Endogenous Skill Choice as Source of Productivity Dispersion, and Export Margins

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Abstract

Technical progress has differential impacts on productivities across sectors contingent on skilled labor shares. At the macro level, given the overall human capital stock of a region and structural congruence with the trading partners, apart from the model of comparative advantage, the agents participate in trade to reap the technological bonus out of trade flows. A theoretical model formalizing the nexus between embodied technology transfer, human capital and TFP Growth is developed. Capturing these benefits requires an appropriate mix of skilled and unskilled labor, which is recognized by the firm in its production decisions. Assuming skilled labor as the harvester of new technology, the ratio of skilled and unskilled wage bills, as a measure of skill intensity, proxies absorption capacity. Sectors with higher skilled labor intensity will have an advantage in extracting the trade-mediated technology spillovers. The "optimal" level of skilled labor makes the best use of the technological bonus reflected in higher productivity. The model is designed for numerical simulation to explore the impact of a technology shock on productivity. Thus, skill heterogeneity explains the sources of heterogeneity in productivities.

JEL-O3, 04: Keywords: Productivity, Skill, Trade, Firm, Absorptive Capacity, Structural Congruence.

Introduction


The success stories of emerging Asian and some Latin American countries show that combination of technological competence, upgrading skills via human capital to undertake complex capital, and skill-intensive activities breaks the barriers of industrial growth, and has profound impact on sustained growth. Comparatively disadvantaged groups, like the other underdeveloped regions, lag behind these early leaders because of inability to create enabling 'systems of learning and diffusion' encompassing human capital base, institutions, technological infrastructure.


Analytical Results

Proposition I: With the foreign-composite input held fixed, a unit increment of domestically sourced intermediate, the input creates the captured productivity bonus (βjγi) on the other hand, with a fixed level of domestic intermediate inputs, βjγi is augmented by an increment of foreign-sourced intermediates due to a higher capture of the foreign-sourced technological improvement.

Proposition II: For positive values of the parameters γi, δh and with MPX(0) (and even if MPX(0) = 0) "TB" per unit of increment of composite labour input δl will go up when skill-intensity increases. Thus, higher AC proxyed by skill-intensity augments the technological bonus via effective assimilation of fruits of transmitted technology.

Proposition III: Since MPX(0), a higher dose of physical capital will stimulate accrual of higher productivity bonus. Thus, higher capital intensity translates into higher appropriation of technological bonus in any region. As long as the destination capital intensity is lower than that in the source (i.e., if capital intensity increases in the destination but not as rapidly as that of the source so that the client’s capital-intensity does not overshoot the source’s), then higher dose of physical capital in the recipient translates into larger value of structural congruence resulting in amplification of productivity bonus.

Proposition IV: An increment of unskilled labor, (keeping skilled labor fixed) reduces βj owing to lower absorption of technology. An increment in skilled labour inflates the value of βj.

Conclusions

A theory which allows for the endogenous capture of foreign technical change has been offered. Transmitted technology shock via imported inputs becomes endogenous. Workers differ in their skill contents to achieve a productivity level with a particular vintage of technology. It is postulated that: (i) AC increases with the skill intensity; (ii) amount of technology potentially captured increases with import intensity; and (iii) SC increases with higher capital intensities. The capacity of traded inputs to carry technological improvements changes the factor-mix problem of representative firms, taking into account not only the conventional marginal rate of substitution between domestic and foreign inputs of same generic type, but also the “bonus” of the superior technology embedded in inputs. The model embeds a mechanics of technology adoption in a global input-output structure based on differences in skill, trade-intensive and capital global.

Key References