



# Do foreign mergers and acquisitions boost firm productivity? ☆



Marc Schiffbauer<sup>a,\*</sup>, Iulia Siedschlag<sup>b,c</sup>, Frances Ruane<sup>b,c</sup>

<sup>a</sup> World Bank, United States

<sup>b</sup> Economic and Social Research Institute, Ireland

<sup>c</sup> Department of Economics, Trinity College Dublin, Ireland

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## ABSTRACT

This paper examines the causal relationship between foreign mergers and acquisitions (M & A) and the productivity of acquired firms using micro-data from the UK over the period 1999–2007. Our results suggest a significant heterogeneity in the total factor productivity (TFP) effects of foreign M & A at the industry level. Overall, we uncover a systematic pattern of post-acquisition TFP effects that is consistent with the most recent theoretical models of firm heterogeneity and cross-border mergers and acquisitions as mode of foreign entry. Furthermore, we find positive aggregate effects on labor productivity due to capital deepening but not due to changes in TFP.

## 1. Introduction

A large empirical evidence has established that foreign-owned firms are more productive than domestic firms.<sup>1</sup> However, separating the effects of foreign ownership from other firm-specific factors appears to be difficult. More recent studies have shown that a large part of this productivity differential is between multinational firms and non-multinationals.<sup>2</sup> Furthermore, the higher productivity of foreign-owned multinationals observed at the economy-wide level might simply reflect the fact that they are concentrated in high productivity sectors (Griffith, Redding, & Simpson, 2004). Moreover, most of these studies do not distinguish between foreign greenfield investment and mergers and acquisitions (M & A).

Foreign M & A implying a change from domestic to foreign owners provide an appropriate framework to isolate effects of foreign ownership. However, existing empirical evidence on the causal link between foreign M & A and firm productivity is inconclusive. To the extent that foreign investors acquire the best performing firms, the productivity advantage might not be associated with foreign ownership *per se*. Harris and Robinson (2003) provide empirical evidence showing that foreign

investors tend to acquire firms with higher productivity in comparison with other manufacturing firms in the UK. Additional evidence on *cherry picking* of high productivity firms by foreign acquirers in the UK is provided by Criscuolo and Martin (2009), Girma (2005), Girma and Görg (2004), Hanley and Zervos (2007). Relevant evidence from other advanced economies include Ilmakunnas and Maliranta (2004) for Finland; Fukao, Ito, and Kwon (2005) for Japan; Bellak, Pfaffermayr, and Wild (2006) for Austria; Benfratello and Sembenelli (2006) for Italy; Mattes (2010) for Germany; Balsvik and Haller (2010) for Norway; Bandick (2011) for Sweden. However, other studies find no evidence for such an effect in the UK (Conyon, Girma, Thompson, & Wright, 2002; Girma & Görg, 2007) or in other developed countries (Gioia and Thomsen, 2004 or Denmark; Piscitello & Rabbiosi, 2005 for Italy; Karpaty, 2007 for Sweden; Bertrand & Zitouna, 2008 for France; Chari et al. (2009) for the US; Arndt & Mattes, 2010 for Germany). While a number of studies have found positive effects of foreign M & A on firm productivity (Lichtenberg & Siegel, 1987 for the US; Conyon et al., 2002 for the UK; Arnold & Javorcik, 2009, for Indonesia; Bertrand & Zitouna, 2008, in the case of France) other research has found that acquired firms do not reap any benefit from

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\* Corresponding author.

E-mail address: [mschiffbauer@worldbank.org](mailto:mschiffbauer@worldbank.org) (M. Schiffbauer).

<sup>1</sup> See, for example, Doms and Bradford Jensen (1998) for the US; Driffeld (1997), Girma and Görg (2007), Griffith and Simpson (2001), for the UK; De Backer and Sleuwaegen (2005) for Belgium; Pfaffermayr and Bellak (2002) for Austria; and Ruane and Ugur (2004) for Ireland.

<sup>2</sup> See, for example, Griffith (1999); Kafourous, Buckley, and Clegg (2012), Temouri, Driffeld, and Higon (2008); Borin and Mancini (2016), Castellani, Montresor, Schubert, and Vezzani (2016).

foreign ownership (Harris & Robinson, 2003, for the UK), has rejected a causal link (Barba Navaretti & Venables, 2004) or has found a positive effect only in the case of US multinationals (Benfratello & Sembenelli, 2006). Girma and Görg (2002) examine the effect in two specific industries in the UK. They find that foreign acquisitions had positive effects on firm productivity in the food sector but negative in electronics. Siedschlag, Kaitila, McQuinn, and Zhang (2014) provide additional evidence based on comparable firm-level data from six advanced small open economies over the period 2001–2009: Austria, Belgium, the Netherlands, Denmark, Finland, and Sweden. The evidence indicates that foreign acquisitions had stronger effects on firm performance in services than in manufacturing. However, the effects of foreign acquisitions on productivity vary across the analyzed countries. This study finds that foreign acquisitions have led to productivity gains in Austria, Denmark, and Sweden while in Belgium and the Netherlands the link has been negative, and in Finland there has been no significant effect.

This paper examines the causal relationship between foreign mergers and acquisitions and firm productivity in the United Kingdom (UK) in the short and the longer run. Since the existing empirical evidence is inconclusive, we also address the following additional research questions to shed more light on the source of the ambiguity in the results: what is the profile of firms which are acquired by or merged with foreign-owned firms? To what extent do the effects on firm productivity vary by the country of origin of the acquiring/merging firm? How do the effects vary at industry level? Do the answers depend on the particular measure of firm productivity?

We focus our analysis on the UK where the number of M & A deals has been large especially in the period up to 2007. In the aftermath of the economic and financial crisis, cross-border mergers and acquisitions activity has contracted sharply.<sup>3</sup> Given the large volatility in the activity of cross-border mergers and acquisitions in the post-crisis period, we limit our analysis on the pre-crisis period from 1999 until 2007.<sup>4</sup> Over this period we identify more than 10,000 mergers and acquisitions in the UK of which foreign takeovers account for a quarter of all deals.

Measuring the effect of foreign acquisition on firm productivity raises two major econometric issues. First, foreign investors may acquire better performing firms (selection bias). To address this selection bias we analyze the causal effect of foreign acquisition on UK firm productivity by using propensity score matching following Rosenbaum and Rubin (1983) combined with difference-in-difference estimators (Heckman, Ichimura, & Todd, 1997). Second, the derivation of firm productivity (total factor productivity) involves several measurement issues. Therefore, we determine total factor productivity (TFP) by means of production function estimations at the three-digit industry level. We follow the approach of Olley and Pakes (1996) which generates unbiased industry level input elasticities by controlling for the correlation between unobserved productivity shocks and firm inputs. In addition, we use three alternative firm productivity measures as a robustness check: a multilateral TFP index based on Caves, Christensen, and Diewert (1982), TFP based on conventional OLS production function estimations, and labor productivity.

Our contribution to the literature is threefold. First, we use improved econometric techniques to uncover the causal effect of

foreign ownership on firm productivity. Second, in comparison with existing studies, we use a richer data set which effectively covers all firms in the UK including over 2000 foreign M & A over the period 1999–2007. Third, we explore the theoretical suggestion of Nocke and Yeaple (2007) that attributes the heterogeneous effects of foreign acquisitions on firm productivity to industry-specific characteristics of the acquiring firm.

We find no long-run effects of foreign ownership on firm TFP in the UK at the aggregate level. However, we do find significant heterogeneity in the effect of foreign M & A on the productivity of acquired firms at the industry level. This heterogeneity across industries potentially explains the absence of positive TFP effects at the aggregate level. Moreover, following Nocke and Yeaple (2007) we classify acquiring firms as R & D- and marketing-intensive. Overall, we uncover a systematic pattern of post-acquisition TFP effects that is consistent with the most recent theoretical models of firm heterogeneity and cross-border mergers and acquisitions as mode of foreign entry. Finally, at the aggregate level, we find that foreign acquisitions had positive effects on labor productivity due to capital deepening. This points to the potentially misleading results from using labor productivity instead of TFP to measure the causal impact of foreign M & A through technology or organizational spillovers on the performance of acquired firms in the UK.

The remainder of this paper is organized as follows. Section 2 reviews the relevant theoretical literature and derives the hypotheses to be tested in this empirical analysis. The next section discusses the empirical methodology we use to explore the causal relationship between foreign acquisitions and firm productivity. Section 4 specifies the data and our different approaches to measure firm productivity. Section 5 discusses our empirical results. Finally Section 6 concludes.

## 2. Theoretical background and testable hypotheses

The early theoretical literature on foreign direct investment known as the Ownership-Location-Internalization (OLI) framework (Caves, 1974; Dunning, 1977; Vernon, 1966) has focused on three characteristics of multinational firms that are likely to explain their better performance in comparison to domestic-owned firms. These characteristics are: (i) large endowments of intangible assets that compensate for the lack of local knowledge (of markets, consumer preferences and business practices), hence allowing successful competition with domestic firms; (ii) location advantages that arise from being located in a foreign country rather than exporting to it; and (iii) advantages from internalizing technology rather than licensing it to foreign producers. These elements have been formalized in seminal papers by Helpman (1984), Helpman and Krugman (1985), Markusen (1984, 1995, 2002), Markusen and Venables (1997, 1998). More recently, Helpman, Melitz, and Yeaple (2004) show that in the presence of fixed costs to exporting and to undertaking foreign direct investment, in equilibrium, heterogeneous firms can be ordered in terms of productivity, as follows: the least productive exit, the more productive firms serve only the domestic market, the next more productive serve the domestic market and export, and the most productive firms serve the domestic market and undertake foreign direct investment. Accordingly, it follows that in their country of origin multinationals are the most productive firms.

This literature explores the effect of foreign ownership on firm productivity not distinguishing formally whether it refers to greenfield investment or foreign M & A. However, the paper by Nocke and Yeaple (2007) focuses explicitly on the relationship between cross-border M & A as a mode of entry into foreign markets and efficiency of firms. The authors show that either the most or the least productive firms acquire foreign targets. In particular, their model predicts that foreign acquirers operating in R & D-intensive industries represent the most productive firms in the corresponding industries in their home country while foreign acquirers operating in marketing-intensive industries

<sup>3</sup> International evidence provided by UNCTAD (2009, 2015) indicates that cross-border M & A peaked in 2007 in developed economies as well as in the UK. In 2008, the number of cross-border M & A deals in the UK fell by 10% in comparison to 2007, followed by a further contraction by 40% in 2009 relative to 2008. In 2015 the number of cross-border M & A deals was still 14% lower than their peak in 2007. The cross-border M & A sales in the UK were down by 57% in 2015 compared to 2007.

<sup>4</sup> The choice of this period for the analysis is related to the data on cross-border mergers and acquisitions available to us. An additional factor for the choice of the analysed period is the change in the European Union classification of economic activities (NACE) in 2008. This change impacts on the comparability of the effects of foreign acquisitions in manufacturing and services before and after 2008.

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