

Advertising affects firms' innovation and sales, and long-run economic growth

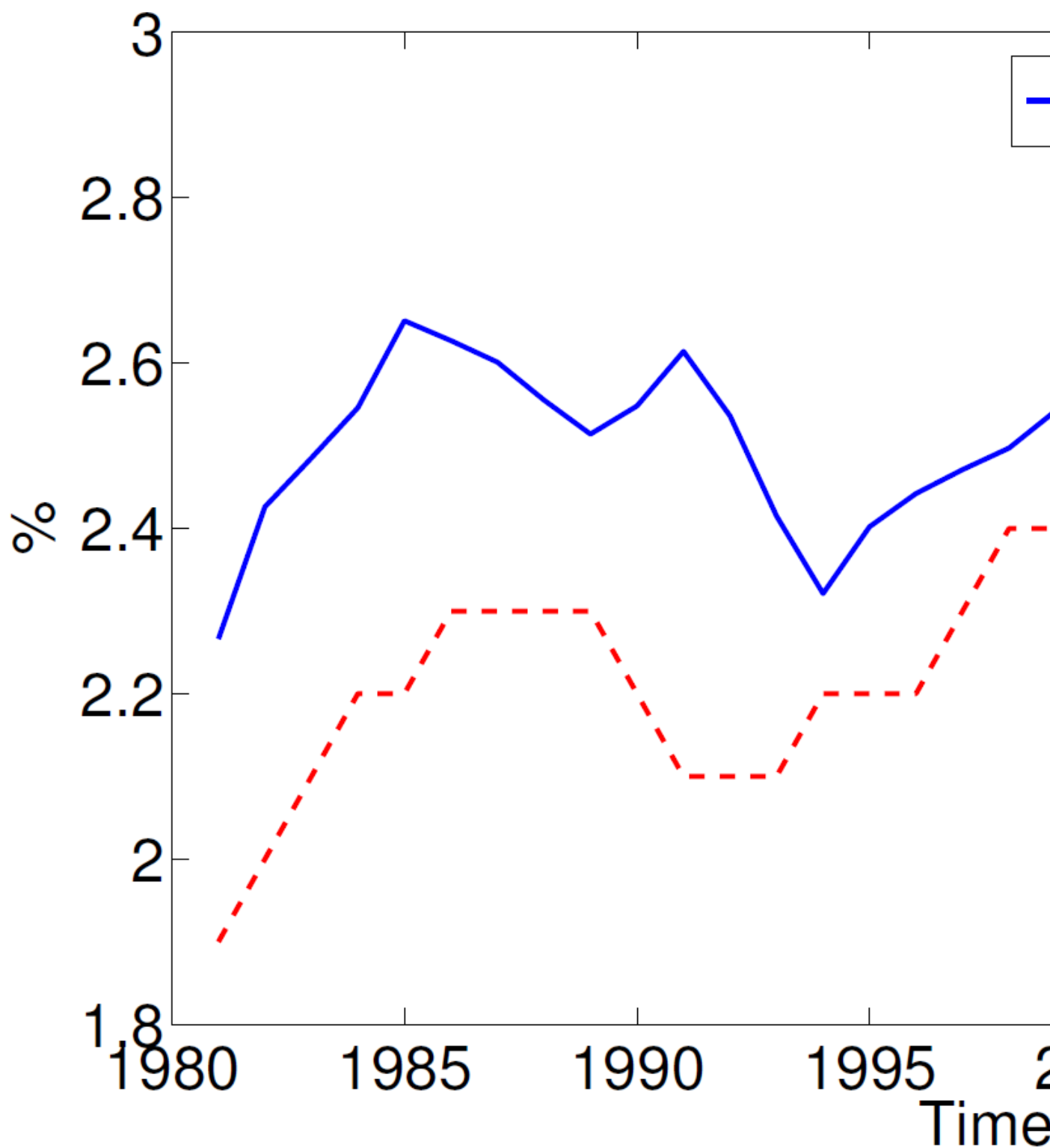
*The interaction between advertising and innovation incentives at the firm level can alter aggregate economic measures. When advertising costs decrease, firms reallocate resources away from R&D and towards advertising, hurting long-run economic growth. **Laurent Cavenaile** and **Pau Roldan-Blanco** write that understanding the relationship between R&D and advertising might help explain the success of industrial policies aimed at generating economic growth and raising living standards.*

Spending on innovation is important for business success but also for the aggregate economy, as a source of improved living standards. It is therefore key to understand what affects investment in research and development (R&D) at the firm level and how it translates into innovation. Innovation can result in the improvement of the quality of a firm's existing products (e.g., the successive innovations from Apple's original iPhone into its latest version), but it can also allow a firm to enter a new product market and potentially displace existing producers (e.g., Nokia's displacement from the mobile phone market by competing smartphones such as the iPhone). In turn, entering firms can either be start-ups or incumbent firms that are already active in other product markets. Understanding the role of these different types of innovation is key for explaining the life cycle of firms. In addition, it is also crucial for public policy design (for instance, the design of targeted R&D subsidies) to understand what type of firms are responsible for each type of R&D and innovation.

From a firm's perspective, R&D investment is driven by the prospect of higher revenues and profits from either selling higher-quality products, decreasing the costs of production, or selling a new product altogether. Firm spending in R&D in the US accounts for around two per cent of GDP. Yet, while R&D is one tool that firms can use to attract demand towards their products, it is certainly not the only one. For instance, firms in the US spend a similar share of GDP on advertising every year (see Figure 1). By advertising their products, firms can provide information to potential customers, affect the perception that consumers have about the quality and desirability of their products and shift demand towards their company.

In a recent paper ([Cavenaile and Roldan-Blanco, 2021](#)), we investigate how the cost of advertising interacts with the incentives for firms to invest in R&D and innovate. We find that advertising opportunities affect firm growth significantly, not only through their direct effect on product demand, but also indirectly through the incentives to innovate on existing products vis-a-vis new product lines. At the micro level, we explore how these incentives change over the life cycle of the firm. In the aggregate, we find that the interaction between advertising and innovation incentives at the firm level can alter aggregate innovation, business dynamics, long-term economic growth, and the standards of living.

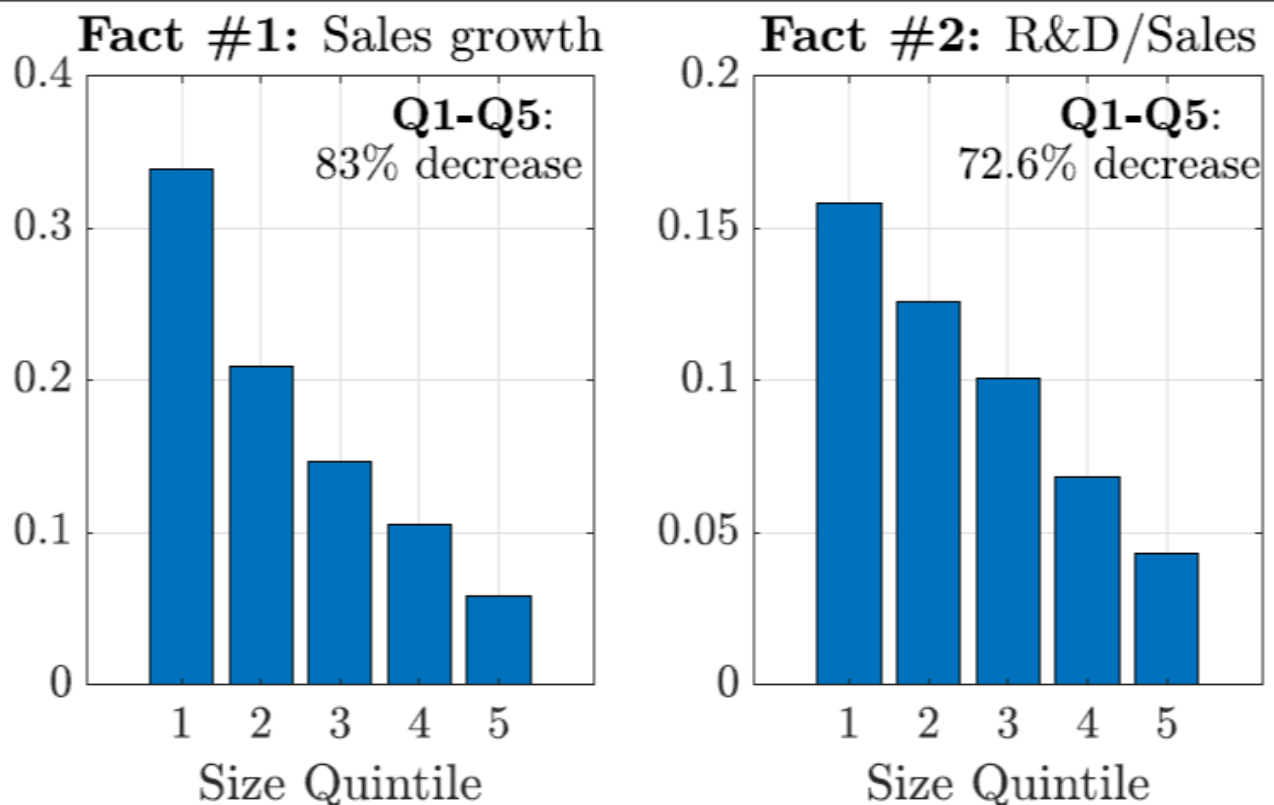
Figure 1. R&D and advertising expenditures as a share of GDP (US)



Data source: OECD and Coen Structured Advertising Expenditure Dataset, respectively (<http://www.purplemotes.net/2008/09/14/us-advertising-expenditure-data/>). The data include advertising expenditures on TV, newspapers, radio, magazines, telephone directories, the Internet, direct mail, billboard and outdoor advertising, and business papers (trade press). The data do not include other forms of marketing, for instance brand sponsorship, sales promotion, or interactive marketing.

Using financial statement information from Compustat, we highlight some empirical regularities regarding the relationship between firm size and sales growth and R&D and advertising investment for innovative firms in the United States. Figure 2 shows that, compared to smaller firms, larger firms tend to grow relatively more slowly (Fact #1), and they invest relatively less in R&D (Fact #2). The lower R&D intensity of larger firms has been proposed as an explanation for their relatively slower growth in the literature (see e.g. [Akcigit and Kerr, 2018](#)). By contrast, we connect these two facts with the behaviour of advertising at the firm level. We observe that larger firms invest relatively less in advertising on average (Fact #3) and, interestingly, that the ratio of advertising to R&D expenses decreases with firm size (Fact #4). In other words, firms tend to substitute advertising for R&D as they grow larger.

Figure 2: Average firm growth, R&D intensity, advertising intensity, and R&D-advertising ratio across firm sale quintiles, and percentage decrease from first to fifth quintile



Data source: Compustat. Notes: Firms are ranked in sales quintiles according to their normalized level of sales (sales as a ratio of average sales in the same year). R&D and advertising intensities are measured as the ratio of total R&D and advertising expenditures to total sales within each group.

Using a quantitative model of endogenous growth and firm dynamics, we show that these facts can be reconciled by well-known features of the returns to advertising. In particular, we model advertising in a way that captures the concept of “umbrella branding” (see, for instance, [Erdem 1998](#) and [Erdem and Sun 2002](#)). According to this concept, firms that have several products under the same brand name benefit from positive spillovers of advertising between those products. For example, Apple’s advertising on the iPhone not only attracts demand toward the iPhone, but also positively affects the perception that consumers have of other products that are sold under the same brand name (such as the iPad or the MacBook). In other words, by having more products in their portfolio, firms can reduce the per-product cost of attracting more customers.

When the marginal reduction in per-product advertising cost is larger for an initially smaller product portfolio size, this induces stronger incentives for smaller firms (i.e., firms with fewer products) to invest into expanding their product portfolio through R&D and innovation. Using our quantitative model, we show that these positive and decreasing marginal gains in advertising spillovers can explain around 61 per cent of the negative relationship between firm size and R&D intensity (Fact #2) and around 50 per cent of the negative relationship between firm size and firm growth (Fact #1). In addition, our model suggests that almost a third of dispersion in firm sales can be explained by differences in perceived product quality that are related to advertising.

Advertising can also have important aggregate implications for long-run economic growth and welfare. Our model predicts that advertising and R&D are substitutes at the firm level: a decrease in the cost of advertising (for instance, due to improved information and communication technologies such as the internet) leads firms to reallocate resources away from R&D and towards advertising. As a result, advertising is shown to be detrimental to long-run economic growth in our model. We confirm this substitutability between R&D and advertising using US data on R&D subsidies.

These results have important policy implications. First, since advertising is shown to be detrimental to long-run economic growth, a tax on advertising might potentially be welfare-improving. Our results, however, show that the gains are very limited for reasonable tax rates, ruling out advertising taxes as a viable policy to generate economic growth. Second, R&D subsidies are more effective at raising firms' R&D investment and aggregate growth in the presence of advertising, compared to an economy in which firms cannot advertise their products. Therefore, understanding the role of advertising in shaping firm R&D behaviour and growth is crucial for the implementation of R&D subsidies

Our empirical and quantitative analysis shows that understanding the relationship between R&D and advertising might be important for explaining firm dynamics as well as the success of industrial policies aimed at generating economic growth and raising living standards. In ongoing research ([Cavenaile, Celik, Roldan-Blanco and Tian, 2021](#)), we further explore how the interaction between R&D and advertising can affect market structure, competition and price markups. All in all, this line of research has just begun to scratch the surface of the potential interactions between different types of firm intangibles, and their impact for the aggregate economy.



Notes:

- This blog post is based on [Advertising, Innovation, and Economic Growth](#), *American Economic Journal: Macroeconomics*, Vol. 13, No 3, July 2021
- The post expresses the views of its author(s), not the position of LSE Business Review or the London School of Economics.
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