

Capital-Skill Complementarity, External Trade, and Domestic Wage Concentration

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Abstract

On most statistics, the income distribution in advanced economies has widened rapidly since the 1980s. With a few exceptions (e.g. France, Turkey, Greece) – labour markets have seen a progressive widening of the skilled/unskilled pay differential. This can be partly ascribed to technology shocks, such as computerization and the advent of more flexible management techniques allowing the ‘unbundling’ of production, but has been principally driven by labour market shocks associated with economic globalization – international investment, and labour migration and competition from low-wage, emerging economies in Asia and Eastern Europe.

However, the more dramatic shift in the income distribution has not been that between the middle class and less skilled workers: rather, it has been the increasing share of income of the top one per cent earners (or, even more dramatically, the top 0.1 per cent – see, for example, Atkinson *et al.*, 2011). This shift is particularly marked given that, in almost all countries, income shares stayed roughly constant until about 1980. Thereafter, the Anglo-Saxon economies (USA and UK particularly) saw a rapid widening across the income distribution – but especially at the extreme top end – with the income distribution returning to the inequality seen in the ‘gilded age’ of the early 20th century. Continental Europe and Japan bucked this trend until about 2000, but have seen widening since. As the OECD (2011) put it ‘earners in the top 10% have been leaving the middle earners behind

more rapidly than the lowest earners have been drifting away from the middle.’ Both salaries and capital income have contributed to the widening (Atkinson *et al.*, 2011).

In this paper, we follow Krusell *et al.* (2000) in arguing that there are strong reasons to believe that one of the primary drivers of increasing demand for skill is likely to have been the marked fall in the real user price of capital that has occurred between the late 1970s and the mid 2000s in many Western economies. Bank of England estimates, for example, suggest that the real capital costs halved in the UK during this period (Bakhshi and Thompson, 2002; Baumann and Price, 2007); about half of this cheapening is attributable to improvements in the quality of capital goods, and about half to international flows of savings out of China, Russia and the OPEC countries, facilitated by an increasingly integrated financial system. While the cost of capital has fallen, stocks of capital per worker have risen so fast that the share of capital in total incomes has increased and the share of labour fallen across the OECD (Guscina, 2006).

Increased wage inequality, however, need not necessarily translate into increased wage concentration – an aspect that Krusell *et al.* (2000) have not focused upon. For a systematic increase in concentration to occur, inequality must progressively increase moving up the wage distribution. Here we show that capital-skill complementarity can account for this progressivity for a broad class of technologies.

We describe a model of production and income distribution featuring a continuum of heterogeneous agents, each endowed with a different skill type (or, alternatively, a different propensity to absorb skills), and a continuum of technologies for producing a homogeneous good. Each skill type is combined with capital for producing a single good, and, crucially, different skill types can combine with capital in different proportions. In an environment where capital is relatively abundant, then, skill types that can be employed in comparatively more capital-intensive technologies will earn a higher wage and will therefore be regarded as being comparatively ‘higher’ skills. Our model is therefore somewhat different to most previous formalisations of capital-skill complementarity in that the ranking of skills arises endogenously as a result of technologies and input supply conditions.

The model predicts a distribution of wages that changes with changes in the rental price of capital, which in turn varies in dependence of conditions in international capital markets and domestic barriers to external capital flows. In particular, we show that the new wage distribution, after a fall in the real user price of capital, Lorenz dominates the former distribution, so that all measures of inequality and concentration increase, i.e. the distribution of wages widens and it does so progressively as we move towards the top end.

We extend our analysis by considering whether these conclusions might be modified by

allowing skill acquisition, so that a rising skill-wage gradient will cause people to choose skill levels more bunched at the top. We incorporate a model of skill acquisition choices with isoelastic costs and show the differences in chosen skill levels (between people with different underlying abilities) progressively widen rather than contract in response to widening pay differentials. This means that endogenous skill acquisition choices amplify, rather than offset, the effects of of capital cost falls upon concentration.

The two principal alternative explanations of widening inequality popular in the literature are trade liberalisation and skill-biased technical change (Helpman *et al.*, 2012; Feenstra and Hanson, 1996; and many other studies). The latter explanation is related to the capital cheapening argument; but the trade liberalisation explanation is different, as it hinges on changes in output prices. Specifically, as OECD countries' exports are comparatively capital-intensive relative to their imports, trade expansion will result for them in a relative increase in the demand (and price) of capital-intensive products. Using a variant of our model in which different degrees of capital intensity are associated with distinct output varieties, we show that such trade-induced output price changes may also operate through a capital-skill complementarity mechanism to increase wage concentration.

We finally proceed to calibrate versions of the two model variants, based upon an underlying Fréchet distribution of abilities, to observed changes in the distribution of incomes in a few representative economies. These exercises show that the capital-skill complementarity mechanism we describe can provide a plausible explanation for those observed changes.