Comments on "Robots and labour: implications for inflation dynamics"

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Summary

This paper investigates how the investment in robots affects labour market variables such as productivity, wages and employment, and vice versa. It contributes to this important subject in two ways. First, it enlarges the panel data set that encompass 29 industries and 33 countries by including China, India, Japan and Korea into EUKLEMS. Second, and more importantly, it incorporates the quality of robots by exploiting the price data from *Statistics on manipulator and robots by order, production and shipment* published by the Japanese Robot Association. This price data is applied (ie extrapolated) to other countries assuming that the firms' production technology in different countries is identical as long as they are in the same industry. The paper uses three empirical methodologies: cross-sectional regression, panel regression and panel vector autoregression (VAR). The empirical results establish a strong correlation between the labour market variables and robot investment.

Comments

VAR with sign restrictions

The regression establishes the correlation, but not the causality. The panel VAR, based on the Choleski decomposition, attempts to identify the causality. However, according to the VAR estimates, the results do not significantly depend on the ordering of variables – ie regardless of which moves first, the labour-market or the investment in robots variable. This could mean that the causality runs both ways, or that the ordering restriction based on the contemporaneous correlation does not provide much power in distinguishing the causality. Instead, I would like to suggest an alternative method – the identification of supply and demand shocks based on sign restrictions (eg Canova (2007)).

Firms adopt robots for various reasons. Depending on the nature of production technology, the robots can be a complement or substitute for labour – it can enhance the productivity of labour or replace it altogether. Either way, such technological progress shifts the labour demand curve. Firms may adopt robots because of the high cost of labour (eg a lack of an appropriate workforce or an increase in wage). These events can be interpreted as inward shifts of the labour supply curve in that industry.

Consider a three variable VAR that comprises price of labour (wage or labour productivity), quantity (employment or hours) and robot investment. If the labour

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demand curve shifts, the price (wage) and quantity (hours) would move in the same direction (along the upward-sloping labour supply curve). If the labour supply shifts, the price and quantity would move in the opposite direction (along the downward marginal product of labour). This framework allows us to examine the causes of investment in robots by supply and/or demand factors.

Cross-industry analysis

With the rich data on hand, the authors might be able to test the so-called "routine-biased technological progress hypothesis" put forward by Autor et al (2006) and Acemoglu and Autor (2011). For example, by exploiting the cross-industry variations of employment shares of the routine-task occupation (based on the classification used by Autor et al (2011)), one can ask whether the robot investments have been particularly strong in an industry where a large share of employment engaged in the routine tasks.

Aggregate vs disaggregate analysis

Robots may replace jobs in some industries. However, from an aggregate point of view, the robot-producing firms create jobs. Moreover, history has shown us that industrial revolutions have created new types of jobs that could not be foreseen at the time. Thus, it is important to distinguish between aggregate effect and industry effect. It would be interesting to estimate the aggregate employment effect of robot investment – or the spillover effect of robot investment across industries. Finally, it would be also interesting to estimate the effects of robot investment on the relative wages and/or employment across industries.

References

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