

CCP Working Paper Policy Briefing

Title: Innovation and growth in the UK pharmaceuticals: the case of product and marketing introductions¹

KEYWORDS: Pharmaceuticals, growth, product differentiation, non-linear pricing

BACKGROUND

- Theoretical literature suggests a positive relationship between innovation and growth, but the empirical literature has reported mixed results with positive links only in some situations, and conditional on firm characteristics. Size, scope, and experience are important factors in determining how much innovative activity a firm undertakes, and whether it results in successful innovation or not. We investigate the innovation-growth link in the context of pharmaceutical business units -- firm operations within a therapeutic class - and highlight the role of product and marketing innovations which differ in their appropriability conditions, how they affect growth in the short and long run, and by the size of the business unit.
- When a firm introduces a new drug within the same therapeutic class it does so by either changing the molecule or the formulation, which typically requires costly and risky R&D activity to receive marketing approval. Such innovations often enjoy patent and marketing exclusivity, and can serve a patient base for which earlier drugs were less suitable. Instead, introducing an additional strength or pack size requires less medical research (as safety and efficacy of the original molecule/formulation are already established) but it may require further marketing research for placement and pricing strategy. Accordingly, we think of the new drug with an alternative molecule/formulation as product innovation, and new pack as a marketing innovation that allows price discrimination and expect the two strategies will have differential impact on growth due to appropriability conditions.
- Specifically, we investigate if:
 - Introducing additional products or packs increases sales growth;
 - Revenue growth is higher for new products relative to new packs;
 - Introduction of new products and packs are substitute strategies for revenue growth;
 - Small business units have a higher revenue growth from innovation than larger business units.

METHODOLOGY

- We use quarterly sales data from the UK pharmaceutical prescription market during the 2003-2014 period in a dynamic lag adjustment growth model to measure firms' growth by therapeutic class, i.e., by the business unit, and identify the impact of additional product forms and of new pack varieties on growth. We treat the introduction of new products and packs as potentially endogenous and instrument for these variables in a dynamic growth model.
- The primary difficulty regarding identification is that growth in previous periods may have an impact on both the current growth, and product and marketing innovations by the business unit. Moreover, other unobserved factors may explain changes in these variables. To overcome this problem, we use the lagged values of growth in the specification but also use a firm's propensity to introduce products and packs – as measured by the average values of these same variables in other periods and related anatomical classes – as instruments for the endogenous variables.

¹ An earlier version of this paper was distributed as “Growth and returns to new products and pack varieties: the case of UK pharmaceuticals”.

KEY FINDINGS

- Our main result is that both the introduction of additional drugs (product innovations) and additional packs (marketing innovations) have a significant impact on revenue growth for the business unit, and that the magnitude is larger for product innovations. New drugs also contribute to the growth in the long run since sales keep increasing, perhaps because more patients switch to the newer formulation. On the other hand, additional packs contribute only to short run growth. Further, product and marketing innovations appear to be substitute strategies.
- We also find that smaller business units grow faster than larger ones. Further, for an existing combination of products and varieties, an additional product leads to greater growth for the smaller business units than for the larger ones. This may be because smaller business units may be introducing more innovative drugs than larger ones. However, the marginal effects with respect to pack variety are not only smaller but also do not statistically differ by size of the business unit.

POLICY ISSUES

- Small firms are important for job creation and growth as they intensify competition. We find that small entities (small business units) are able to get higher returns from innovations, vis-à-vis growth opportunities, particularly product innovations, compared to their larger counterparts. In part this may be because they introduce more innovative products. The fact that small business units receive a higher return from product innovations than large business units are evocative of a dynamic market.
- Looking at both the long and short run, we find that both product and marketing innovations have a significant impact on revenue growth, with a magnitude larger for new drugs than new packs. A finding of interest is that new products generate persistent growth -- evidence that product innovation is a robust driving force for business unit growth -- whereas marketing innovations contribute only to short run growth. However producing only short run growth is not *per se* a bad business strategy. In fact, due to price regulation for branded drugs, marketing innovations can be a profitable short-term business strategy.

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