Three Essays on Inequality, Education, Trade and Endogenous Growth
Statement of Research Interests
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Inequality grew substantially not only in many developed countries during the 1980s and 1990s, but also in most developing countries. The growth in inequality was particularly severe in Latin America and Africa, but significantly less in many East Asian countries. The diverse patterns of income inequality motivate my research, which reveals the important forces underlying the dynamics of inequality. The interaction between technological change and educational quality emerges as a principal determinant of the growth of inequality. My research also focuses on inequality among firms and the implications for economic growth. Endogenous growth models feature firm level research and development (R&D) as the engine of growth. The distribution of firms and the allocation of R&D among the firms are, therefore, central to maximizing long run economic growth and welfare. In 2009, my overall body of research was recognized with the Drexel University Research Award.

Current Research

My job market paper entitled “Within and Across Country Inequality in a Model of Trade and Endogenous Growth” asks how new technologies and educational quality interact to create diverse patterns of income inequality dynamics. This paper presents a general equilibrium model of North-South trade with endogenous innovation and imitation in which agents can choose to acquire education. The model features the effects of technological change on the incentives to acquire education. Specifically, faster rates of technological change raise the return to acquiring education by increasing relative productivity of skilled workers, but also increase the time required for unskilled workers to adapt to new technologies. These forces determine both the skill composition of the work force as well as their relative wages. This model is novel in several ways. First, I am able to capture the distribution of income both across and within regions for both developed and developing countries. To the best of my knowledge, this is the first endogenous growth model to do so. Second, I fully characterize the transitional dynamics of technological change and income inequality following trade liberalization in order to compare these patterns with the diverse experiences of Africa, Latin America, and Asia.

I find that in developing countries with low educational quality, Southern trade liberalization leads to a first increasing then decreasing transition of within country income inequality, and divergence in terms of average income relative to the North. However, when the South has a high quality of education, workers are better equipped to adapt to new technologies, and trade liberalization induces an initial decline of within country income inequality. The quality of education, therefore, plays a critical role in explaining the variations in the observed dynamics of income inequality in developing countries. For example, during the 1980s and 1990s,
inequality grew rapidly within many Latin American countries with a low quality of education, while remaining stagnant in Asian countries with a relatively higher quality of education. The results suggest that nations concerned with the impact of globalization on rising inequality can avert or minimize the issue by first investing in education.

The second essay of my dissertation entitled, “The Diffusion of Technology, Education and Income Inequality: Evidence from Developed and Developing Countries,” empirically analyzes the interaction of the quality of education and the diffusion of new technologies on the dynamics of inequality. I find that the data supports the theoretical predictions of the first essay. I proxy the diffusion of new technologies by the skilled factor content of imports. To create this proxy I employ a theoretically consistent gravity model with importer and exporter fixed effects. I find that: (1) a higher skilled factor content of imports significantly increases the change in inequality, reflecting the skill-biased nature of technological change; (2) a higher quality of education reduces the change in inequality, reflecting a greater ability of the work force in adapting to new technologies; and (3) the interaction of these terms is negatively related to the change in inequality. Taken together, the results imply that a faster rate of technological progress increases inequality more so if the quality of education is low. The evidence explains why inequality remained constant or even fell in East Asian countries with a high quality of education, while inequality grew within Latin America with a relatively lower quality of education.

The third essay of my dissertation investigates the optimal allocation of research and development (R&D) subsidies among firms when the government observes firm heterogeneity. The preliminary results for this paper entitled, “Optimal R&D Policy in a Growth Model with Heterogeneous Firms,” joint with Christopher Laincz (Drexel University), indicate that it is growth and welfare maximizing to subsidize the relatively smaller firms even if their likelihood of exit is relatively high. In the context of both a duopoly setting and a more rich market structure with endogenous entry and exit, subsidizing the R&D efforts of the relatively smaller firms places more pressure on larger firms to escape the greater competition and increase its own R&D outlays, in turn, raising the growth rate. In contrast, subsidies given only to the largest and more efficient firms would weaken the escape competition effect and indirectly raise the cost of catching up for the small firm resulting in reduced growth rates.

Future Research

My future research agenda plans not only build upon my existing research in many important ways, but also extend my research to other issues of macroeconomics. The theoretical model, developed in the first essay of my dissertation, can be extended in several important ways to better understand the linkages of technology, education, and inequality. For example, considering the role of intellectual property rights, a more dynamic market structure, or Southern innovation, would each help further explain the diverse patterns of inequality across developing countries.
An important research objective asks whether the effects of skill biased technological change (SBTC) on inequality are a temporary phenomena or whether there are long run implications. SBTC is modeled in several different ways and each produce a different long run prediction. For example, in Aghion (2002) and Greenwood and Yorukuglu (1997) the flood of new information and communication technologies create a short run bias (and a higher premium) for those with a greater ability to adapt to new technologies. Acemoglu (2000, 2002) argue a change in the direction of technological innovation toward those with greater skills leads to a permanent rise in inequality, while Galor and Moav (2000) show a rise in the rate of technological progress increases long run inequality. My research nests the differences in the long run implications into a unified framework to allow the data to reveal the short and long consequences of technological change on income inequality.

Grossman and Maggi (2000) consider the distribution of talents, or human capital, to be an important determinant for patterns of trade. Countries with a more homogeneous labor force specialize in the production processes which require workers to preform highly complementary tasks, known as supermodular production technologies. The opposite is submodular production technologies where tasks are more substitutable. Thus, countries with a more diverse set of talents specialize in the production of goods with submodular technologies. This concept has yet to be applied to income inequality. Consider the differences between Japan, with a homogeneous labor force, and the U.S., with a more diverse set of talents. One would expect inequality to be greater in the country with a less homogeneous work force, in this case, the U.S. However, there are also implications for the dynamics of inequality. As countries open up to trade, those countries with a less homogeneous labor force become increasingly specialized in submodular production technologies which increases inequality more relative to a country specializing in supermodular technologies. The distribution of talents is contribute to explaining the diverse patterns of inequality among developing countries.

Along with these research objectives, I intend to pursue other issues involving the process of R&D, the diffusion of new technologies within and across industries and countries, the market structure, and education and their impact on growth, inequality and, ultimately, welfare.