Research Statement

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My job market paper is about the effect of product innovation on the rising inequality between white-collar and blue-collar workers. The wage inequality by education has been rising since the 1980s in most industrialized countries. Most of the existing literature assumed that the wage gap is the result of the rising productivity gap between the workers. They explain that the PC revolution in the 1980s increased the wage gap by rapidly raising the productivity of the white-collar workers relative to the blue-collar workers. However, they largely ignore the role of product innovation by assuming single representative good production function, and assume that both white-collar and blue-collar workers are variable input.

Alternatively, I have constructed a model which assumes that the demand for white-collar workers increases not because their productivity grows faster, but because increasing product variety requires white-collar workers as fixed input. For example, to develop a new mobile phone, many white-collar workers including engineers, designers, marketing experts, project managers and other administrative staffs are needed regardless of the production quantity. Therefore, increasing product variety increases the demand for such fixed input. The product variety increased dramatically since the 1980s, and this could have increased the demand for white-collar workers.

This model leads to several predictions different from the standard SBTC theory. Firstly, while the share of white-collar workers, who are supposed to be more productive, is positively correlated with the aggregate productivity in the standard theory, this model predicts negative correlation between the two, because the white-collar labour is a fixed input. Therefore, this model's prediction is consistent with such puzzling empirical facts as the coexistence of the rising white-collar employment share and the stagnant productivity growth in the 1980s and the coexistence of the counter-cyclical skill intensity of labour and the pro-cyclical labour productivity across the business-cycle.

Secondly, this model predicts that there is an upper bound to the skill-biased change. As firms can pay for the fixed input only if the price exceeds the marginal cost, the wage-bill for the white-collar worker cannot exceed the variable profit (flow profit) of the firms. Although

technological innovations, such as Flexible Manufacturing System, could have lowered the share of non-labour fixed cost and allow more resources diverted from fixed capital input toward fixed labour input, the size of price-cost mark-up imposes a ceiling on the skill-biased change in the long run. Therefore, it is predicted that the growth of inequality between white-collar workers and blue-collar workers will eventually slow down in the long run. This is also consistent with the empirical findings that the pace of skill-biased change began to slow down since the 1990s.

Thirdly, in contrast with the standard view that education is the key driving force of GDP growth, education might not necessarily contribute to GDP growth. It is because the contribution of white-collar labour is not on quantity but on variety. However, increasing university education still helps to improve welfare through its contribution to variety. As the current GDP measure does not fully count the welfare gain from the variety of consumption, the economic contribution of education cannot be simply judged by its contribution to GDP growth.

This model provides implications not only on SBTC, but also on a wide range of subjects, including international trade, business-cycle, growth and industrial organization. For example, it the model is extended so that entering a foreign country's market, as well as introducing a new product variety, involves fixed input, which is biased toward white-collar labour, the increase of trade partners contributes to the skill-biased change regardless of whether it is North-South trade or not.

I have another paper, which will be part of my PhD thesis, on the relationship between firm size and white-collar employment. This paper focuses on the role of firm dynamics differently to the most existing literature; the latter focused on the role of universal technological change. I empirically estimated the relationship between the firm size and the white-collar employment share using firm level data on UK manufacturing industries. The relationship appears positive across cross-section, but negative over time. It implies positive relationship between white-collar employment and firm specific time-invariant effect. This paper attributes it to the fixed labour input biased toward white-collar workers.

This paper also assumes that the white-collar labour is partly fixed input at least although it is not entirely fixed input. It is also assumed that the different product varieties require different level of fixed labour input, which is biased toward white-collar workers. For example, the fixed input to develop a new model of car is higher than that of T-shirt.

Therefore, those firms producing complicated product varieties, which require larger fixed input, are both larger in size and higher in the share of white-collar workers, which leads to the positive cross-sectional correlation. However, short-run output expansion increases only variable labour, biased toward blue-collar workers, decreasing the employment share of white-collar workers, which leads to the negative correlation over time.

My research has several distinctive predictions, which remains to be further studied. Firstly, my model implies both the aggregate labour productivity and TFP would increase upon positive demand shock. It does not require price rigidity or labour hoarding, which are assumed in existing literature. Secondly, the elasticity of substitution between white-collar labour and blue-collar labour might be different by the level of aggregation: lower at firm or plant level and higher at more aggregated level. Thirdly, the contribution of education and R&D on GDP growth might be lower than what is implied from their private rate of return. Fourthly, the international trade might increase the demand for white-collar labour even if it does not lead the country to specialize in skill intensive sector. Fifthly, unexpected product innovation decreases saving while the news of future product innovation increases saving. They are not fully covered in my job market paper, but each of them deserves to be a topic of separate paper. Therefore, I am planning to implement separate researches on them in the near future.