

Expatriate CEOs and Firm Performance: The Role of General Skills, Investment and Exporting Ability*

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Abstract

We estimate the effect of expatriate CEOs on firm performance using Hungarian administrative data. Comparing firms with expatriate and local CEOs following a foreign acquisition, we find that expatriates increase TFP by 8.5% and sales by 118%. Interpreting these effects through the lens of an industry equilibrium model reveals that 87% of revenue gains stem from TFP improvements, with capital deepening and export market access contributing 10% and 3%. The decomposition is similar across sectors, except export gains are absent in nontradable sectors. Our results suggest that expatriates create value primarily through superior general management skills.

JEL classification: F23, F61, L25

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1 Introduction

Many multinational enterprises (MNEs) send expatriate managers to run their foreign subsidiaries, even though these assignments are costly (Harvey & Moeller 2009). This widespread practice suggests that expatriates bring important benefits, and research has identified three potential channels through which expatriates add value: they may possess superior general management skills, have better knowledge of parent firm processes and priorities and be loyal to the parent company, or connect more effectively with international markets. While evidence exists for each mechanism, the overall causal effect of expatriate managers and the relative importance of these channels remain poorly understood.

The fundamental challenge in estimating the causal effect of expatriate management is that foreign acquisitions involve simultaneous changes: new ownership, new management, reorganization, and integration into global value chains. These confounding factors make it difficult to isolate the specific contribution of expatriate CEOs. Moreover, headquarters consider many factors, most unobservable to the researcher, when deciding whether to send an expatriate manager. As a result, subsidiaries with expatriate CEOs are not directly comparable to those with local CEOs. The challenge lies not merely in documenting the positive correlation between expatriates and firm performance but in identifying the causal effect separate from other changes accompanying foreign acquisition and understanding through which specific channels these improvements materialize.

This paper addresses both challenges. We develop a structural framework which recognizes that expatriates can create value through multiple channels simultaneously, and we decompose the effect of expatriates on firm growth into three channels: general management skills (captured by total factor productivity (TFP)), parent-specific advantages (reflected in capital allocation), and international market expertise (measured by export

price premiums). TFP is perhaps the best measure of general management skills: it controls for all inputs and reflects technical efficiency and management practices (Syverson 2011, Verhoogen 2023), making it unlikely to be driven by export connections or parent company loyalty. Capital allocation can be seen as a measure of trust in the loyalty of the CEO, while exporting measures the CEO’s general knowledge of foreign markets and also the ability to provide intermediate inputs to the parent company in case of vertical integration. Our decomposition is based on a novel staggered difference-in-differences strategy, an extension of Callaway & Sant’Anna (2021), which describes how firms react to the arrival of an expatriate CEO.

Our model is a standard industry competition model with Cobb-Douglas production and monopolistic competition, which allows us to derive closed-form solutions for managerial choices and estimate the structural parameters from the data. We assume that CEOs take capital stock as given, with investment decisions made by the parent company rather than subsidiary management. This is a realistic assumption for foreign acquisitions where headquarters typically control capital allocation, though good CEOs may indirectly influence it. A second important assumption concerns output prices. We model better export capabilities of expatriates by a firm-specific export demand shifter that increases the output price in foreign markets. When firms have better export market access, they optimally shift sales toward foreign markets, resulting in higher export and lower domestic revenue shares. Managers optimize variable inputs (labor and materials) to maximize profits, facing downward-sloping demand curves in output markets while acting as price-takers in input markets. This approach accounts for the fact that better managers will hire more inputs. The model results in an accounting decomposition of revenue growth into changes in TFP, capital, and export prices which are multiplied by their corresponding revenue elasticities.¹

We use novel administrative data on foreign-acquired firms in Hungary and their CEOs. Hungary provides an ideal setting for this analysis: as a transition economy later integrated into the common European market, it has attracted substantial foreign in-

¹In the empirical analysis we estimate the elasticities with the method developed by Olley & Pakes (1996), which addresses the simultaneity of inputs and output, as well as the bias arising from firm exit.

vestment while maintaining detailed administrative records. Our data setup has three distinctive features that enable credible identification. First, it covers all listed and unlisted corporations that were acquired by foreign owners between 1990 and 2019. Thus, our comprehensive sample is dictated by our research design and not the convenience of observing particular types of firms. Second, the longitudinal nature of our data allows us to track firms before and after foreign takeover and to conduct event study analyses. Third, we observe the identity of the CEO of each corporation and we can use this information to precisely time the arrival of new CEOs and to classify them as expatriates based on their names and first recorded addresses.

These data features enable us to construct a comparison group that diminishes several potential biases. Rather than comparing expatriate-managed firms to all other firms, we limit our analysis to firms that were acquired by foreign owners. Specifically, we compare the post-acquisition performance of firms acquired by foreigners that hired an expatriate CEO with those that did not (either retained the incumbent or replaced with a local CEO).² We find that this natural comparison group is, for most observables, similar from would-be expatriate firms before the acquisition. As we argue below, our method can credibly identify the effect of *hiring* an expatriate CEO, which is the *joint decision* of the owner and the CEO. Without more detailed data or experimental variation, we cannot distinguish whether the expatriate effects are due to decisions made by the owner or by the CEO.

To estimate the effect of expatriate CEOs on the components in the decomposition, we exploit variation in the type of CEO (expatriate or local) after foreign acquisition. We employ a difference-in-differences method that addresses recent critiques of two-way fixed effects estimators with staggered treatment. The key insight is that we compare changes in outcomes for two groups of firms identical in all observable respects except one: *both were acquired by foreign owners in the same year*, but one group hired an expatriate CEO while the other maintained local management. This avoids post-treatment differences in

²We study acquisitions where the acquirer is from a developed country. This choice is partly data-driven: 84% of foreign acquisitions in our sample originate from such countries. In addition, prior research shows that development distance between countries correlates with acquisition effects (Earle et al. 2018). We therefore focus on the most prevalent and economically comparable segment of foreign acquisitions.

timing that can bias traditional TWFE estimates under staggered adoption. The local-management group thus serves as a control group for the expatriate-CEO group, ensuring comparisons within the same acquisition cohort and event time. Standard two-way fixed effects estimators cannot be applied without modification to this dual-treatment design where all firms receive treatment (foreign acquisition with an expatriate or local CEO); our approach adapts the framework laid out in Callaway & Sant’Anna (2021) to handle this specific comparison structure.

Our method rules out several potential sources of bias, such as the foreign acquisition effect, headquarter-subsidiary fixed effects, and the combined effect of the time of the treatment and the time passed since the treatment. The remaining threat to identification is that new owners systematically send expatriate managers to subsidiaries with better unobservable prospects. Our event studies address this concern directly: performance measures break sharply at the time of management change, with no pre-trends.³ This pattern is inconsistent with selection on anticipated future performance and supports a causal interpretation.

We find that expatriate CEOs increase sales by 118%. TFP rises by 8.5% and capital stock by 48%, the latter indicating the foreign owners are more willing to invest in expatriate-led subsidiaries. These effects are remarkably similar across tradable and nontradable sectors. Export prices grow by about 19%, but this effect is restricted to the tradable sectors. These patterns strongly suggest that expatriates possess superior general management skills beyond their international expertise.

The structural decomposition quantifies the relative importance of each mechanism for sales growth by multiplying the estimated effects with the corresponding elasticities. TFP improvements account for 87% of this gain, with capital deepening contributing about 10% and export price effects the remaining 3%. This dominance of productivity effects over international connections challenges the conventional view of expatriates as primarily valuable for their global networks. Instead, our findings suggest that MNEs

³The sole exception is the domestic share of sales, which has a negative pre-trend, suggesting that expatriate CEOs are placed in firms with higher than average exporting. We circumvent this problem by looking at tradable and nontradable sectors separately, therefore shutting down the exporting channel in the latter group.

deploy expatriates mainly to transfer superior management practices to their subsidiaries, with international market access serving as a complementary but secondary benefit.

The predominance of general management skills in our decomposition aligns with several explanations for why expatriates might be superior managers. Expatriates are chosen from a larger, international talent pool (Selmer 2001), have expertise working in multinational companies, and can transfer best practices from headquarters to subsidiaries (Cho 2018, Heyman et al. 2019). They may also face stronger career incentives: expatriate assignments typically last only a few years, and success in managing a subsidiary can lead to promotion at headquarters. These career concerns create high-powered incentives and help mitigate agency problems between parent and subsidiary (Grossman & Hart 1986).

While smaller than the general management effect, the other channels in our decomposition are also substantial. Expatriates' understanding of parent firm processes (Collings et al. 2019) and role as guardians of parent interests (Kostova et al. 2018) likely explain the increased capital investments we observe. Their experience in international markets (Mion & Opromolla 2014, Meinen et al. 2022) drives the export growth, particularly when subsidiaries become integrated into parent company supply chains. Our framework shows that these mechanisms operate simultaneously, with their combined effect producing the large revenue gains from expatriate management.

These findings contribute to several strands of literature. We advance the emerging research on expatriate managers' impacts on firm performance. The subsidiaries of Japanese MNEs with expatriate managers have superior performance only in developed, but not in developing countries (Ando 2014) and this effect declines with the cultural distance from the host country (Gong 2003). In the United Kingdom, MNEs with expatriate managers do not fare better than other firms, but domestic firms with expatriate managers do (Exadaktylos et al. 2024). Closest to our approach are Cho (2018) and Heyman et al. (2019), two papers which employ panel data methods to diminish selection effects. Cho (2018) finds that the affiliates of South Korean MNEs experience a faster labor productivity growth if they are staffed with Korean managers.⁴ Heyman et al. (2019) exploit the

⁴Nonetheless, the two papers differ in many respects. Cho (2018) has information on sales within production networks, which we do not have access to. Our measure of productivity (TFP) accounts for

variation in general management skills across source countries of MNEs active in Sweden. They find that firms with parents from countries with high management scores are more productive. They do not, however, study the presence of expatriate managers in MNE affiliates, which may be the key mechanism to adopt the superior management practices.

Related work examines the role of ethnic and cultural alignment between owners and managers. Hjort, Song & Yenkey (forthcoming) shows with data from Kenya that investors systematically favor firms managed by coethnics despite earning lower risk-adjusted returns, suggesting that ethnic biases can lead to misallocation of capital. This finding is particularly relevant for our study as we identify manager ethnicity from names to distinguish expatriates from locals, and our foreign acquirers may similarly prefer managers from their home country for non-performance reasons. However, unlike the Kenyan context where coethnic bias reduces firm value, we find that expatriate managers increase productivity and sales. Hjort, Li & Sarsons (forthcoming) documents another form of headquarters-subsidiary linkage: wage spillovers from multinational headquarters to foreign operations, particularly affecting low-skill workers. While their focus is on wage transmission, this mechanism could complement our findings if expatriate managers serve as conduits for transferring not just wages but also management practices from headquarters. Our contribution differs by focusing on the productivity effects of expatriate management and by decomposing the channels through which expatriates create value—finding that general management skills, rather than just headquarters alignment, drive most of the performance gains.

Beyond the expatriate context, a broader literature has examined the extent to which CEOs and other managerial inputs shape firm outcomes. This literature demonstrates that CEO identity matters (Bennedsen et al. 2020, Huber et al. 2021, Koren et al. 2025), that their managing styles shape firm behavior (Bandiera et al. 2020), that good CEO training increases firm performance (Bloom et al. 2013, Giorcelli 2019), and that per-

the impact of new investment, while labor productivity may still be influenced by it. The South Korean sample consists of the subsidiaries of MNEs in many countries, while we study the subsidiaries of HQs from many countries settled in Hungary. We study the expatriate effect in nontradable sectors separately as these are less affected by the knowledge of international markets. Our estimation method incorporates the results of the two-way fixed effects literature that has emerged in the last several years.

sonality traits also matter (Kaplan et al. 2022). Fenizia (2022) shows in the U.S. public sector that managers account for a large share of productivity variation, while Metcalfe et al. (2023) find that store managers explain a quarter of performance dispersion in a large U.S. retail chain. Most closely related, Bijmans et al. (2025) use Belgian VAT transaction data to show that management consulting raises firm-level labor productivity by about 3.6% over five years. Their evidence highlights that managerial know-how can be transferred through temporary interventions, while our findings emphasize that expatriate CEOs embody sustained managerial capital within the firm’s leadership structure. This difference likely explains why we find much larger productivity effects, particularly in a context such as Hungary where baseline management practices are weaker.

2 Modeling Framework

To quantify the various mechanisms through which expatriate managers affect firm performance, we introduce a simple modeling framework. We follow De Loecker (2011), and model industry competition between internationally engaged firms that differ in a variety of supply and demand shifters. To simplify the analysis, we assume a Cobb-Douglas production function with capital, labor and intermediate inputs and monopolistic competition with isoelastic demand in both domestic and international markets. The framework helps us derive input and output choices of managers as a function of their structural shocks.

Firm i in year t can produce output Q_{it} using a Cobb-Douglas production function of capital K_{it} , labor L_{it} and intermediate inputs M_{it} ,

$$Q_{it} = \Omega_{it} K_{it}^{\alpha} L_{it}^{\beta} M_{it}^{\gamma}. \quad (1)$$

The elasticities α , β and γ are assumed to be constant both across firms and over time, but may differ across sectors in our empirical application. Firms differ in a Hicks-neutral total-factor productivity Ω_{it} . Because production is Cobb-Douglas, any factor-specific productivity can be expressed as Hicks neutral.

On the demand side, firms face an isoelastic residual demand for their product in both

the domestic and the foreign market. This can be microfounded by a constant-elasticity-of-substitution demand system, in which each firm is infinitesimally small. More specifically, if firm i wants to sell $Q_{it,D}$ amount in the domestic market, it has to set a price

$$P_{it,D} = P_{t,D} Q_{it,D}^{-1/\sigma}, \quad (2)$$

where $P_{t,D}$ is a demand shifter common across firms, and σ is the own-price elasticity of demand. Similarly, inverse demand in foreign markets depends on the quantity the firm wants to sell there,

$$P_{it,F} = P_{t,F} \Lambda_{it} Q_{it,F}^{-1/\sigma}, \quad (3)$$

with $P_{t,F}$ as the market-specific demand shifter. Here we also allow for a firm-specific demand shifter Λ_{it} to allow for the possibility that some firms face better export demand conditions than others (Kee & Krishna 2008, Demidova et al. 2012).⁵ As a special case, this formulation also nests the possibility of not being able to export at all, by setting $\Lambda_{it} = 0$ for a particular firm.

Demand for the firm's product is downward sloping and potentially different across the two markets. As a result, the firm will direct its output to the two markets in optimal proportions so as not to hit the diminishing demand too fast in any one market.

To close the model, we assume that firms are price takers in input markets. They face wages W_t and intermediate input prices ϱ_t . We do not model investment explicitly, assuming that managers take the capital stock as given. This assumption is relevant for targets of foreign acquisitions, where investment decisions are often made by the parent company (owner) rather than by the manager of the target (Fama & Jensen 1983, Jensen & Meckling 1976, Bloom et al. 2012, 2019, Koren et al. 2025). The owner, however, can change its investment policy when the manager is replaced, which we will capture in our empirical analysis.

This framework nests various mechanisms through which expatriate managers can affect firm performance. They can increase Ω_{it} by adopting better management practices

⁵We could also add a firm-specific demand shifter to the domestic market but, in absence of quantity data, it would be indistinguishable from a TFP shifter.

or new technologies (Bloom et al. 2013, Bandiera et al. 2020). They can improve foreign market access Λ_{it} by relying on their existing business network or integrating the firm in a supply chain (Mion & Opromolla 2014, Meinen et al. 2022). And they can attract more capital K_{it} by being more loyal to, or better monitored by, the parent company (Kostova et al. 2018).

We are now ready to characterize the industry equilibrium. Managers maximize profits taking Ω_{it} , $P_{t,D}$, $P_{t,F}$, Λ_{it} , W_t , ϱ_t , and K_{it} as given. We express input and output choices as a function of these parameters and show how to recover the parameters from the data.

2.1 Market composition of output

As is standard in these types of models, the demand and the production side of the profit maximization problem can be analyzed separately. We start with the choice of which market to sell to.

Suppose the firm has decided to produce Q_{it} units of output (this will be an equilibrium outcome). How much of this should it sell in the domestic and how much in the foreign market? Let S_{it} denote the domestic share in output, $Q_{it,D}/Q_{it}$. We can write total revenue of the firm as the sum of revenues in the two markets,

$$R_{it} = P_{it,D}Q_{it,D} + P_{it,F}Q_{it,F} = Q_{it}^{1-1/\sigma} [P_{t,D}S_{it}^{1-1/\sigma} + P_{t,F}\Lambda_{it}(1 - S_{it})^{1-1/\sigma}], \quad (4)$$

where we have made use of the isoelastic nature of demand. The term in brackets, which we denote by

$$\Phi_{it} = P_{t,D}S_{it}^{1-1/\sigma} + P_{t,F}\Lambda_{it}(1 - S_{it})^{1-1/\sigma}, \quad (5)$$

is the weighted average price in the two markets when the firm wants to sell one unit. With more units, the price will go down with the inverse elasticity of demand.

Holding fixed the physical quantity of output produced (and hence production costs), the firm will maximize revenue as a function of the domestic share,

$$\max_{S_{it}} Q_{it}^{1-1/\sigma} \Phi_{it}(S_{it}), \quad (6)$$

which amounts to maximizing the average price in the two markets, irrespective of the quantity produced. The first-order condition for revenue maximization is $d\Phi_{it}/dS_{it} = 0$, with the solution

$$S_{it}^* = \frac{P_{t,D}^\sigma}{(P_{t,F}\Lambda_{it})^\sigma + P_{t,D}^\sigma}. \quad (7)$$

The optimal domestic share in sales only depends on the demand shifters. It is increasing in domestic demand and decreasing in foreign demand, including the firm-specific demand shock. Intuitively, the firm wants to equalize the prices it receives in the two markets, so if a particular market has a higher demand, it will direct more sales there. When the elasticity of demand σ is high, the optimal share is more sensitive to the demand shocks. At the extreme, as σ approaches infinity, the firm only wants to sell in the market with the higher price. In all other cases, the solution will be interior with $S_{it}^* \in (0, 1]$. Note that $S_{it}^* = 1$ is possible when $\Lambda_{it} = 0$, which may be the case if the manager is unable to export at all (for example, does not speak a foreign language, does not have foreign business connections). Because prices are equalized across markets, S_{it}^* is both the quantity and the revenue share in domestic markets. As we claimed above, the optimal share is independent of the produced quantity, Q_{it} .

With the optimal domestic market share, the average price achieved in the two markets can be written as

$$\Phi_{it}^* = [P_{t,D}^\sigma + (P_{t,F}\Lambda_{it})^\sigma]^{1/\sigma}. \quad (8)$$

Notice that this is homogeneous of degree one in $P_{t,D}$ and $P_{t,F}$ and is equal to $P_{t,D}$ whenever $\Lambda_{it} = 0$ (nonexporting firms). The average price increases with firm-specific export demand Λ_{it} . To anticipate our estimable equations, we can also write the average price as a decreasing function of the optimal domestic share,

$$\Phi_{it}^* = P_{t,D} \cdot S_{it}^{*-1/\sigma}. \quad (9)$$

Given an estimate of σ (see Section 4), we can recover the firm-specific export price from

the domestic share and the common price shifters as

$$\Lambda_{it} = \frac{P_{t,D}}{P_{t,F}} \left(\frac{1 - S_{it}}{S_{it}} \right)^{1/\sigma}.$$

2.2 Input choices

The firm is price taker in all its input markets. Maximizing profits will imply equalizing the value marginal product of an input to its price. Because the firm faces downward sloping demand in its output markets, the value marginal product uses the marginal revenue, not the price (De Loecker 2011). Formally, the firm maximizes revenue minus production cost,

$$\max_{L_{it}, M_{it}} \Phi_{it}^* Q_{it}^{1-1/\sigma} - W_{it} L_{it} - \varrho_{it} M_{it}. \quad (10)$$

The first-order conditions for labor and material inputs are

$$\beta(1 - 1/\sigma) \Phi_{it}^* Q_{it}^{1-1/\sigma} / L_{it} = W_t, \quad (11)$$

$$\gamma(1 - 1/\sigma) \Phi_{it}^* Q_{it}^{1-1/\sigma} / M_{it} = \varrho_t. \quad (12)$$

Introducing the notations $\tilde{\alpha} := (1 - 1/\sigma)\alpha$, $\tilde{\beta} := (1 - 1/\sigma)\beta$, $\tilde{\gamma} := (1 - 1/\sigma)\gamma$, $\chi := (1 - \tilde{\beta} - \tilde{\gamma})$, and $\tilde{\Omega}_{it} = \Omega_{it}^{1-1/\sigma}$, we can solve for optimal employment and intermediate input usage as

$$L_{it} = \left(\tilde{\beta} \Phi_{it}^* \tilde{\Omega}_{it} \right)^{1/\chi} K_{it}^{\tilde{\alpha}/\chi} (\gamma/\beta)^{\tilde{\gamma}/\chi} W_t^{(\tilde{\gamma}-1)/\chi} \varrho_t^{-\tilde{\gamma}/\chi}, \quad (13)$$

$$M_{it} = \left(\tilde{\gamma} \Phi_{it}^* \tilde{\Omega}_{it} \right)^{1/\chi} K_{it}^{\tilde{\alpha}/\chi} (\beta/\gamma)^{\tilde{\beta}/\chi} W_t^{-\tilde{\beta}/\chi} \varrho_t^{(\tilde{\beta}-1)/\chi}. \quad (14)$$

Substituting in, the optimal revenue is

$$R_{it} = \tilde{\beta}^{\tilde{\beta}/\chi} \tilde{\gamma}^{\tilde{\gamma}/\chi} \left(\Phi_{it}^* \tilde{\Omega}_{it} K_{it}^{\tilde{\alpha}} \right)^{1/\chi} \varrho_t^{-\tilde{\gamma}/\chi} W_t^{-\tilde{\beta}/\chi}. \quad (15)$$

Revenue of the firm is increasing in its average price Φ_{it}^* , TFP $\tilde{\Omega}_{it}$, and capital K_{it} , and decreasing in the prices of labor and intermediate inputs. Because $\chi < 1$, the elasticity

of revenue with respect to price and TFP is greater than one. The intuition is that any difference in price or productivity can be leveraged by hiring more variable inputs, which leads to a more than proportional increase in revenue. The elasticity is the inverse of χ , the share of quasi-rents to fixed inputs in revenue.

2.3 Decomposing the expatriate effect

Our goal is to assess the effect of expatriate CEOs on firm behavior. For this, take a firm which replaces its CEO with an expatriate and compare it to a firm that does not. The impact of the expatriate CEO on revenue can be derived with the logarithmic transformation of equation (15):

$$r_{it} = c + \frac{1}{\chi} \left(p_{t,D} - \frac{1}{\sigma} s_{it}^* + \tilde{\omega}_{it} + \tilde{\alpha} k_{it} - \tilde{\gamma} \rho_t - \tilde{\beta} w_t \right), \quad (16)$$

where lowercase variables denote logarithms of their uppercase counterparts and c is a constant only depending on parameters. We have substituted in the optimal domestic share from equation (9). By assumption, the CEO can influence three of the right-hand side variables: the share of domestic sales, TFP, and the value of capital. Firms can also receive common shocks which are not related to the CEO change.

Let Δx denote the difference-in-differences estimator of an outcome variable x , with $\Delta x = E(x_{\text{after}} - x_{\text{before}} | \text{expat CEO}) - E(x_{\text{after}} - x_{\text{before}} | \text{no expat CEO})$ (we discuss the estimation in Section 4). Subtracting the terms that are common across firms, we get

$$\Delta r = \frac{\tilde{\alpha}}{\chi} \Delta k - \frac{1}{\sigma \chi} \Delta s^* + \frac{1}{\chi} \Delta \tilde{\omega}. \quad (17)$$

How do expatriate CEOs affect Δr , the difference in revenue between their company and one led by a local CEO? They can obtain more capital from the parent company, increase export prices (and hence reduce the domestic share of sales), and improve TFP. The quantitative contributions of these effects add up to the total increase in revenue. We can hence decompose the expatriate effect into these three components.

3 Data Construction

3.1 Data on CEOs

Data on managers originates from an administrative dataset compiled and maintained by the Hungarian Corporate Court (HUN-REN KRTK 2024a). According to Hungarian Corporate Law (*Cégtörvény* 1997), businesses have to maintain accurate public records about their corporation at county courts. Among other relevant information such as owners and business locations, companies must register all individuals who can represent the company in legal or business matters (“representatives”). Such representatives include CEOs, other managers and directors of the company, but also legal counsels and lower-ranked employees with signatory rights.⁶

Electronic court records start in 1992 and the last year we use is 2019. The data also contain the starting date of service for the representatives even if this date is before 1992, which allows extending the time span of the data. In this subsection we outline the procedures employed to construct an operational dataset from the raw data.

Information on representatives includes a number of personal identifiers, such as name, mother’s name, birth date, and home address. Before 2010, the data contains no numerical identifier uniquely identifying the person. Court records constitute a *temporal database*, which means that each entry has an effective date interval. Over the decades covered by our sample, new entries are added not only at times of hiring, firing and change in corporate position, but also when any individual identifier changes or when the reporting requirements change. For example, if a representative moves to a new address, she gets a new entry. An additional complication is that effective dates are not always filled in.

Our first task was to identify which of the predominantly text-based records referred to the same person as a company representative. This *entity resolution* enabled us to assign a unique identifier to each person and to track them over time within a firm and across firms. We then had to solve three problems to obtain our analysis dataset: (1) setting the period of service in a given position, (2) identifying CEOs, and (3) identifying

⁶In rare cases, such as when the firm is in bankruptcy proceedings, the representative may be a legal entity. We exclude these cases.

expatriates.

Period of service. We set the starting and ending dates of each manager in a given position by filling in missing dates from the available neighboring records. Corporate Court records are entered sequentially, so we can set bounds on missing starting and ending dates. For example, if a manager is recorded to leave, after which a new manager is registered without a starting date, we impute her starting date as the day on which the previous manager left (note that end dates are treated as exclusive in Hungarian corporate records, so the successor’s tenure begins immediately after the predecessor’s tenure ends without overlap). At the edges of the list, we use information about the firm’s life cycle: if the firm was established in June 1993, we can assume its first representative also started then, even if this is not recorded in the data.

As the financial information is reported annually, there is no reason to use within-year changes in management. We create an annual panel of managers by keeping the records which include June 21 (so the start date of the position is before, and the end date later than June 21 of the given year).

CEOs. Firm representatives always include the CEO, but can also include lower ranked managers and other employees with signatory rights. The precise occupation of the manager is not recorded in a standardized way. Instead, there are many expressions for the same occupation. Chief executives (“managing directors”) should, in principle, always be flagged as such. If we have this information, we use it. For firms that do not report a CEO in a given period, we proceed as follows.

If there are three or fewer representatives at the firm in a given year, we assume that all of them are CEOs. If there are still no CEOs at the firm (because there were more than three representatives), but one of the representatives was a CEO in the past, we set this person to be the CEO. In our final sample, 76% of firms have one CEO in the year before foreign acquisition, 17% have two, the rest have three or more. We drop all firms with 15 or more CEOs throughout the sample period. Firms led by co-CEOs may be real,

but can also be the result of our data cleaning.⁷

In our analysis, we are interested in the replacement of CEOs by the new foreign owner. In the case of multiple CEOs, we classify an event as “CEO change” whenever a new CEO was hired, irrespective of what happened to the other CEOs.⁸

Expatriates. Finally, we classify whether the CEO is local or foreign (“expatriate”) with the help of both the name of the representative and her first recorded home address.

Several peculiarities of Hungarian names help us differentiate local managers from expatriates. First, Hungarian law restricts the selection of first names for its citizens to a predetermined list (*Törvény az anyakönyvi eljárásról* 2010).⁹ Second, Hungarian follows the Eastern name order (placing the family name first and the given names last) so even with internationalized given names, we can distinguish the Hungarian version. Third, many names have accents or otherwise different spelling from international variants, further aiding differentiation. For example, “Richter Éva” would be classified as a Hungarian name, because the last word is an approved Hungarian given name and the name order is Eastern. At the same time, “Eva Richter” would be classified as a foreign name. After the visual inspection of several hundred entries coded as Hungarian or foreign individuals, we are confident in the quality of this segmentation algorithm.

The use of the home address of the CEO poses both an opportunity and a challenge. The opportunity is that if the home address of a CEO is foreign, we can also classify the sending country by its overall level of development. To ensure comparability and focus on the most economically relevant cases, we restrict our analysis to acquisitions by firms from developed countries that are both significant investors in Hungary and technologically advanced.¹⁰ The challenge is that CEOs often move to the place of their

⁷Research shows that this leadership structure is uncommon, but exists in public firms in the US (Krause et al. 2015), but we did not find any study showing the prevalence of co-CEOs among private firms. As our estimation method hinges upon the identification of new hiring and expatriate CEOs and not the number of executives, this potential data deficiency does not affect our results.

⁸Including CEO firings in the definition of “CEO change” does not affect our results.

⁹If parents belong to an ethnic minority, they may choose names from a different list. Since Hungary is ethnically fairly homogeneous and parents belonging to ethnic minority groups often choose Hungarian names, this does not affect our algorithm much.

¹⁰We included Austria, Belgium, Canada, Denmark, France, Germany, Ireland, Israel, Italy, Japan, Korea, the Netherlands, Norway, Spain, Sweden, Switzerland, the United Kingdom, and the United States as sending countries. This restriction eliminates 16% of expatriate CEOs in the broader foreign

company, and we would only observe their Hungarian address. We overcome this difficulty by concentrating on the first recorded address of CEOs.

If a person has both a Hungarian name and address, we classify her as local. Similarly, if both the name and the address are foreign, we classify the CEO as expatriate. We have reviewed the names of all 133 CEOs in our foreign acquisition sample with a foreign name and a Hungarian address. We found 14 CEOs to be Hungarian (misclassified due to unusual given names or misspellings) and 78 to have names in languages of our sending countries (German, English and Italian being the most common). The remaining 41 CEOs with names from other countries were excluded.

3.2 Data on companies and sample construction

Company data. We use the financial statements of the population of Hungarian double-entry bookkeeping firms for the period between 1992 and 2019, as well as several other variables – employment, the location and main activity of the firm and the share capital owned by domestic and foreign entities (HUN-REN KRTK 2024b).¹¹ We augment the company data with balance sheet information for the period between 1986-1991. These data are recorded according to the Socialist bookkeeping, but all the key variables used in this analysis are included (ownership only for 1990 and 1991, but there were very few foreign-owned companies in the eighties).

We transform ownership shares into dummy variables. We define a firm as foreign-owned if the majority of its share capital is owned by foreigners.¹² We also consider a firm as foreign-owned if it is owned by a foreign subsidiary registered in Hungary.

Final sample. We link the managerial data to the financial statements with the help of the company tax identifier. This eight-digit identifier can change during reorganizations, but we can link the same firm over time even if they changed their identifier.

acquisition sample.

¹¹Up to 2002, there is a significant number of small firms that did not engage in double-entry bookkeeping while in the latter period the number of such firms radically declines. Single-entry bookkeeping firms are predominantly very small and would not be included in our data anyway.

¹²Other thresholds, such as 10%, lead to a very similar number of foreign firms.

We keep only firms with an average employment of at least 10 employees for the years included in the sample, as foreign ownership and expatriate managers are scarce among very small firms. We drop firms with more than 15 CEOs during the studied period, as these likely reflect data quality issues or unusual organizational structures. We only use firm-years with non-missing data for sales, employment, tangible assets and material costs. We exclude firms in agriculture, mining, construction, and financial services, as these sectors have distinct characteristics that may confound our analysis. We construct four large sectors: manufacturing (NACE sector “C”), wholesale, retail trade and transportation (NACE sectors “G” and “H”), tradable services (NACE sectors “J” and “M”) and nontradable services (all other services except finance). We aggregate the sectors for two reasons. First, we estimate the structural parameters of the production function and product demand, which are likely to vary across sectors. Second, this aggregation allows us to test the behavior of expatriate CEOs in firms operating in tradable and nontradable sectors, which is particularly interesting for examining expatriate behavior in sectors where the export channel is effectively closed. Since our focus is on decomposing the expatriate effect on firm revenue into TFP, capital, and exporting effects, sectoral variation in these mechanisms is economically important.

To ensure clean identification and a control group similar to the treated firms (i.e., those with an expatriate CEO), we keep in the data only foreign acquisitions: we focus on firms that start as domestic-owned and experience at most one foreign acquisition. Specifically, we drop firms with more than two ownership transitions and require firms to begin as domestic-owned with at most two ownership spells (domestic, then foreign-owned). If the firm was later divested, we drop the years after the divestment. This makes foreign acquisition a permanent treatment in our sample.

Close to the acquisition time most, but not all, CEO replacements took place in the same year with the acquisition itself. If the expatriate CEO arrived a year “early” or a year “late,” relative to the time of acquisition, we adjusted the time of acquisition to match the arrival of the new CEO. In other words, we believe CEO starting dates to be more accurate than reported changes in foreign ownership. We drop firms where the

expatriate manager arrived two or more years before the ownership change. To maintain clean treatment definitions, if an expatriate CEO was later replaced with a local CEO, we drop the firm-years after the expatriate departure. We also exclude firms where a local CEO hired at acquisition was later replaced by an expatriate. We allow, however, for expat-to-expat and local-to-local transitions within the same treatment group.

We use the resulting sample to estimate the parameters of the production function. Because foreign acquisitions may change many aspects of firm behavior, we only use pre-acquisition data for this estimation. For the analysis of expatriate CEOs, we drop firms with more than 15 CEOs during the studied period, as these likely reflect data quality issues or unusual organizational structures. We only use firm-years with non-missing data for sales, employment, tangible assets and material costs. To concentrate on the period around the acquisition, we trim the data and keep a time window of 4 years before and 4 years after the acquisition; together with the acquisition year, we have nine-year-long spells.

The final sample has 1,974 firms, out of which 1,523 got a local and 451 an expatriate CEO at the time of the acquisition. The number of firm-years is 15,317. The average number of pre- and post-acquisition years is 3.4 and 4.2, respectively. The mean and median number of employees in our sample is 93 and 30. The number of acquisitions is similar in the decade of 1990-1999 and 2000-2009 and smaller in the last 9 years of study. Expatriates were somewhat more prevalent in the first decade studied, but they are present in every decade.¹³

3.3 Descriptive statistics

Table 1 presents the means and standard deviations of several variables for firms with a local and expatriate CEO in the year before acquisition. Expatriate CEOs manage larger firms than locals by both employment and the value of tangible assets, but they have

¹³During the nineties, the main vehicle of FDI was the privatization of state-owned enterprises. In our data, 12% (234 firms) of the acquisitions are privatization transactions, out of which 215 firms got a local and 19 an expatriate CEO. Exclusion of the privatization transactions from the analysis leads to similar conclusions, with the expatriate effect on capital being somewhat smaller, and on total and domestic sales larger.

lower sales. For example, the average number of employees is 85 in firms with a future local CEO and 126 in those with an expatriate CEO. Expatriate led companies are also more export oriented as the share of exports in total sales is 23%, which is 11 percentage points larger than firms that obtain a local CEO. Finally, expatriates take over firms that are less productive.

These differences become less pronounced when we consider all these factors together, demonstrating that our control group is rather similar to the treatment group, at least in observable characteristics. In Table 2 we present the estimated coefficients of a linear probability model with the dependent variable indicating expatriate CEO and explanatory variables being the firm characteristics before acquisition: employment size, capital, productivity and export share. In Column 1 we also add a dummy variable for early acquisition (before 2000) and three dummy variables for the aggregated sectors we use in the analysis. We replace these dummy variables in the second column with a full set of 2-digit industry-year fixed effects and also control for the year of acquisition. Expatriate CEOs are more prevalent in manufacturing and tradable services and in the early period. We find small size differences between the two groups before the acquisition: the coefficient of labor is small and insignificant, while that of capital is also small. Firms to be led by expatriates are less productive, but the magnitude of the variable is quite small: 10% higher productivity increases the chance of getting an expatriate CEO by only 0.24 percentage points. The only sizable difference between the two groups is exporting, as expatriate firms export more already before acquisition by 6 percentage points (but the estimated coefficient is insignificant).

4 Estimation Method

4.1 Production function estimation

We estimate equation (16) to quantify effects of expatriate CEOs on firm revenue. This requires the estimation of the parameters of the revenue function, $\tilde{\alpha}$, χ and σ , the recovery of TFP, $\tilde{\omega}$, and the appropriate comparison of firms with expatriate and local CEOs. To

this end, we proceed in three steps.

First, we follow Gandhi et al. (2020) and Koren et al. (2025) to compute the scaled elasticities of revenue with respect to variable inputs: labor, $\tilde{\beta} = (1 - 1/\sigma)\beta$, and material, $\tilde{\gamma} = (1 - 1/\sigma)\gamma$, as the share of these inputs in revenue. This follows directly from the first-order condition of the firm. The input shares also pin down the share of rents $\hat{\chi} = 1 - \hat{\tilde{\beta}} - \hat{\tilde{\gamma}}$. Note that at this stage we recover the scaled parameters, not the true production elasticities β and γ , which require knowledge of the demand elasticity σ .

Second, we estimate the scaled capital elasticity $\tilde{\alpha} = (1 - 1/\sigma)\alpha$ and the demand elasticity parameter σ from the revenue function. Taking logs of (15), multiplying by our estimated $\hat{\chi}$, and introducing time fixed effects to capture variation in input and output prices, we arrive at our estimable equation,

$$\hat{\chi}r_{it} = \tilde{\alpha}k_{it} - \frac{1}{\sigma}s_{it}^* + \mu_t + \tilde{\omega}_{it}. \quad (18)$$

This regression directly identifies $\hat{\tilde{\alpha}}$ and $\widehat{-1/\sigma}$. Given these estimates, we can recover the true capital elasticity as $\hat{\alpha} = \hat{\tilde{\alpha}}/(1 - 1/\hat{\sigma})$, and TFP can be recovered as the residual of equation (18) using the estimated regression coefficients.

Third, we compare the evolution of various outcome variables between firms that get an expatriate CEO and those that do not using a difference-in-differences approach, allowing for heterogeneous treatment effects (Callaway & Sant'Anna 2021).

To estimate the revenue equation, we need to make assumptions about the distribution of the error term $\tilde{\omega}_{it}$. The identification challenge is that TFP is correlated with our right-hand side variables. Because more productive firms have higher investments, capital stock, which depends on past investments will be positively correlated with productivity whenever productivity is persistent (Olley & Pakes 1996). This introduces an upward bias in the OLS estimate of α . Domestic sales, on the other hand, is expected to be negatively correlated with productivity, as exporting firms (with lower domestic share) tend to be more productive (Bernard & Bradford Jensen 1999). Moreover, expatriate managers may both increase productivity and decrease the domestic share if they are better at accessing

export markets (Mion & Oromolla 2014). This leads to a downward bias in the OLS coefficient of log domestic share and a downward bias in the estimate of σ .

To address these identification challenges, we follow Olley & Pakes (1996) and assume that TFP follows a first-order Markov process with innovations that are orthogonal to all past variables,

$$\tilde{\omega}_{it} \sim F(\omega|\tilde{\omega}_{i,t-1}, k_{i,t-1}, s_{i,t-1}) = F(\omega|\tilde{\omega}_{i,t-1}). \quad (19)$$

Let

$$h(\tilde{\omega}_{i,t-1}) := E(\tilde{\omega}_{it}|\tilde{\omega}_{i,t-1}) \quad (20)$$

denote the unknown function linking past TFP to the mean of current TFP. We expect TFP to be persistent, that is, h to be monotonically increasing. This already shows the endogeneity problem: because past TFP determines the path of capital k_{it} and domestic sales s_{it} , these will be correlated with the error term.

Evaluating TFP at the true parameter values, we can write the Markov condition as

$$E\left(\chi r_{it} - \tilde{\alpha} k_{it} + \frac{1}{\sigma} s_{it}^* | \chi r_{i,t-1} - \tilde{\alpha} k_{i,t-1} + \frac{1}{\sigma} s_{i,t-1}^*\right) = h\left(\chi r_{i,t-1} - \tilde{\alpha} k_{i,t-1} + \frac{1}{\sigma} s_{i,t-1}^*\right), \quad (21)$$

which means that innovations in TFP are orthogonal to all past input choices. Note that s_{it}^* is a function of the exogenous price indices $P_{t,D}$ and $P_{t,F}$ and the firm-specific export-demand shifter Λ_{it} (see equation (7)), which we assume are known at the end of period $t - 1$. Thus, s_{it}^* is predetermined exactly like capital k_{it} , and the orthogonality condition applies to the TFP innovation $\xi_{it} = \tilde{\omega}_{it} - h(\tilde{\omega}_{i,t-1})$:

$$E\left[\chi r_{it} - \tilde{\alpha} k_{it} + \frac{1}{\sigma} s_{it}^* - h\left(\chi r_{i,t-1} - \tilde{\alpha} k_{i,t-1} + \frac{1}{\sigma} s_{i,t-1}^*\right) | k_{it}, s_{it}^*\right] = 0. \quad (22)$$

We can then estimate $\tilde{\alpha}$ and σ by generalized method of moments (GMM). In practice, we approximate $h(\cdot)$ with a quadratic polynomial and search for $\tilde{\alpha}$ and σ parameters that satisfy these moment conditions.¹⁴

¹⁴An additional complication arises if exit is endogenous. In this case, even if equation (20) holds unconditionally, we only observe it for surviving firms, which have higher-than-average productivity. Addressing this survival bias requires an estimate of the exit probability $\hat{p}_{i,t-1}$ and a correction of h for this probability (Olley & Pakes 1996). To estimate $\hat{p}$, we regress exit on polynomials of state variables k ,

4.2 Estimation of the expatriate effect

Take the following model for outcome variable Y in year t at firm i which was acquired in year g ,¹⁵

$$Y_{igt} = \alpha_i + \nu_{gt} + \gamma_{gt} \times \text{Expat}_i + \varepsilon_{igt}. \quad (23)$$

Note that g is also defined for firms that received a local CEO instead of an expatriate (“control firms”). The outcome variable is assumed to depend on a firm fixed effect α_i , a fixed effect for the interaction of treatment time and calendar time ν_{gt} , and a treatment effect for firms run by expatriate managers, the variable of interest.

We follow Callaway & Sant’Anna (2021) and allow for heterogeneity in mean outcomes not only over calendar time t , but also for different treatment cohorts g . Business cycles and inflation can introduce heterogeneity in calendar time. Differences in economic policy stance towards foreign acquisitions can introduce heterogeneity in treatment cohort. Because we include fixed effect ν_{gt} for each combination of treatment cohort and calendar time, we are effectively comparing firms with an expatriate manager to other firms in the same year with a local manager, that were *acquired at the same time*. The identification assumption is that ε_{igt} is orthogonal to treatment status for all g and t .

As the time series of firms are as long as 34 years and the treatment of expatriate CEO is staggered in time, traditional OLS estimates of a two-way fixed effects model will produce biased results (De Chaisemartin & d’Haultfoeuille 2020). To estimate the expatriate CEO effect on firm behavior, we develop a new difference-in-differences method building on Callaway & Sant’Anna (2021). Our method proceeds in three steps. First we compare all outcome variables of a firm to their level in the pre-acquisition year (the “first difference”). Second, we estimate mean differences between expat-managed and local-managed firms within each cohort (the “second difference”). Third, we average these treatment effects across all cohorts with appropriate positive weights.¹⁶

s and material m , as a proxy variable that controls for TFP. Because material is freely and immediately adjustable by the firm, it is a suitable proxy variable (Levinsohn & Petrin 2003, Gandhi et al. 2020, Halpern et al. 2015).

¹⁵For each g , we add 4 pre- and 5 post-treatment years, $t = g - 4, \dots, g + 4$.

¹⁶The method is an extension of Callaway & Sant’Anna (2021) to two treatments, where one treatment can be used as a control group for the other. Indeed, if we estimate two separate treatment effects $\gamma_{\text{Expat},gt}$ and $\gamma_{\text{Local},gt}$ relative to a common control group using Callaway & Sant’Anna (2021), the difference

It is useful to compare our method to that of Callaway & Sant’Anna (2021). Typical applications do not specify g for the control group: they compare treated firms with controls in the same t , but not in the same g , and one untreated firm-year can serve as control for treated firms with different gs . Our method is stricter in the sense that we dedicate a special control group for each group treated in g : those firms that are also treated in g , but with a different treatment. In addition, we compare the evolution of Y between treated and control groups for the same time distance relative to the treatment.

We estimate this model as follows. We first express the outcome variable relative to the year before foreign acquisition, $t = g - 1$,

$$\tilde{Y}_{igt} = \nu_{gt} + \gamma_{gt} \times \text{Expat}_i + \tilde{\varepsilon}_{igt}, \quad (24)$$

where $\tilde{Y}_{igt} = Y_{igt} - Y_{ig,g-1}$ and we have normalized the fixed effects and the treatment effects to zero when $t = g - 1$. This step removes the firm fixed effects.

We then use standard fixed effects estimation (Correia 2023, version 6.12.5) to recover estimates $\hat{\nu}_{gt}$ and $\hat{\gamma}_{gt}$. Note that $\hat{\nu}_{gt}$ is simply the mean outcome difference, relative to period $g - 1$, among firms that were acquired in the same period g but did *not* receive an expatriate manager.

Similarly, $\hat{\gamma}_{gt}$ is simply the mean difference in (differenced) outcome between treated and control firms. Instead of reporting the mean difference for each cohort g and year t , we compute two kinds of weighted averages, as implemented in the Stata module `xt2treatments` (Koren 2024, version 0.8.4). Average treatment effect on the treated is defined as the average of post-treatment differences minus pre-treatment differences between the treatment and the control group,

$$\hat{\gamma}_{\text{ATT}} := \frac{\sum_{g,t:t \geq g} \omega_{gt} \hat{\gamma}_{gt}}{\sum_{g,t:t \geq g} \omega_{gt}} - \frac{\sum_{g,t:t < g} \omega_{gt} \hat{\gamma}_{gt}}{\sum_{g,t:t < g} \omega_{gt}}. \quad (25)$$

The subtraction of the pre-period average serves to net out any persistent cohort-specific baseline differences between treated and control groups. Under the parallel trends as-

$\gamma_{\text{Expat},gt} - \gamma_{\text{Local},gt}$ is numerically identical to our estimator for all g and t .

sumption, this pre-period term has expectation zero, and the estimator targets the standard ATT while accounting for potential pre-existing level differences. This adjustment increases precision when baseline gaps exist but adds sampling variance when parallel trends holds exactly. We use the weight $\omega_{gt} = n_{1gt}n_{0gt}/(n_{1gt} + n_{0gt})$, where n_{1gt} is the number of treated firms that were acquired in year g and have non-missing data in year t , and n_{0gt} is the number of control firms in this same group. This weight is inversely proportional to the standard error of an ordinary least squares estimate of γ_{gt} (Greene 2018, Chapter 4, Section 4.2), so more precisely estimated cohorts are given a higher weight.¹⁷

To conduct event study analysis, we average treatment effects for different event times $e = t - g$,

$$\hat{\gamma}_e = \frac{\sum_{g,t:t-g=e} \omega_{gt} \hat{\gamma}_{gt}}{\sum_{g,t:t-g=e} \omega_{gt}}. \quad (26)$$

Here $\hat{\gamma}_e$ for $e \geq 0$ are treatment effects, and $\hat{\gamma}_e$ for $e < 0$ can be used to check for pre-trends.¹⁸

All the regressions are estimated for the whole sample and for each of the four sectors, to study how the expatriate effect varies across sectors with different exporting opportunities and capital requirements.

5 Results

Production function estimates. Table 3 summarizes the estimated production function parameters for the four main sectors: manufacturing, trade, tradable services, and nontradable services. It reports the estimated capital share $\tilde{\alpha}$, the variable input share χ , which is the share of labor and intermediate input cost in revenue and the own-price elasticity of demand σ . The capital elasticities and variable input shares differ modestly across sectors, $\tilde{\alpha}$ being in the range of 0.02 - 0.03 and the χ between 0.09 - 0.16. Contrary to these estimates, σ varies widely, having the value of 35 in tradable services, 59 and 64

¹⁷Other weighting schemes give similar results.

¹⁸Following Roth (2024), we are reporting pre-trends the same way as treatment effects: relative to period $g - 1$. This aids the interpretation of event study figures.

in trade and manufacturing and 87 in nontradable services. Despite the differences, these values are sufficiently large to indicate that, on average, firms operate in markets with elastic product demand.

Expatriate effect. Table 4 displays the changes in various firm outcomes after the arrival of an expatriate CEO. Panel A reports the average effect in our sample. After acquisition, firms with an expatriate CEO increased sales by 78 log points (118%) on average. TFP increases by 8.2 log points (8.5%), capital by 39 log points (48%) and the domestic share declines by 17 log points (18.5%).¹⁹ The drop in the domestic share indicates a 19% increase in the firm-specific export price shifter.²⁰

These estimates show that expatriates are versatile: they increase sales through higher levels of TFP, by attracting more capital and increased exports. Note that we compare foreign acquisitions with expatriate and local CEOs, and thus the foreign effect does not contaminate our regressions.²¹

Separate estimates across the four sectors reveal that both the sales and the TFP effects are remarkably consistent: the coefficients associated with sales are between 64 and 85 log points and with TFP between 7 and 8.8 log points. Firms led by expatriate CEOs exhibit higher investment levels than those with local CEOs across all sectors, with greater differences in tradable and nontradable services compared to manufacturing and trade. The share of domestic sales in total sales declines in tradable sectors (manufacturing and tradable services) and remains unchanged in nontradable sectors.

These results demonstrate that expatriate CEOs outperform local managers across all sectors. Their advantage extends beyond firms where they benefit from firm-specific knowledge, which helps them in subsidiaries that are vertically integrated and supply intermediate goods to the parent company, and knowledge of foreign markets, which generally facilitates exporting. This implies that expatriates possess superior general

¹⁹Because the effects are large, the usual approximation of percent change with log points would be inaccurate. Percent changes can be computed from the estimated log point changes as $\exp(\beta) \times 100 - 100$.

²⁰Because Λ_{it} can take the value zero (for non-exporter firms), we do not express it in logarithms, but as a fraction of the pre-acquisition mean value.

²¹We also ran regressions on the restricted sample of foreign acquisitions which also experienced a change in the CEO, to control for potential effect of a new CEO. These results (not shown) are very similar to the ones in the paper.

management skills and they are beneficial to firms even when the exporting channel is shut down. In fact, in sectors producing for the local market, local CEOs have the advantage of the knowledge of local markets but expatriate led firms still have higher revenue growth after acquisition.

To gauge the time evolution of the effects, and also assess pre-trends, Figure 1 presents the coefficients and 95-percent confidence intervals for our event-time regressions. The pre-trends reveal that our carefully chosen control group and the applied method eliminates most of the differences in the dependent variable pre-treatment: generally, the coefficients estimated for 4, 3, and 2 years before the acquisition are small and with a confidence interval including 0. Moreover, the coefficients abruptly increase after the treatment year. The sole exception is the domestic sales share, where the pre-treatment coefficients are insignificant, but they are rather large and exhibit a declining trend. Thus, it is possible that the estimated effect of expatriates on the domestic share reflect the fact that export-oriented firms are more likely to get expatriate CEOs in the first place. The figures also reveal that the evolution of the expatriate effect is not a one-time shift but rather smooth and prolonged: in the post-acquisition period, the coefficients continuously increase for 4 years.

Decomposition analysis. To quantify the mechanisms through which expatriate CEOs enhance firm performance, we decompose the total revenue effect into changes in total factor productivity effect, capital utilization effect, and exporting (reflected in the domestic share of sales). Table 5 presents this decomposition for the full sample and by sector. The first column is taken from Table 4, while columns 2 - 4 are the corresponding effects, which are computed by taking the estimated effect and multiplying it with the corresponding elasticities from Equation 17. Panel A aggregates the sector-level results in Panels B - E, weighted by the number of treated firms in each sector.

The results in Panel A reveal that the 78 log points increase of sales attributed to expatriate CEOs in the full sample arises from three distinct mechanisms. The largest contribution comes from improvements in total factor productivity, which accounts for 87% of the total revenue increase. The magnitude of this effect provides strong evidence

for our hypothesis that expatriates possess superior general management skills, which translate directly into operational efficiency gains.

The second largest channel is increased capital utilization, contributing 10% of the total revenue effect. This finding is consistent with expatriates serving as more trusted intermediaries between the parent company and the subsidiary, enabling greater capital flows and more aggressive investment strategies.

Export market access improvements contribute the remaining 3% of the revenue increase. Even though the export share changes significantly after the arrival of an expatriate manager, the contribution of this channel to revenue is muted, because of the high elasticity of demand for exports. The estimated effect is consistent with a 19% increase in export prices among expatriate-led firms (see the previous Table).

The dominance of the TFP channel in this decomposition confirms our main hypothesis that expatriate CEOs create value primarily through superior management practices rather than through firm-specific knowledge of parent company operations or specialized knowledge of international markets. The quantitative breakdown shows that nearly nine-tenths of the expatriate advantage stems from fundamental improvements in how efficiently firms transform inputs into outputs.

The sectoral decomposition results reveal remarkably consistent patterns across industries. TFP improvements constitute the dominant channel in all sectors, ranging from 80% in tradable services to 92% in trade. Capital effects contribute between 7 and 18% of the total revenue increase. Export price effects remain modest in tradable sectors at about 5-6% of the total effect.

We interpret these results as evidence that expatriates possess greater general managerial skills than locals. It is natural to think about expatriates as guardians of the foreign owners' interests (which is manifested in the data through higher levels of investment), knowledge of the internal processes of the headquarter (which is useful if the subsidiary is vertically integrated) or general knowledge of international markets, and our data does provide evidence that these channels are indeed important. In the full sample, export share increases by 5.8 percentage points and capital by 37.2%. The export share

increased only in the tradable sector (by 8.9 percentage points, which translates to a percentage increase of 43, relative to the mean export share of 20.8).²² The increase of capital is quite similar in the two sectors.

But the magnitude of the effects, when scaled by the corresponding elasticities, demonstrates that TFP growth is the most important mechanism which increases the revenue of firms under expatriate CEOs. Furthermore, in nontradable sectors, where firms do not export nor provide intermediate goods to the parent company, the revenue increase is larger than in tradable sectors.

6 Conclusions

Using comprehensive administrative data from Hungary, we find that appointing expatriate CEOs after foreign acquisition leads to significant improvements in firm performance. We estimate these effects using a novel staggered difference-in-differences design to identify causal impacts, and develop a structural model that decomposes the increase in firm revenue into a TFP, investment, and exporting effect.

The primary channel of revenue growth is superior general management, which markedly raises TFP and sales, with additional but smaller contributions from increased investment and export orientation. The decomposition of effects is stable across sectors and suggests that expatriates outperform local CEOs even when sector-specific advantages, such as exporting or headquarters integration, are absent.

The findings can help evaluate the relative efficacy of trade, FDI, and immigration policies of high-skilled individuals in promoting economic growth. For example, if expatriate managers contribute largely to knowledge flows between firms via worker mobility and trade connections, then immigration restrictions are harmful to growth (e.g., Kerr & Lincoln (2010)).

²²We do not study the value of exports as many firms do not export at all, and for those the logarithm of exports is undefined. Nonetheless, we have looked at exporting status (a dummy variable which equals 1 if the firm exported in the given year). Expatriates increase exporter status by 7 - 9 percentage points.

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Figures and Tables

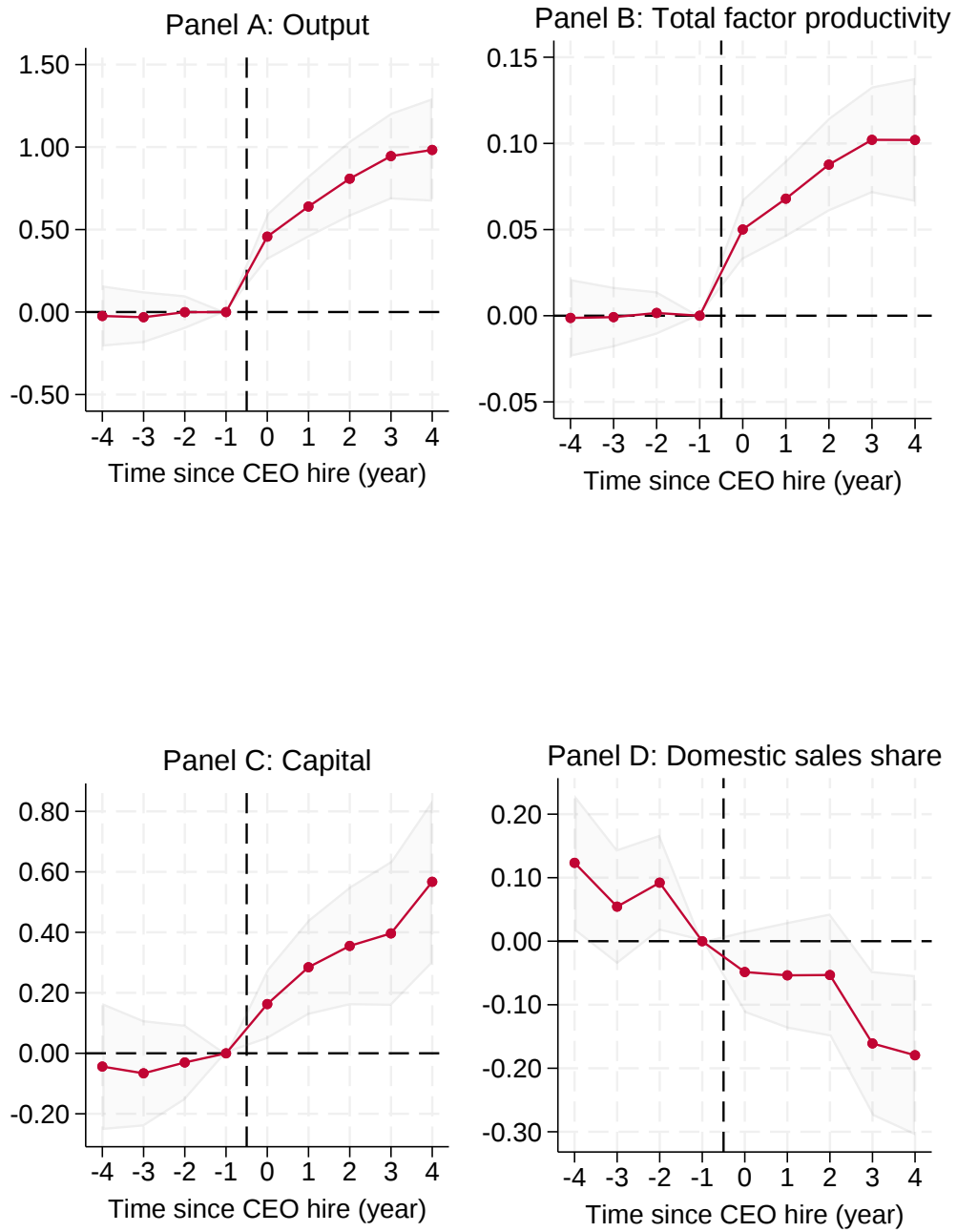


Figure 1: Effects of Expatriate CEOs on Firm Outcomes: Event-Time Estimations

Notes: The figures present estimated coefficients and 95-percent confidence intervals from event-time regressions. Panel A: Output (log sales). Panel B: Total factor productivity. Panel C: Capital (log). Panel D: Domestic sales share (log). Treatment group: firms which hired an expatriate CEO at foreign acquisition. Control group: firms which did not hire an expatriate CEO at foreign acquisition. Sample: foreign-acquired firms in 4 years before and after acquisition. Gray shaded areas show 95-percent confidence intervals.

Table 1: Characteristics of Firms with Local and Expatriate CEOs

	(1) Local CEO	(2) Expatriate CEO
Employment	85.27 (237.5)	125.8 (356.5)
Sales	13.13 (1.877)	12.95 (2.238)
Capital	11.10 (2.442)	11.39 (2.584)
Sales-Labor Ratio	9.963 (1.501)	9.658 (1.638)
Export Share	0.120 (0.390)	0.228 (0.340)
Observations	1523	451

Notes: The table presents the average values and standard deviations, in parentheses, of foreign acquisitions with local or expatriate CEOs, in the year before acquisition. Capital, sales and sales-labor ratio are reported as natural logarithm.

Table 2: Firm Characteristics: Expatriate vs. Local CEOs (Multivariate Analysis)

	(1) Expatriate CEO	(2) Expatriate CEO
Labor	-0.015** (0.006)	-0.010 (0.009)
Capital	0.012*** (0.004)	0.013** (0.006)
Sales-Labor Ratio	-0.022*** (0.007)	-0.024** (0.010)
Export Share	0.100 (0.061)	0.059 (0.071)
Early Acquisition	0.079*** (0.018)	
Manufacturing	0.000 (.)	
Trade	-0.049** (0.022)	
Tradable services	-0.003 (0.029)	
Nontradable services	-0.092*** (0.024)	
Observations	2422	2422
R^2	0.046	0.450
Mean dep.var.	0.186	0.186

Notes: The table presents the estimated coefficients, with standard errors in parentheses, of a linear probability model with the dependent variable indicating expatriate CEO. Sample: the year before acquisition. The second column includes 2-digit industry – year interaction fixed effects.

Table 3: Estimated Production Function Parameters by Sector

	Manufac- turing	Trade	Tradable services	Nontradable services
Capital elasticity, α	0.029*** (0.001)	0.020*** (0.001)	0.031*** (0.002)	0.024*** (0.001)
Variable input share, χ	0.124*** (0.000)	0.091*** (0.000)	0.163*** (0.001)	0.140*** (0.001)
Elasticity of substitution, σ	58.928*** (0.122)	64.054*** (0.070)	35.524*** (0.268)	87.289*** (0.940)
Observations	94,501	96,578	23,034	64,109

Notes: The table presents estimated structural parameters of the revenue function for four sectors. $\tilde{\alpha} = (1 - 1/\sigma)\alpha$ is the scaled capital elasticity. $\chi = 1 - \tilde{\beta} - \tilde{\gamma}$ is the share of quasi-rents to fixed factors, where $\tilde{\beta}$ and $\tilde{\gamma}$ are variable input shares estimated from revenue shares of labor and materials. σ is the elasticity of substitution between domestic and foreign markets. Parameters estimated using GMM following Olley & Pakes (1996) and Gandhi et al. (2020), controlling for endogeneity of capital and domestic share using lagged TFP as instruments, with exit correction. Estimation sample: domestic firms only, before any foreign acquisition. Standard errors in parentheses, clustered at the firm level. See Section 2 for details.

Table 4: The Effect of Expatriate CEOs on Firm Outcomes

Panel A: Full sample					
	(1) Sales	(2) TFP	(3) Capital	(4) Domestic Share	(5) Export Price
Expat CEO	0.781*** (0.116)	0.082*** (0.014)	0.388*** (0.101)	-0.167*** (0.050)	0.188* (0.099)
Observations	15317	15317	15317	15317	15317
Panel B: Manufacturing					
	(1) Sales	(2) TFP	(3) Capital	(4) Domestic Share	(5) Export Price
Expat CEO	0.642*** (0.140)	0.069*** (0.016)	0.226* (0.126)	-0.241*** (0.079)	0.136** (0.061)
Observations	4972	4972	4972	4972	4972
Panel C: Trade					
	(1) Sales	(2) TFP	(3) Capital	(4) Domestic Share	(5) Export Price
Expat CEO	0.852*** (0.215)	0.071*** (0.018)	0.273* (0.163)	-0.025 (0.065)	0.083 (0.114)
Observations	5062	5062	5062	5062	5062
Panel D: Tradable services					
	(1) Sales	(2) TFP	(3) Capital	(4) Domestic Share	(5) Export Price
Expat CEO	0.644** (0.281)	0.085** (0.043)	0.488** (0.241)	-0.216* (0.114)	0.181 (0.182)
Observations	2163	2163	2163	2163	2163
Panel E: Nontradable services					
	(1) Sales	(2) TFP	(3) Capital	(4) Domestic Share	(5) Export Price
Expat CEO	0.769*** (0.245)	0.088*** (0.034)	0.820*** (0.311)	-0.039 (0.086)	0.716 (0.470)
Observations	3107	3107	3107	3107	3107

Notes: The table presents average treatment effects on the treated (ATET) using the difference-in-differences method described in Section 4, with standard errors in parentheses. Treatment group: firms that hired an expatriate CEO at foreign acquisition. Control group: firms that did not hire an expatriate CEO at foreign acquisition. Sample: foreign-acquired firms 4 years before and after acquisition. Standard errors clustered at the firm level. Sales, capital, and domestic share are in natural logarithm. TFP is computed as the residual of a sector-specific revenue function.

Table 5: Decomposition of the Expatriate Effect on Firm Revenue

Panel A: Full sample				
	(1) Sales	(2) TFP	(3) Capital	(4) Export price
Expat CEO	0.781*** (0.116)	0.679*** (0.108)	0.078*** (0.021)	0.024*** (0.007)
Contribution (%)	100.0	86.9	10.0	3.0
Panel B: Manufacturing				
	(1) Sales	(2) TFP	(3) Capital	(4) Export price
Expat CEO	0.642*** (0.140)	0.558*** (0.128)	0.052* (0.029)	0.033*** (0.011)
Contribution (%)	100.0	86.9	8.0	5.1
Panel C: Trade				
	(1) Sales	(2) TFP	(3) Capital	(4) Export price
Expat CEO	0.852*** (0.215)	0.787*** (0.199)	0.060* (0.036)	0.004 (0.011)
Contribution (%)	100.0	92.4	7.1	0.5
Panel D: Tradable services				
	(1) Sales	(2) TFP	(3) Capital	(4) Export price
Expat CEO	0.644** (0.281)	0.518** (0.261)	0.090** (0.044)	0.037* (0.020)
Contribution (%)	100.0	80.3	13.9	5.8
Panel E: Nontradable services				
	(1) Sales	(2) TFP	(3) Capital	(4) Export price
Expat CEO	0.769*** (0.245)	0.629*** (0.241)	0.137*** (0.052)	0.003 (0.007)
Contribution (%)	100.0	81.8	17.8	0.4

Notes: The table presents the decomposition of expatriate CEO effects on firm revenue into three channels: TFP improvements, capital deepening, and export price effects (via reduced domestic share). Column 1 shows total sales effects. Columns 2 - 4 show the contribution of each channel to the total revenue increase. The contribution (%) indicates how much of the total revenue increase is attributable to each mechanism. Treatment group: firms that hired an expatriate CEO at foreign acquisition. Control group: firms that did not hire a local CEO at foreign acquisition. Sample: foreign-acquired firms in 4 years before and after acquisition. Number of observations are the same as in Table 4. Standard errors in parentheses, clustered at the firm level. See Section 2 for the decomposition methodology.