Welfare consequences of asymmetric growth ☆

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A B S T R A C T

Standard models in macroeconomics and development economics imply that growth in the aggregate enhances welfare for everyone in the economy. I show that instead, if economic growth is biased toward the consumption bundle of the rich, the welfare of the poor may fall. I document the relevance of this mechanism during the latter part of the Twentieth Century by showing that new information technology disproportionately benefited sectors consumed by the rich.

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1. Introduction

What are the conditions under which economic growth can help or hurt the poor? An implicit assumption of standard general equilibrium models is that economic growth increases the welfare of everyone in the economy. For example, in the recent models of biased economic growth in Acemoglu (2003) and Buera and Kaboski (2012), well-being increases for everyone even when growth is accompanied by increases in inequality.

The implicit assumption in standard general equilibrium models that growth is associated with Pareto improvements for all agents in the economy is in part due to a general consensus that existing theoretical mechanisms of "immiserizing growth" are empirically irrelevant.[1] Bhagwati (1958) and Johnson (1955) proposed trade models in which growth in a country's export sector is associated with a loss in welfare when the export growth is accompanied by a sufficiently large deterioration of the terms of trade. As Krugman et al. (2011, p. 122) note,

> "Most economists now regard the concept of immiserizing growth as more a theoretical point than a real-world issue."

While the original concept of immiserizing growth may be irrelevant in practice, understanding the consequences of growth remains a central focus in economics. Many developing countries experienced rapid growth during the latter part of the Twentieth Century, yet large portions of the population continue to live in dire poverty. In the U.S., there remains a

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1 Models of Dutch disease (e.g. Corden and Neary, 1982; Krugman, 1987) are often considered to represent immiserizing growth. As Krugman (1987) notes, the natural resource boom associated with Dutch disease is only potentially welfare-reducing if the boom ends. Therefore Dutch disease is more akin to a temporary transfer than to a permanent increase in an economy's production possibilities frontier.

strong public perception that living conditions failed to improve for those at the lower rungs of the economic ladder during the growth of the 1990s and 2000s (e.g. Egan, 2004). Such stagnation for segments of the population, if true, is difficult to reconcile with the predictions of general equilibrium models that economic growth increases the welfare of everyone in the economy.

This paper presents a new theoretical framework to understand the conditions under which growth can reduce welfare in general equilibrium. These conditions are more general than those in the canonical models of immiserizing growth, and, as I discuss below, have been relevant in practice during the latter part of the Twentieth Century. My framework extends the standard model of skill-biased technological change (Acemoglu, 1998) to distinguish between consumption bundles of the rich and the poor, and to allow technological change to be biased toward sectors as well as toward factor inputs. When growth is biased toward the labor of a subset of the population and toward the consumption bundle of that group, the welfare of the second group may fall.

I present evidence that technological change during the latter part of the Twentieth Century was biased toward the consumption bundle of the rich, which, according to the theory, causes a fall in the welfare of the poor. Jorgenson and Stiroh (2000) argue that the majority of TFP growth has been in the production of computers and IT, and Triplett and Bosworth (2000) show that the most intensive users of computer technology have included industries such as finance, professional services, and communications. I examine the 1997 capital flow table and derive a similar result as in Triplett and Bosworth's (2000) analysis based on the 1992 capital flow tables. I then match the IT-intensive industries with personal consumption expenditure categories to identify the sectors which have directly benefited from new information technology. Based on data from the Consumer Expenditure Survey, I show that the expenditure share of these IT-intensive consumer categories is strongly increasing in income.

The bias in growth toward the consumption bundle of the rich may be even larger than that implied by data on aggregate consumption categories. Recent evidence using scanner data documents that high-income individuals consume different products than do low-income individuals, even when those products are similarly classified (Broda et al., 2009; Handbury, 2013). While data limitations prevent a mapping of IT investment to specific products, product-biased growth will amplify the extent to which growth is biased toward the consumption bundle of the rich. For example, if financial planners have benefited from IT technology more than payday loan establishments, then growth is even more asymmetric than is implied simply by looking at the Engel curve for an IT-intensive sector such as financial services.

I demonstrate the effect of this sector-biased growth by extending the standard model of skill-biased technological change to allow technological change to be biased toward sectors as well as toward factor inputs.[2] The model features two sectors (Yachts and Potatoes) and two types of agents (Rich and Poor).[3] Yachts represent goods or services consumed by the Rich, while Potatoes represent the consumption bundle of the Poor. The Rich agents own an endowment of high-skilled labor, while the Poor own an endowment of low-skilled labor.[4] The key assumptions are, first, skill-biased technological improvements are sector specific; and second, the elasticity of substitution between high skilled labor and low skilled labor is greater than unity. If technology improves in the Yacht sector, the wage of the skilled Rich increases. The Rich in turn use their increased income to demand more Yachts, which requires skilled labor to flow out of the Potato sector and into the Yacht sector. The result is a fall in the supply of Potatoes and a decline in the welfare of the Poor.

The welfare decline for the Poor is substantial when there is no overlap between the consumption bundles of the Poor and Rich. The decline is mitigated by symmetry in technology across sectors or, isomorphically, by symmetry in the consumption bundles. In the case of perfect symmetry, the model is indistinguishable from the standard theory of skill-biased technological change in which both Rich and Poor benefit. The baseline theory focuses on the extreme case of different consumption bundles to illustrate the mechanism in the simplest setting possible. It should be noted that the strength of the mechanism depends on the degree of asymmetry in consumption and technology, which, as discussed above, may be quite strong.

According to the theory, the sector-biased growth of the 1990s may have reduced the welfare of America's low-skilled poor. A number of other mechanisms that I do not explicitly model may have offset the effect of sector-biased growth, so the net effect on the welfare of the Poor is unclear. For example, cheaper imports due to trade liberalization and efficiency gains in the production of goods consumed by the poor may have lowered the cost of consumption and increased welfare for low-income Americans (e.g. Fajgelbaum et al., 2014). Based on changes in prices of subsets of goods consumed by the poor, as well as on changes in quantities of some amenities consumed such as in-home air conditioning, it appears that the economic conditions of America's poorest members have improved during the end of the Twentieth Century (Broda et al., 2009; Meyer and Sullivan, 2011). However, it remains unclear whether increased consumption of subsets of goods applies generally to the entire consumption basket of the poor. If other unexamined goods and services became more expensive or less accessible to low-income individuals, then well-being may have fallen, consistent with publicized perceptions. For example, consumer goods at Wal-Mart may have gotten cheaper, but the availability of other goods and services may have

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[2] While the model focuses on skill-biased technological change, the same mechanism applies in the Buera and Kaboski (2012) context of skill-neutral growth that causes demand to shift toward skilled labor.

[3] Appendix D extends the capital-skill complementarity model in Krusell et al. (2000), which has three factors of production, and derives the same welfare implications. This paper considers capital-skill complementarity to be consistent with skill-biased technological change and therefore refers to the two interchangeably.

[4] I use the terms 'high-skilled' and 'low-skilled' in accordance with the literature on skill-biased technological change. However, the model's mechanism is relevant when technological change is biased toward any factor (e.g. capital) that is not equally owned across groups.