) explains how this can happen. "[As productivity advances, with the increasing division of labor,][3] All things would gradually have become cheaper…. But though all things would have become cheaper in reality, in appearance many things might have become dearer than before, or have been exchanged for a greater quantity of other goods." Thus, to paraphrase Smith, all prices can decline, but some prices change relative to others and may appear to increase.

Section Four, Appendix: "Sectoral Income" (a.k.a. Sectoral Revenue) Analysis with Productivity Advance in the Manufacturing Sector:

With neutral productivity increase in the capital-intensive sector, the relative price of the capital-intensive good, the price of capital, and income to each unit of the factor, capital, rise ($E_d > 1$). When we consider sectoral income (or revenue), from total sector sales, rather than factor income as in the conventional analysis, we would expect relative income (or revenue) to the manufacturing sector to fall. ($E_d > 1$, and the price of the manufactured good has risen).

Similarly, with neutral productivity-increase in the capital-intensive sector, the relative price of the agricultural good, the wage to labor, and income to each unit of labor, fall. Again, consider sectoral income (or revenue) rather than factor income. Relative income (or revenue) to the agricultural sector should fall ($E_d < 1$ and the price has declined.)

Thus both sectoral incomes (or revenues) appear, if we take the conventional analysis, to have declined even as productivity in the manufacturing sector increases. This paradoxical result is hard to explain. But, if we include money in our thought-process, we can explain it.

Moreover, we can expand the reasoning to show that, if productivity increases in both sectors, the conventional analysis will give a similar result. That is, if productivity increases, economywide, the conventional analysis will require that product-prices (and therefore the corresponding factor-prices) either change or remain the same. The phenomenon of relative sector-incomes (or revenues) that change in response to their "natural" elasticities of demand, as output increases, will fall under the radar of this conventional relative-price analysis.

That is – whatever happens to relative prices – if output increases economywide, there will be a shift of sectoral emphasis, via elasticity responses, in favor of the manufacturing sector. In general, the richer the country, the more of its people will prefer to buy manufactures. Emerson has developed some formal mathematics to explain the details of this behavior. She argues that, today, it has gone "too far." A re-set is needed, and it may not be as impossible as some people think.

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3. Smith focuses on increases in productivity caused by an increasing division of labor (specialization). In today's world, the relevant cause of productivity-increase is more likely to be scientific technological progress. In Smith's world, the proliferation of scientific knowledge was a relatively small factor to consider, as he sought to understand the wealth of nations. So, as we update our thinking, we need to understand that the economic impact of scientific and material technological progress is different from that of specialization and exchange. Scientific and technical knowledge is only one of many important skills that have value to society; we may be losing good balance among many types of skills.

Summary of the Discussion

Emerson's challenge was to turn the two-sector neoclassical comparative static result into a dynamic growth model. The model shows how the "dualism" phenomenon of emerging market economies can exist worldwide, even in wealthy countries.

As explained above, there were some unexpected results from focusing on relative sectoral incomes (or revenues) rather than relative factor incomes – intersectoral interactions being of particular interest for rural-urban migration analysis*. Emerson made several more departures from convention in order to build a two-consumption-sectors model of urbanization, growth, and development that is consistent with the data.

Emerson isolated two sectors, as explained in Section One Above. Adding a service sector could model the cost disease of services within the larger context of intersectoral flows of money. *Emerson found data on the service sector that suggest it serves the manufacturing sector; thus, services is a derived demand within the manufacturing sector.*

Expanding on this point, ANY industry or sector with inelastic demand is likely to suffer loss of labor, just as agriculture does. The two sectors may be called "money-magnet" industries, and "resource-losing" industries.

References:

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*Notes:

a. Emerson's doctoral dissertation was a migration analysis in an oil-rich developing country. Census takers had recorded many details about the population, including socioeconomic status and region of prior residence. Migrant-selectivity, inter-regional differences, urbanization, growth, and development were relevant to the research. Emerson wished to understand both why workers left rural regions for cities, and *also to offer an explanation for selectivity in migrant streams.* The best available basic model consistent with the data was the comparative statics of the closed neoclassical two-sector model with productivity advance. Yet, this model is neither dynamic nor does it include "human capital."

b. Therefore, in building a dynamic growth model around the comparative statics of the closed two-sector model, we prefer to speak to the role of education rather than put it in the model explicitly. But it is not hard to see that, since the manufacturing sector is where the money runs, then the kinds of skills needed by that sector (technical education, for example) will proliferate, at the expense of the kinds of skills needed in the agricultural sector. Emerson's longer paper goes into more detail about this phenomenon. If authors and analysts continue to ignore the "left-behind" narrative of Trump supporters, it is no wonder Trump supporters are angry. Emerson saw such a position ("no justification for the left-behind narrative") in a recent article in The Atlantic, just yesterday (January 16, 2024).

c. Finally, Emerson was comfortable referencing the closed two-sector model. (Earth does not trade with other planets, and urbanization is a global phenomenon. The reader may picture the many countries on Planet Earth experiencing similar economic changes, in parallel over time, so that the whole global system behaves like one large – albeit complex – multi-sectoral closed model, over time).