

# Better, faster, stronger: how trade liberalisation fosters global innovation

Karen-Helene Ulltveit-Moe, Andreas Moxnes and  
Federica Coelli present new evidence on the benefits of  
freer trade in terms of growth and innovation

**F**ree trade is under fire, with evidence documenting the distributional impacts and labour adjustment costs of trade liberalisation mounting. This column instead presents new evidence on the benefits of freer trade in terms of growth and innovation. It points to gains that could be lost if support for globalisation is not maintained.

Innovation is considered a major force in economic growth. It goes without saying that understanding how we can encourage innovation is essential (Keuschnigg 2016). Governments allocate substantial resources to industrial policy initiatives aimed at promoting innovation. In a recent paper we study the impact of another type of innovation policy, namely, trade policy (Coelli et al. 2016). The research question is simple but important: does trade liberalisation encourage innovation and, if so, to what extent? Despite its relevance, this is an issue that so far has not been the subject of rigorous analysis.

To provide an answer to this question, we investigate the impact of what is commonly referred to as the ‘Great Liberalisation’ of the 1990s (Estevadeordal and Taylor 2013), in the aftermath of the GATT Uruguay Round, on firm-level innovation worldwide.

Our results show that declining tariffs during the 1990s had a large positive net impact on innovation. According to our estimates, around 7% of the increase in global knowledge over this period can be attributed to freer trade. More broadly, our results point to substantial dynamic gains from trade – gains which are typically difficult to observe or quantify. The results also support existing evidence (eg. Bøler et al. 2015, Moxnes et al. 2012) showing the importance of trade policy for innovation and productivity.

### **From trade liberalisation to innovation**

According to economic theory, trade liberalisation affects innovation through two channels: improved market access, and increased competition. Better access to markets abroad raises profits and may therefore lead to more in-

novation. A more competitive marketplace can also foster innovation due to an increased threat to monopoly rents, which may induce incumbent firms to innovate more in order to 'escape' competition (Aghion et al. 1997, 2005). On the other hand, the fundamental Schumpeterian force implies that competition lowers price-cost margins, thereby reducing the rents from innovation and the incentives to innovate (Aghion et al. 1992). Hence, the net impact of trade liberalisation on innovation remains an empirical question.

During the 1990s, tariffs in both developing and developed countries came down substantially. Those reductions were predominantly a result of the GATT Uruguay Round, spanning the years 1986 to 1994 and phased in from 1995 to 2000, but also a result of regional trade agreements and unilateral liberalisation. On average, developed country tariffs were cut from around 8% to around 3%, while developing country tariffs were cut from 25% to less than 15% between 1990 and 2000 (Estevadeordal and Taylor 2013).

We use the Great Liberalisation as a quasi-natural experiment and estimate the causal impact of diminishing tariffs on innovation by using firm-level variation in country and industry exposure prior to the tariff cuts. Intuitively, a firm

*Our findings underscore the importance of trade policy for firms' long-term performance and for aggregate economic growth*

located in Germany and selling to the US and Mexico is affected differently than a Japanese firm selling to China and South Korea because tariff cuts vary across countries and industries. Furthermore, a German firm selling only to Germany is again affected differently because that firm does not immediately benefit from improved market access abroad but is potentially hurt by fiercer import competition in its home market.

### Using patents to measure innovation and country exposure

The data requirements for a global analysis of innovation is large. Ideally we would need a firm-level panel data set on innovation over a long time period, along with detailed information on where firms are located and in which markets they sell in.

To measure firms' innovation and knowledge stock we use information on patenting worldwide provided by the database PATSTAT, which was established by the European Patent Office. PATSTAT offers bibliographic data, family links and citations of 90 million patents applications from nearly 100 countries. It contains the population of all patents globally since the mid-1960s. We observe the name of the applicant and date of filing, and if and when the patent was granted. We know the geography of the patent in the sense that we have information on both residence country of the applicant and the country of the patent authority (USPTO, EPO, JPO, etc.).

PATSTAT allows us to construct a global and comprehensive firm-level data set and to follow the patenting activity of a firm through time. Patenting is known to be highly correlated with innovation and R&D (eg. Griliches 1990), and we also document a close relationship between R&D expenditure and patenting for a subsample of our data set. For our purpose, there is one major advantage of using patents: it is the only data source that allows for a comprehensive analysis of global innovation over a long-time period.

Figure 1. Patenting, 1980-2004

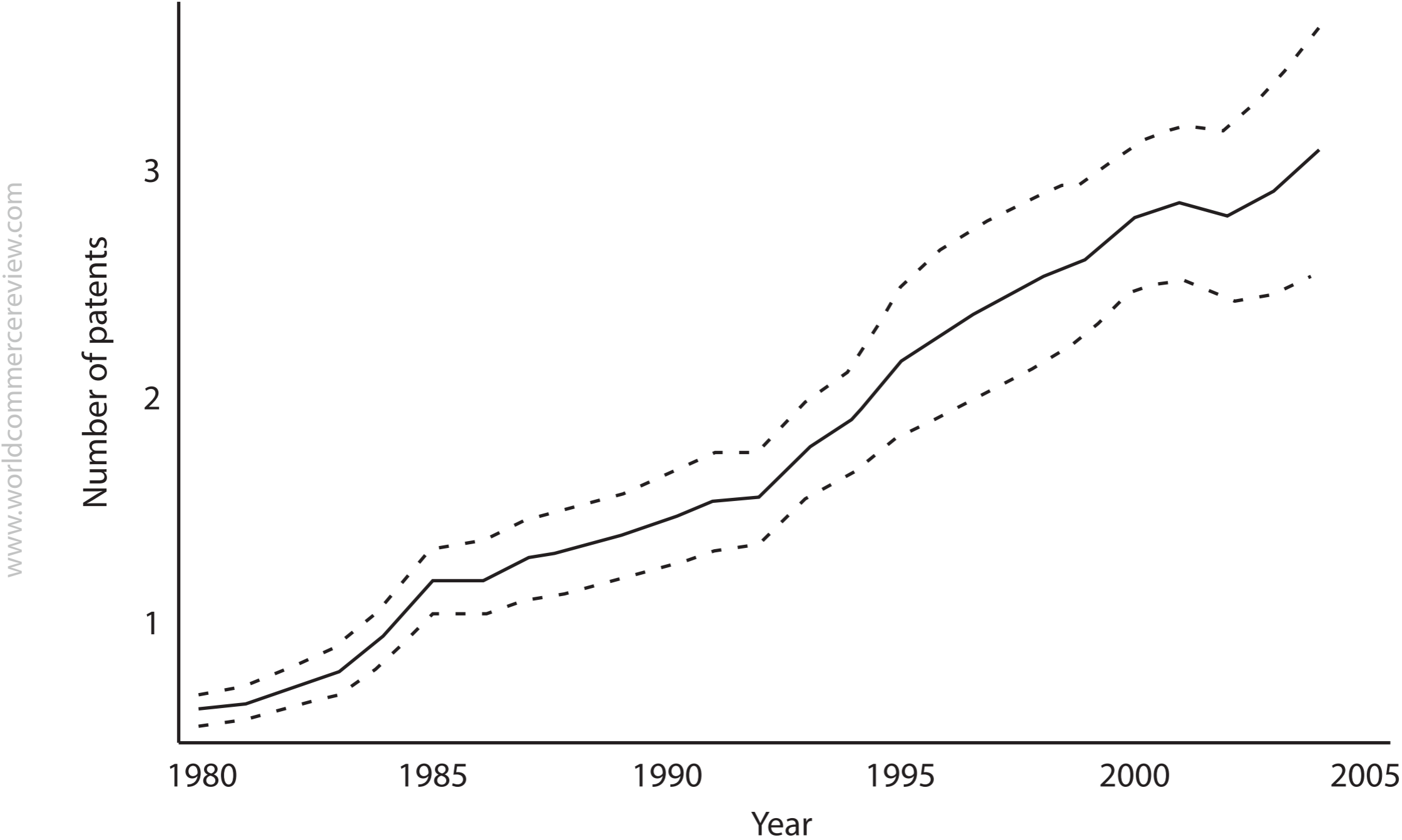


Figure 1 shows the mean number of patents filed by year for our balanced sample of firms. We observe that the mean number of patents increases steadily from 1980 and onwards, but at a higher rate from the beginning of the 1990s.

In order to investigate the impact of trade liberalisation on innovation, we need information on firms' market exposure. We do not directly observe which markets firms sell in, but we do observe where firms are patenting.

This is a good proxy for sales because firms typically file patents in the markets where they sell their goods to ensure protection for the underlying inventions. We observe nearly every firm worldwide that files a patent, in what countries they file, along with their industry and home country affiliation. Hence, the patent data does not only allow us to measure the knowledge stock of each firm, but also to create measures of each firm's exposure to markets worldwide.

### **Freer trade and more innovation**

Our results show that freer trade has a large positive net impact on innovation. Figure 2 summarises our main findings graphically. The figure plots demeaned changes in firm-specific tariffs ( $T$ ) versus demeaned changes in the log stock of knowledge ( $K$ ) over the 1992-2000 period. We find a strong and negative causal relationship between tariff reduction and innovation.

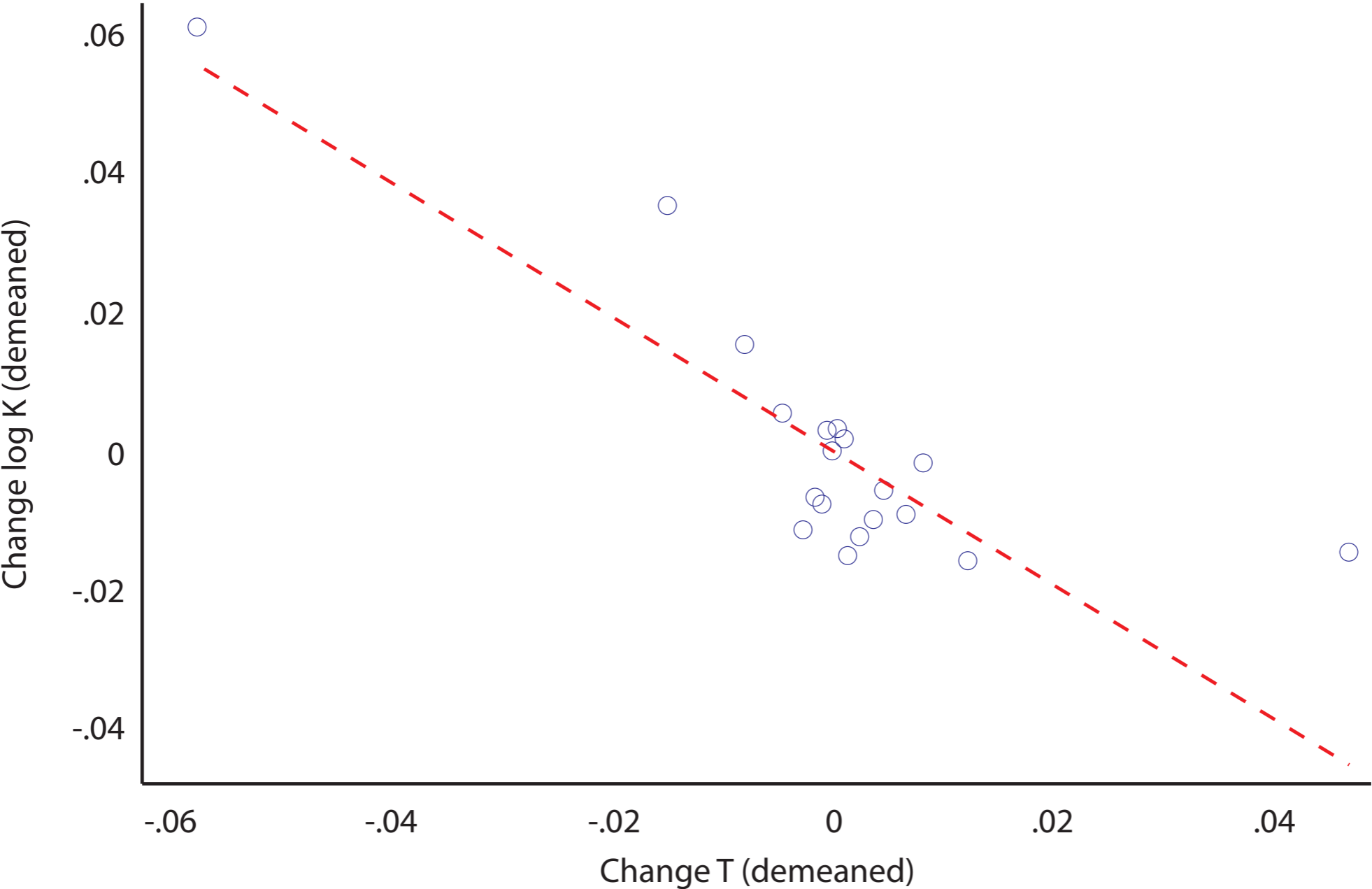
Our findings underscore the importance of trade policy for firms' long-term performance and for aggregate economic growth. Moreover, we find that both improved market access and tougher import competition have positive effects on innovation. The economic magnitude of the two mechanisms is similar.

Our study points to large dynamic gains from trade; gains that are typically not observed and therefore neglected in empirical analyses. ■



Figure 2. The effect of trade policy on innovation

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