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The economic value of accredited management systems certification

Performance, productivity and resilience in UK firms

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This study establishes a new, large-scale longitudinal evidence base to examine the uptake, determinants and impacts of accredited management systems certification among UK businesses. By linking UKAS's CertCheck (the national database of accredited certificates) with firm-level financial data from Moody's Analytics Orbis over the 2005-2024 period, the project constructs a panel comprising 34,583 firms certified to ISO 9001 Quality Management Systems (QMS) and 14,060 firms certified to ISO 14001 Environmental Management Systems (EMS), including 12,647 firms holding both certifications.

This linked dataset – considerably larger and more granular than prior small-sample surveys that dominate the existing evidence base – enables an unprecedented analysis of the diffusion of these certification schemes, the characteristics of adopting firms and whether certification is associated with measurable performance benefits. QMS and EMS constitute core operational pillars of the national and international Quality Infrastructure (QI), embedding internationally recognised quality assurance and environmental sustainability principles into firm-level processes. Understanding their effect on business outcomes is, therefore, of both commercial and policy significance.

Research questions

The analysis addresses four key questions regarding management system standards after several decades of diffusion: (i) What does the current pattern of accredited certification uptake look like? (ii) What types of firms are most likely to adopt QMS/EMS standards? (iii) Is accredited certification associated with stronger business performance, such as higher revenue or productivity? and (iv) Does achieving certification improve firm outcomes including revenue, labour productivity and resilience to shocks?
The study combines descriptive profiling with panel-based econometric analysis to examine short-run effects around first adoption and longer-run effects where standards are already embedded through continued renewal.

Certification landscape

The adoption of ISO 9001 and ISO 14001 across the UK is extensive, but uneven. Certification is most prevalent in manufacturing and construction, with clear regional concentrations in the South East, North West and West Midlands. Many firms pursue dual certification – around 12,600 hold both QMS and EMS - underscoring the complementarity between quality and environmental management systems. Overall, these standards are now mature and widely diffused; the typical certified firm is larger, older and more established than the average UK business. This reflects a strong element of self-selection, whereby higher-performing or better-managed firms are more likely to pursue certification.

Descriptive performance differentials

In simple comparisons, certified firms report higher levels of revenue and labour productivity than never-certified peers. Median revenue and tangible assets tend to rise around ISO 9001 adoption and firms that maintain certification generally outperform those that lapse or never certify. Employment responses are mixed, suggesting that advantages often arise through efficiency and process reliability rather than immediate workforce expansion. These associations describe unconditional differences rather than causal effects and therefore need to be interpreted alongside models that adjust for differences in the characteristics of certified and non-certified firms.

Analytical approach

To distinguish correlation from causation, the econometric strategy uses matched comparisons, difference-in-differences and event-study designs. Short-run analyses estimate immediate post-adoption changes in revenue and labour productivity for first-time adopters. Long-run analyses assess crisis-period resilience among firms already certified before the Brexit and COVID-19 shocks, capturing benefits that arise once standards are embedded and maintained through renewals. These designs control for persistent firm characteristics and common shocks.

Key findings

Strong association, modest short-run causal effects on revenue and productivity

Certified firms consistently outperform in levels; however, for recent first-time adopters the average short-run post-adoption effects on revenue and labour productivity are small and imprecisely estimated. Sectoral nuance is apparent: in construction, certification – particularly ISO 9001 – is associated with a measurable rise in labour productivity in our preferred specifications although pre-trend differences suggest caution in interpreting the estimates. The evidence implies that certification consolidates the performance of already well-organised firms rather than generating rapid productivity gains on its own.

Longer-term resilience benefits

Firms that entered the Brexit and COVID-19 periods with established certifications demonstrated greater resilience. Certified firms maintained higher revenue and, in several analyses, higher labour productivity relative to uncertified peers through these years of disruption. Crucially, further analysis reveals that this aggregate resilience premium is driven disproportionately by Small and Medium-sized Enterprises (SMEs). The performance gap narrowed at the pandemic's peak, when all firms faced severe constraints, but re-emerged during recovery and the later spike in energy prices. This pattern suggests that accredited management systems enhance adaptability and continuity during economic shocks. The effect is more pronounced for ISO 9001 than for ISO 14001, consistent with QMS's stronger focus on process control, risk management and customer retention. EMS certification may yield benefits in compliance and reputation that manifest over longer horizons rather than immediate financial outcomes. Overall, the results highlight the role of certification as a foundation for organisational resilience. For SMEs, in particular, management systems enhance adaptability and continuity during economic shocks by functioning as a form of "organisational insurance". These codified routines provide the highest returns for SMEs, where baseline managerial and financial buffers are often more constrained.

Interpreting the results

Several inherent features of the data naturally attenuate the measured short-run effects. As ISO 9001 and ISO 14001 are mature schemes, many large early adopters pre-date the observational window of our dataset and, thus, cannot be utilised to identify immediate post-adoption impacts. Consequently, the identification sample focuses on later, typically smaller adopters for whom marginal benefits may be lower and financial series more volatile. Furthermore, firms that renew their certification are excluded from short-run estimates even though sustained adherence is where longer-run benefits are most likely to accrue. Certification is also a process rather than a discrete point event: firms typically implement changes over 12–24 months before formal issuance. Additionally, fiscal year-ends often do not align with audit milestones, spreading measurable impacts across years. Collectively, these factors reduce statistical power and dilute discontinuities at the point of adoption.

Given these considerations, the evidence implies that the impact of certification is nuanced. While large, economy-wide short-term productivity gains are not detected for recent adopters of these mature standards, smaller positive effects remain plausible. However, the study's design and sample size mean such small effects cannot be identified with sufficient precision, falling within the margin of statistical uncertainty. Certification should, therefore, be viewed as a long-term investment in managerial systems, resilience and organisational capabilities rather than a near-term economic stimulus.

Concluding implications

Management systems certification (ISO 9001 and 14001) emerge from this study as valuable components of a firm's strategic toolkit, particularly for building resilience and satisfying market or regulatory requirements. While certified firms consistently exhibit superior performance, an economy-wide, immediate causal uplift in output or productivity was not detected among recent first-time adopters. Instead, the evidence suggests that sustained adherence to accredited standards fosters long-term performance gains for established adopters. This comprehensive study thus provides robust evidence that accredited certification represents a critical long-term investment in resilience. In an era of frequent economic shocks, firms with established Quality Management Systems (ISO 9001) proves more robust, successfully protecting revenue and productivity when their uncertified peers falter. This effect is most profound for SMEs, implying that certification is a critical tool for bolstering the stability of the UK's smaller business base.

For businesses, the evidence underscores that the value of certification lies in implementation depth – embedding continuous improvement and process discipline – rather than the mere acquisition of a certificate. For policymakers, the results suggest that certification should be promoted as part of a capability and resilience strategy, rather than a short-term productivity intervention. Support measures could specifically target helping smaller firms translate standards into effective routines, while targeting sectors where process assurance and contract credibility most directly affect competitiveness.

In sum, accredited certification strengthens the organisational foundations required to sustain performance over time. Its long-run contributions to quality, reliability and resilience represent a durable benefit to both firm-level competitiveness and the wider quality infrastructure of the UK economy.

Glossary of terms

TERM	DEFINITION
Accredited certification	Verification that a management system meets an international standard (eg ISO 9001 or ISO 14001) by a Certification Body accredited by UKAS.
CertCheck (database)	UKAS database recording accredited certificates, including issue and expiry dates and scheme type.
Certification (QMS and/or EMS)	Formal recognition that a firm's management system conforms to ISO 9001 (Quality Management) or ISO 14001 (Environmental Management).
Control group	Non-certified firms used as comparators to estimate what would have happened to certified firms in the absence of certification.
Difference-in-Differences (DiD)	Econometric method comparing changes over time between certified ('treated') and non-certified ('control') firms to identify causal effects of certification.
EMS	Environmental Management System, ISO 14001.
Event-study/Dynamic effects	Cumulative effects of certification on firm performance to trace how impacts evolve.
Fixed effects	Statistical controls removing unobserved, time-invariant firm characteristics (eg management quality, sector).
Firm age	Years since incorporation, controlling for lifecycle effects in performance.
Heterogeneity analysis	Examination of whether certification effects differ by firm size, age, region or sector.
Labour Productivity (LP)	Output per employee, proxied by revenue per worker (£000s per employee).
Matching	The statistical pairing of certified and non-certified firms to enable 'like-for-like' comparisons, based on observed characteristics (eg sector, size, age, region).
NACE code	EU/UK classification of economic activities; used to group firms by sector.
Non-certified/Control firms	Firms with no record of accredited certification within the study period (eg never certified).
OLS (Ordinary Least Squares)	Baseline econometric estimator used before applying fixed-effects or DiD frameworks.
Orbis (database)	Moody's Analytics dataset providing firm-level financials, employment and ownership data for the UK and globally.
Panel data	Repeated yearly observations on the same firms (2015–2024 in this study).
QMS	Quality Management System, ISO 9001.
Resilience effect	The capacity of certified firms to sustain or recover performance faster during economic shocks (eg post-2017 and post-2021 periods).
Selection bias/Self-selection	Bias arising because stronger or better-managed firms are more likely to seek certification.
Treatment/Treated Firms	Firms holding either a QMS or EMS, or both certifications, during the observation period.
TWFE (Two-Way Fixed Effects)	Econometric model controlling for both firm and year effects, to isolate the average impact of certification.
UKAS	The United Kingdom Accreditation Service.

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Context and objectives

Accredited management certification provides independent assurance that a firm's processes meet internationally recognised standards. For the UK's quality infrastructure, certification underpins business credibility, fosters continuous improvement and supports trade.

Recent discourse has increasingly linked the adoption of recognised standards to improvements in business competitiveness and productivity, particularly for small and medium-sized enterprises (SMEs). Yet despite widespread acknowledgement of its potential benefits, there remains a shortage of robust empirical evidence on the effect of certification on firm-level outcomes such as revenue and productivity. This research aims to address that gap.

This research programme, led by Professor Cher Li (Aston Business School) in partnership with Professor Richard Kneller (the University of Nottingham) and Dr John Moffat (Durham University Business School), evaluates the business-level impact of accredited management certification. It focuses on two major standards – ISO 9001 (Quality Management Systems, QMS) and ISO 14001 (Environmental Management Systems, EMS) – by linking the UKAS CertCheck certification database to firm-level data from Orbis (a company accounts database provided by Moody's Analytics). This report provides a comprehensive evaluation of how accredited management systems certification affects business performance in the UK.

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Literature review: Value of accredited certification

Theoretical perspectives and motivation for certification

Firms pursue ISO 9001 (quality management) and ISO 14001 (environmental management) certifications for a mix of strategic and institutional reasons. From a *signalling theory* perspective, achieving these internationally recognised standards sends a credible signal of quality or environmental commitment to customers, investors and other stakeholders.

Certification can help overcome information asymmetries by demonstrating that a firm's processes meet an external benchmark, thus enhancing its reputation and trustworthiness. This signalling value is especially important in competitive markets and global supply chains, where ISO logos on certificates are commonly used as proof of quality assurance or sustainability practices. Firms may also be driven by *coercive pressures* (an institutional theory view): for example, requirements from major customers or regulators to have ISO 9001/14001 in place as a condition of doing business. In such cases, certification serves as a legitimacy tool to align with industry norms and stakeholder expectations.

Studies indicate that some companies may adopt ISO standards primarily for *legitimacy* and *market access* rather than internal improvement, which can lead to a more superficial implementation.

The *resource-based* view (Barney, 1991) suggests that when firms genuinely internalise these standards, they can develop valuable organisational capabilities that improve performance. ISO 9001's emphasis on process documentation, continuous improvement and customer feedback can thus institutionalise efficient routines, potentially enhancing product quality and productivity. Likewise, ISO 14001 can spur better resource efficiency and waste reduction, which may yield cost savings. Indeed, many firms thus view management certifications as investments in *operational excellence* that will drive performance and customer satisfaction. Certification drives firms to formalise processes, train employees and undergo audits, which can in theory translate into better management control and learning - aligning with Resource-Based View arguments that such process *improvements* become a source of competitive advantage that is difficult for rivals to imitate.

However, not all firms experience benefits equally and motivations play a critical role. The literature suggests that firms' motivations for adopting quality management standards are diverse, encompassing both regulatory compliance and the pursuit of competitive advantage through various internal and external benefits. Clougherty and Grajek (2013), for instance, argue that motivations for implementing ISO 9000 series can be divided into three main categories:

1) compliance with government regulations;
2) ability to establish business relationships by meeting buyer requirements; and
3) internal efficiency gains.

Similarly, Manders et al. (2013) categorise motivations into two types:

1) external reasons, such as pressure from customers, the market or the government; and
2) internal reasons, such as improving productivity and efficiency.

Furthermore, Hudson and Orviska (2013) explain that firms adopt standards for various reasons, including improving efficiency, signalling quality to gain an advantage, being necessary to gain entry to certain markets and improving relationships with stakeholders. They also note that firms in EU-regulated industries are more likely to demand management system certification from their suppliers, indicating a form of regulatory — or market-driven compliance. A survey by IAF (2012) on business drivers for seeking certification found that 13% of respondents stated it was to satisfy regulatory requirements, 32% reported that their customers required it and 47% stated it was to improve internal business operations and processes. Other reasons included using it as a marketing tool or to achieve a competitive advantage.

Differences in motivation to certify and the extent of internalisation of the standards can lead to divergent outcomes. Firms primarily seeking a marketing badge or responding to external pressure might implement the minimum required changes ('tick-box' certification), whereas firms motivated by internal improvement are more likely to embed the standards deeply, yielding greater performance gains. Anderson et al. (1999) found that firms' reasons for adopting ISO 9000 ranged from simple regulatory compliance to the pursuit of competitive advantage. Those aiming for the latter tend to integrate the standard more thoroughly. These insights align with institutional theory in that some certifications can be largely symbolic (to gain legitimacy) while others are substantive (to genuinely improve operations). Indeed, studies have documented cases of 'ceremonial' adoption that resulted in little change, versus committed adoption leading to measurable improvements (eg defect reduction, efficiency gains).

Furthermore, other theoretical lenses also shed light on the certification-performance link. *Transaction cost economics* suggests that ISO certifications reduce transaction costs in inter-firm trade by establishing common standards and reducing the need for costly supplier audits or quality inspections. By providing an assurance of quality, ISO 9001 in particular, can smooth transactions and open doors to new markets. This is related to signalling: a certified firm entering a new supply chain doesn't need to build trust from scratch, as the certification serves as a shorthand assurance of its management quality, thereby lowering search and contracting costs for buyers. In international trade contexts, this 'common language' aspect of ISO standards can facilitate export relationships by assuring foreign customers that products meet globally accepted benchmarks (WTO, 2005).

In summary, the decision to seek management certification is often driven by a combination of external pressures (market and institutional) and internal strategic objectives. The expected benefits — from enhanced reputation (signalling theory) to internal capability development (RBV) — form the motivation. These theoretical perspectives also imply that the realised impact of certification will depend on how and why it was adopted. This sets the stage for examining whether, and under what conditions, certification delivers economic benefits to firms.

Performance effects on productivity and profitability

A central question in the literature is whether ISO management systems certification translate into superior financial performance for firms – through higher productivity, profitability or growth.

Over the past two decades, numerous studies have investigated this, yielding mixed findings. A consistent theme is that firms with ISO 9001 (and to a lesser extent ISO 14001) tend to outperform others on various measures, but causality is difficult to establish. High-performing firms might be more likely to seek certification in the first place, so simply observing a correlation can be misleading. Researchers have therefore employed progressively sophisticated methods to untangle whether certification causes better performance or merely attracts already higher perfoming firms.

Early evidence often came from cross-sectional studies and simple comparisons, many of which showed positive associations. For example, a UK study commissioned by BSI found that standards (including ISO 9001 and similar) contributed significantly to national productivity growth over time. Likewise, Swann (2010) noted that adopters of international standards tend to report improved efficiency and waste reduction, as well as marketing advantages from signalling quality. At the firm level, survey evidence suggested that managers perceive benefits such as fewer defects, better process control and higher customer satisfaction after ISO 9001 implementation, which they believe ultimately improve financial outcomes. A comprehensive meta-analysis by Manders et al. (2013) suggested that ISO 9001 certification is generally associated with increased sales revenue, though it found no guarantee of reduced costs or improved profit ratios in the short run. In other words, certification often helps 'grow the top line' (by accessing new customers or markets that value the credential), but its effect on the 'bottom line' can be neutral if the costs of maintaining certification offset efficiency gains.

To more convincingly estimate causal effects, some rigorous longitudinal studies have been conducted. For instance, Corbett et al. (2005) tracked all publicly traded manufacturing firms in the US that adopted ISO 9000 (the precursor to ISO 9001) and compared their performance to matched control firms (which did not adopt the standard) over time. Using an event-study methodology with propensity score matching, they found that companies' financial performance significantly improved after ISO 9000 certification relative to the control group. By three years post-certification, the certified firms showed much higher returns on assets and productivity than would have been expected without certification, under multiple matching specifications. This study provides credible evidence of a causal improvement, since it carefully controlled for pre-certification performance and industry trends. The authors noted that the timing of gains varied: some firms saw an early boost (suggesting immediate market recognition of the quality signal), while others realised improvements more gradually through internal process enhancements. The overall finding was that ISO 9000 yielded significant 'abnormal' financial gains for adopters in the medium term.

Other studies have leveraged panel data and quasi-experiments to strengthen causal inference. For example, Benner and Veloso (2008) examined a panel of firms in the automotive supply industry to see how adopting ISO 9000 practices impacted their financial results over time. They discovered an important dynamic: early adopters of ISO 9000 reaped clear performance benefits, but once most firms in the industry were already certified, late adopters did not benefit. In effect, the competitive advantage from certification eroded as it became an industry norm, consistent with the idea that what begins as a differentiator turns into a baseline requirement. This finding implies that the timing of certification matters - firms certifying in the 1990s may have gained a leg up, whereas those certifying much later mainly 'keep up' with peers rather than surpass them. Benner and Veloso also explored how firms' internal characteristics moderated outcomes: firms with complementary technological capabilities benefited more from ISO 9000, whereas those with either very narrow or very broad technological focus saw fewer gains. This suggests that aligning the quality system with a firm's existing resources and innovation breadth is key - a nuanced support for the resource-based view notion that the impact of ISO standards depends on how well they mesh with firm-specific capabilities.

Evidence on ISO 14001 and financial performance has been more mixed. Some studies mirror the positive results found for ISO 9001, reporting that ISO 14001-certified firms achieve greater efficiency in resource usage, lower regulatory risks or improved credit ratings from demonstrating environmental responsibility - all of which can translate to better financial health. However, other research finds little boost to profits. Heras-Saizarbitoria et al. (2011), in a longitudinal analysis of UK firms that adopted ISO 14001, observed that certified firms already tended to have above-average performance before certification (suggesting a strong self-selection effect), and certification did not lead to additional performance improvement beyond their pre-existing trend. In this study, ISO 14001 adopters had higher profitability and sales growth in the years prior to adoption than the average firm and they maintained this lead afterwards - but the gap did not widen post-certification. In other words, environmentally proactive firms were doing well anyway; achieving ISO 14001 may have been a result of their success (ie they could afford the costs and had the managerial slack to engage in certification) rather than the cause of significantly better financial outcomes. This reflects what some scholars term a 'luxury good' hypothesis: robust environmental management may be something successful firms pursue when they can afford to, rather than a strategy that drives success on its own. A related interpretation is that ISO 14001's benefits are more indirect or long-term, in terms of risk reduction, brand value and avoiding fines - and thus harder to capture in short-term financial metrics. Additionally, some benefits of ISO 14001 might appear as improved environmental performance (eg lower emissions) rather than immediate profit; an outcome not captured by pure financial analysis.

Considering productivity, several European studies link ISO adoption with efficiency gains. ISO 9001 has been associated with better internal process alignment and a reduction in defect rates, which can raise labour and capital productivity. A UK econometric analysis by Frenz and Lambert (2013) found a positive correlation between ISO 9001 certification and productivity growth at the regional level. Regions (or industries) with higher densities of ISO-certified firms tended to exhibit slightly faster growth in revenue, employment and labour productivity than others, suggesting that widespread adoption of quality standards may have an impact on regional economic outcomes. The effect size was small - accredited ISO 9001 certification showed a 'moderate' positive link to growth indicators - but statistically significant. It is worth noting that such correlations still face endogeneity concerns: do innovative, growing regions simply adopt more standards, or do standards help them grow? The authors controlled for some confounding factors and interpreted the results as supportive of standards enabling growth, consistent with other macro-level findings.

In summary, insights from the academic literature suggest that ISO 9001 (QMS) certification, when properly implemented, may lead to a positive impact on firm performance, particularly on sales growth and sometimes on productivity or stock performance. The evidence for ISO 14001's financial impact is less uniform, with some studies finding gains in efficiency or technical performance (like energy usage per unit) but others questioning whether there is a direct profit benefit. Importantly, the strength of causal inference varies across studies. The more convincing analyses use methodologies such as:

- Panel data with fixed effects estimation: exploiting multi-year firm-level data to control for unobserved firm traits that do not change over time (eg culture or management quality) and observing the impact of certification status on performance (eg Benner and Veloso, 2008).
- Propensity score matching: pairing certified and non-certified firms with similar characteristics (eg size, industry, prior performance) to isolate the effect of certification (eg used in Corbett et al. (2005) and in several national studies).
- Instrumental variables: using predictors of certification that are not directly related to firm performance and uncorrelated with other firm characteristics (eg distance to certifiers, local take-up rates, or timing of standard revisions) to tease out exogenous variation in certification status (see, for example, Blind et al. (2018) in a trade context). However, finding a good instrument is challenging.
- Difference-in-Differences (DID): comparing performance trends of certified firms before vs after certification, against a control group of non-certified firms over the same period. This controls for baseline differences and common shocks.
- Event studies: treating certification as a quasi-event and examining abnormal changes in financial metrics or stock prices following the event. A few studies looked at stock market reactions to ISO certification announcements and generally found small positive abnormal returns, indicating investor approval (though such evidence is not uniform).

The overall weight of evidence is that when methodological biases are addressed, ISO 9001 certification tends to be associated with improved business performance, albeit not always immediately and not for every metric. Increases in profits may take time to materialise as firms incur initial compliance costs, but sales and productivity often improve. For ISO 14001, the economic *pay-off* appears more contingent: firms that innovate in environmental processes or enjoy efficiency gains from waste reduction can benefit financially, but others may only break even, especially if their adoption was driven by external image concerns rather than internal efficiency. A critical takeaway is that inferring causality is difficult – higher-performing firms are more likely to seek certification (selection effect) *and* certification can further enhance performance if leveraged well. Many studies that question the benefits of certification have pointed out that simply getting the certificate is not, in itself, a guarantee of improvement; it's the underlying quality/environmental management effort that matters.

The role and value of accredited certification

While much research focuses on the presence or absence of ISO certification, an important question is whether *accredited* certification confers additional benefits compared to non-accredited certification.

Accreditation refers to the formal recognition that a certification body itself meets international standards (such as ISO/IEC 17021 for management system certifiers). In the UK, for example, UKAS (the UK Accreditation Service) is the sole national body authorised to accredit ISO 9001/14001 certification providers. The premise is that a certificate issued by a UKAS-accredited body carries more weight - it has been independently verified to follow rigorous auditing practices - whereas a certificate from an unaccredited body might be viewed with scepticism. From a signalling perspective, accreditation strengthens: it is a 'certificate for the certifier,' effectively assuring the quality of the certification process.

Empirical analysis on this topic is relatively sparse. Frenz and Lambert (2013) suggest that UK firms certified by a UKAS-accredited body may enjoy greater reputational and performance advantages than those certified by bodies without accreditation. The logic is that clients and supply chain partners often prefer or require accredited certificates, considering them more reliable. If a firm has a certificate from a less demanding, non-accredited provider (sometimes termed a 'certificate mill'), it could be viewed as having taken a shortcut, thereby weakening the credibility of its signal. Frenz and Lambert's work further found indications that regions with a higher share of accredited ISO certifications saw stronger correlations with innovation and productivity than regions where firms perhaps opted for unaccredited certificates or did not certify at all. However, they also emphasised that truly rigorous analyses isolating accreditation effects are rare. This constitutes a key research gap - most datasets do not distinguish whether a given ISO certificate was accredited or not. Notably, the *CertCheck* database compiled by UKAS now captures accredited certification but there is no comparable data available for non-accredited certification in the UK to allow a direct comparison.

Internationally, Blind *et al.* (2018) provided strong evidence of the value of accreditation in the context of trade: countries engaging in cooperation through the IAF multilateral accreditation agreements see significantly higher trade flows attributed to ISO 9000 standards. This implies that accreditation adds economic value by making certificates *trustworthy across borders*. For policymakers, it underscores that simply having firms adopt standards is not enough - the certification ecosystem must be credible. The finding that IAF-MLA signatory countries (which recognise each other's accredited certificates) have extra trade between them is a concrete economic validation of the accreditation framework.

There are also insights from qualitative studies and case studies into accreditation's importance. Many firms have reported that using an accredited certification body was essential to satisfy their more demanding customers or regulators. For example, aerospace and automotive sectors typically mandate that ISO 9001 certificates come from accredited bodies; a certificate from a non-accredited source would not be accepted by Original Equipment Manufacturers (OEMs) in those sectors. Thus, in practice, the marketplace often distinguishes accreditation status. Accreditation can also yield a performance benefit since accredited certification bodies are themselves subject to regular oversight and must follow stringent auditing guidelines, likely resulting in a more thorough audit for the firm. A more rigorous audit can pinpoint improvement areas and ensure the firm truly meets the standard's requirements, potentially driving more substantive internal changes. Non-accredited audits might be lighter touch, resulting in firms doing the minimum to get 'paper certified.' Over time, these differences could compound into performance differentials, though, as discussed above, quantifying this effect is challenging.

One piece of evidence on this front comes from the concept of 'forum shopping' in certification. Lerner and Tirole (2006) and Chiao et al. (2007) (originally in the context of patent offices and standard setting) introduced the idea that companies might shop around for the easiest certifier - in this context, choosing a certification body with the least stringent audit to obtain the certificate cheaply. If such forum shopping is widespread, it could undermine the credibility and impact of ISO standards on performance, because the certificate no longer guarantees true process quality. Accreditation is intended to prevent this by enforcing a level playing field (all accredited certifiers must apply the standard rigorously). Thus, firms that do not forum-shop but instead go for accredited certification arguably commit more strongly to quality improvement, which could correlate with better outcomes. This aligns with the earlier discussion regarding motivation and internalisation: seeking an accredited certificate often signals that a firm is serious about meeting the highest standard, not just ticking a box.

From a UK policy perspective, the government has affirmed that accreditation is crucial for confidence.

This policy stance is in response to industry concerns about the rise of unaccredited certifiers offering quick, cheap certificates. The implication is that certificates issued without accreditation oversight may not deliver the same assurance or performance benefits. In economic terms, if businesses or international partners distrust unaccredited certificates, those certificates fail to function as effective signals, potentially nullifying any competitive advantage a firm sought by getting certified. By contrast, a UKAS-accredited certificate is widely recognised (thanks to the IAF agreements) and thus more valuable for both market access and signalling. In the academic literature, a key knowledge gap remains in measuring the impact of accreditation per se. Most large-sample studies until now lacked data distinguishing accredited vs non-accredited certifications.

Accreditation is therefore seen as a vital component of the certification ecosystem, amplifying the positive impacts of ISO 9001 and ISO 14001 by ensuring the integrity of the certification process. Credible, accredited certification should strengthen the signal to external stakeholders (potentially improving market and trade outcomes) and may also enforce a higher standard of implementation (potentially leading to greater internal performance improvements). The literature to date strongly supports the notion that 'not all certificates are equal' – those backed by a reputable accreditation body carry more economic value. A clear *practical implication* is that firms and policymakers should favour accredited certification if the goal is to truly reap the performance, innovation and trade benefits of ISO standards.

In conclusion, it's important to highlight that despite the generally positive findings, significant gaps remain in the research. More work is needed to establish causal links (especially using large-scale longitudinal datasets linking certification to performance over long periods), to understand long-term effects (do benefits persist or decay over time?) and to disentangle the mechanisms (eg is it process efficiency, improved customer trust or employee morale that drives observed gains?). Many existing studies have been country- or sector-specific; expanding to broader contexts will strengthen generalisability. Moreover, the interplay between multiple certifications (firms often adopt ISO 9001, ISO 14001 and others like ISO 45001 together) and performance is not fully understood - whether they yield complementary benefits or just additional costs is an open question. These limitations notwithstanding, the corpus of high-quality studies since 2000 provides a solid foundation: overall, accredited ISO management systems certification emerges as an economically beneficial practice for firms, supporting improved performance, greater innovation capacity and enhanced access to international markets, provided that it is pursued earnestly and integrated into the firm's broader strategy.

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Data, definitions and analytical framework

To evaluate the economic impact of accredited management systems certification, we assembled a large-scale firm-level panel of UK-based certified and non-certified businesses by linking two primary datasets:

- ***CertCheck*** – UKAS's registry of accredited certificates, which provides each firm's certification details (eg scheme type such as ISO 9001 or ISO 14001 and issue and expiry dates).
- ***Orbis/FAME (Financial Analysis Made Easy) (Moody's Analytics)*** – A comprehensive company-level database (Moody's Analytics) containing ownership information, industry codes, locations and financial accounts (eg revenue, employment, profits and balance sheet items) from Companies House filings.

Using an initial extract of CertCheck data, we started with a list of 52,672 UK company records appearing in CertCheck, including firms currently or previously certified. Our aim was to merge these records with firm details from Companies House. To facilitate this, we leveraged Orbis (and its UK subset known as FAME) to match CertCheck entries to official company records. Orbis provides standardised company names and addresses, helping to identify the correct registered entity for each certificate record. In conducting the match, we undertook several data cleaning steps to improve accuracy:

Address and name cleaning

i. Whenever possible, we extracted the postcodes from the raw address text in the CertCheck dataset to manually verify the accuracy of linking when Orbis's matching algorithm returned possible matches.

ii. Extensive manual checks were undertaken to verify businesses that changed address, relocated offices or simply had name variations over time.

Resolving multiple or mismatched entries

iii. In some cases, multiple Orbis records linked to a single certified entity (eg a holding company plus several subsidiaries). Here, we retained the entry with clear evidence of economic activity, such as positive employment or financial returns, over purely administrative or dormant records.

iv. Conversely, we excluded non-commercial or purely public-sector entities (eg universities, NHS services and police or fire services) if they appeared in the dataset. Misplaced or partial addresses outside the UK also prompted exclusion, since this project focuses on businesses operating in the UK.

Out of the company records in CertCheck, 12,547 could not be linked to Orbis as they were non-private sector entities, no longer in business or entities with non-UK registered addresses. A total of 47,632 records matched to a valid business ID in Orbis, though some entries corresponded to multiple sites or branches of the same legal entity. Following the consolidation of these duplicate entries and the exclusion of records lacking usable financial data in Orbis, the final linked dataset comprises 34,583 firms certified to ISO 9001 and 14,060 firms certified to ISO 14001, including 12,647 firms holding both certifications.

Importantly, to evaluate the business-level impact of accredited certification, we need to construct a counterfactual group, ie control firms. These are non-certified firms with similar characteristics to those that are certified. We therefore identify, from Orbis, businesses of similar size, sector, age and region that have never held an accredited management certification. Initial tests indicate that, for nearly every certified business in the dataset, at least one comparable non-certified counterpart can be found and that the certified firms' distribution of industry and other characteristics is mirrored within the broader sample. This matching capability is crucial: it enables us to construct 'like-for-like' comparison sets (for example, pairing a QMS-certified manufacturing SME with a similar manufacturing SME that lacks certification) with adequate sample sizes. Having a credible counterfactual group is essential for isolating the impact of certification by comparing certified firms to otherwise similar non-certified firms.

For the estimation of economic impact, we define a final analysis sample spanning major sectors of the economy, selected to balance sample size, coverage and variation in certification uptake: Manufacturing (NACE code C), Construction (F), Wholesale and retail trade; Repair of motor vehicles & motorcycles (G), Administrative & support service activities (N), Professional, scientific & technical activities (M), and Information & communication (J). A further composite 'Other' grouping pools activities where individual certification counts are smaller — water supply; sewerage, waste management & remediation; transportation & storage; financial & insurance; real estate; human health & social work; and other service activities. This sectoral design ensures sufficient observations for matching within each sector while capturing heterogeneity between areas where certification is commonplace and areas where it is less prevalent.

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4

Descriptive landscape of certification in the UK

4.1 Patterns of certification adoption

Quality Management Systems (QMS): ISO 9001

Sample overview

As described above, in the linked CertCheck–Orbis database, we identify 34,583 UK businesses that obtained ISO 9001 QMS certification through UKAS-accredited bodies, including 12,647 firms also holding EMS certification. Among these, 4,025 firms hold multiple ISO 9001 certificates (eg separate certificates for different locations or subsidiaries). For this section, we use financial information for the QMS-certified firms available from Orbis for the years 2005–2022, yielding a rich panel of 622,494 firm-year observations for analysis.

Timeline of new QMS certification

The earliest instances of ISO 9001 adoption in our dataset date back to 1978. Figure 4.1 shows the number of firms obtaining their first QMS certificates in each year (with all pre-1990 adopters grouped into a '<1990' category). There were notable surges in new certifications in the early 1990s, followed by a dip in the late 1990s and a steady increase throughout the 2000s. A sharp drop is observed around 2020 – likely reflecting the disruptions caused by the COVID-19 pandemic – but this was followed by a strong rebound from 2021 onwards. In fact, 2021 saw the highest number of new QMS certifications (2,008 firms) in the entire period. Overall, the pattern indicates that the popularity of ISO 9001 certification has fluctuated over time, but demonstrates a clear upward trend since 2000.

Figure 4.1: Timeline of new QMS certification

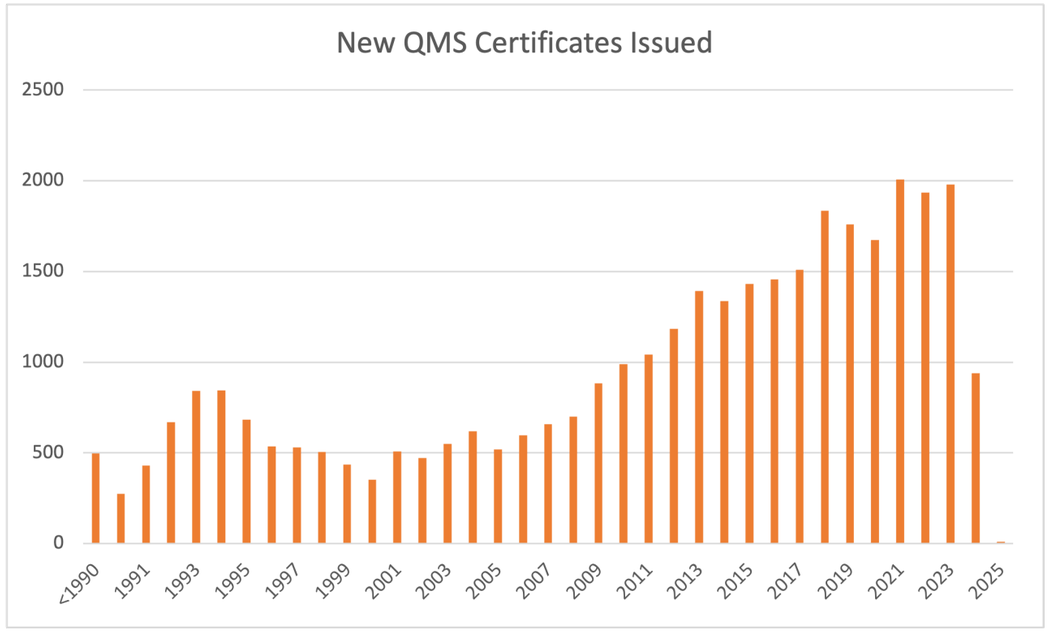
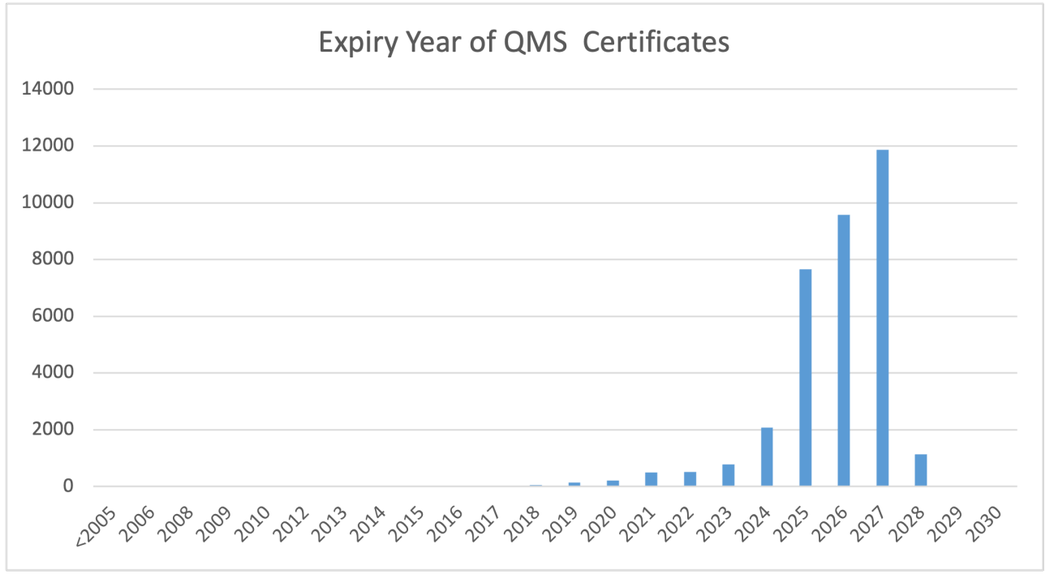


Figure 4.2 shows the distribution of certificate expiry dates for QMS certifications. Because the CertCheck data were compiled from current certification records, the majority of certificates have expiry dates several years into the future. Over 87% of QMS certificates held by firms in our sample are set to expire in 2023 or later, while only 1,487 certificates expired by the end of 2022. This indicates very high renewal and retention rates once a firm achieves ISO 9001 certification. In other words, most businesses tend to maintain the standard across multiple audit cycles once adopted.

Figure 4.2: Expiration of QMS certification

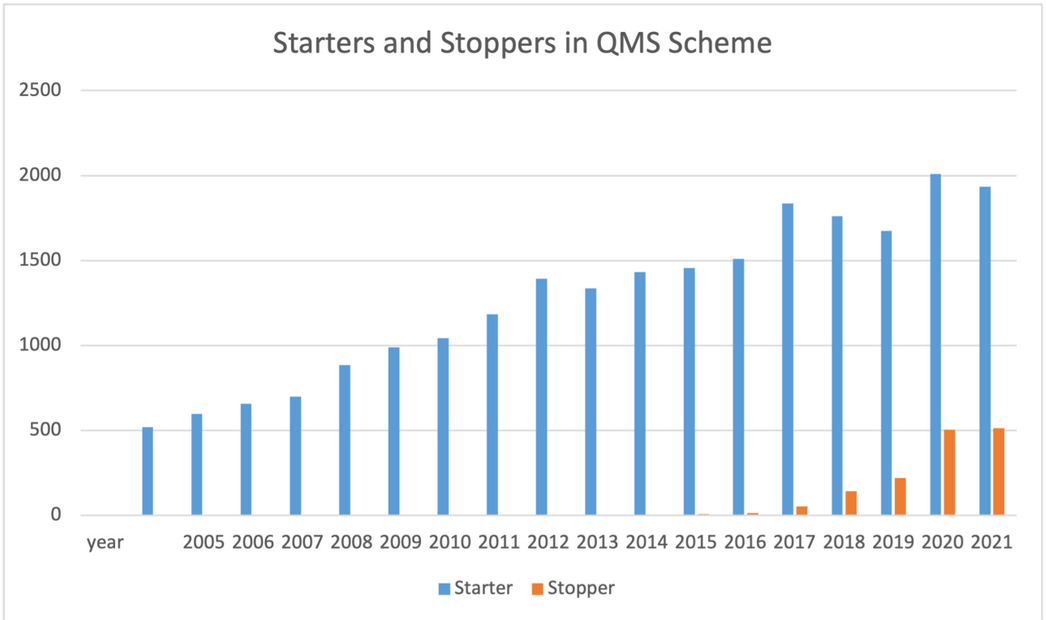


The dynamic patterns of QMS certification

To assess how certification status evolves over time, we distinguish firms that continuously held QMS certification from those that started or stopped being certified during the sample period. Between 2005 and 2022, 8,362 businesses in our dataset were already certified by 2005 and maintained their ISO 9001 certification for the entire 18-year window (an 'always certified' group). In addition, 22,911 firms obtained a QMS certificate for the first time at some point between 2005 and 2022; of these, 593 firms eventually relinquished their QMS certification by 2022 ('stoppers'). Finally, a further 367 businesses that had been certified prior to 2005 chose to discontinue their QMS status during the 2005–2022 period.

Figure 4.3 visualises the timing of QMS adoptions ('starters,' in blue) and cessations ('stoppers,' in orange) by year. Around 500 firms became newly certified in 2005 and the number of new QMS adopters rose to nearly 1,400 per year by 2013. After a brief plateau, new certifications spiked in 2017 and reached a peak of just over 2,000 in 2021 (consistent with Figure 4.1). By contrast, very few firms gave up their QMS certificates in any given year. The count of stoppers gradually increased over time, reaching 513 cumulative cases by 2022 – predominantly companies that had only adopted ISO 9001 in the mid-2000s or later. These patterns suggest that once firms achieve QMS certification, they are likely to retain it, and the overall pool of QMS-certified companies has expanded significantly over the past two decades.

Figure 4.3: QMS adoption and cessation



Environmental Management Systems (EMS): ISO 14001

Sample overview

Our linked dataset contains 14,060 UK businesses that have obtained ISO 14001 EMS certification through UKAS-accredited certification bodies. The EMS-certified business population is less than half the size of the QMS group, reflecting the later introduction and somewhat narrower uptake of ISO 14001. More specifically, the earliest EMS certifications in the data appear in the mid-1980s, whereas ISO 9001 had earlier adopters from the late 1970s. Like the QMS firms, the EMS-certified firms' financial data are tracked from 2005 onwards, providing a longitudinal view of their performance before and after certification.

Timeline of new EMS certification

The ISO 14001 saw gradual adoption in its early years. The earliest EMS certifications in our data occurred in 1986 and uptake remained modest through the late 1980s and 1990s. Figure 4.4 reports the number of firms obtaining their first EMS certification each year. The pace of new adoptions picked up in the early 2000s and then rose more steadily by the 2010s. Similar to the QMS trend, a dip is evident around 2020 (coinciding with the COVID-19 pandemic), but thereafter the trajectory turns sharply upward. The largest intake of new EMS certifications is observed in 2023, when 1,242 firms gained ISO 14001 for the first time. Overall, the timeline shows sustained growth in environmental management certification, with periodic accelerations that often mirror broader economic or policy shifts (such as growing environmental awareness and supply-chain pressures in the 2010s).

Figure 4.4: Timeline of new EMS certification

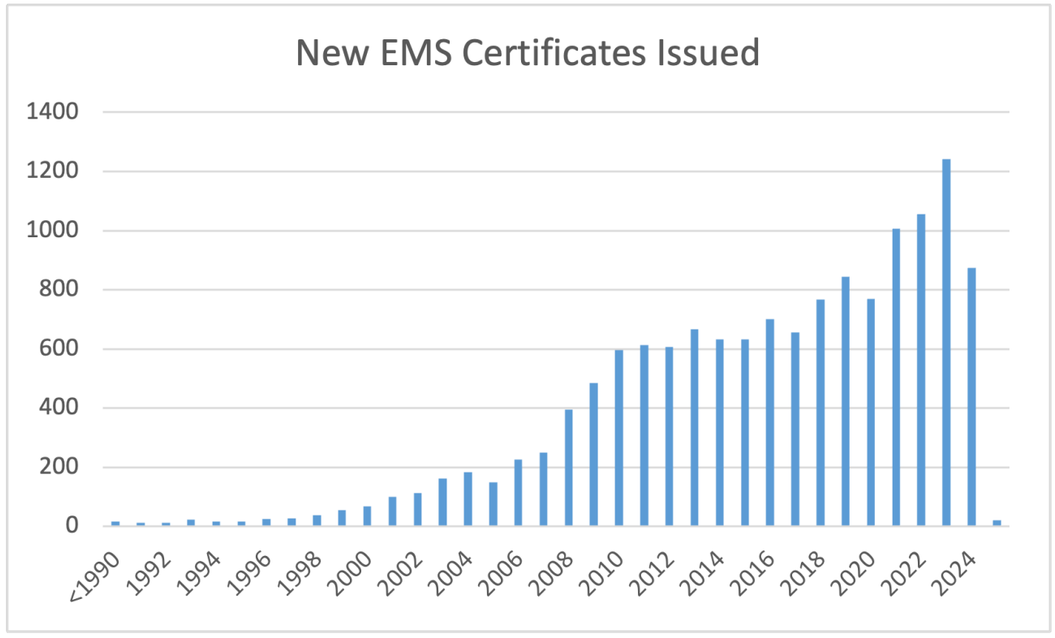
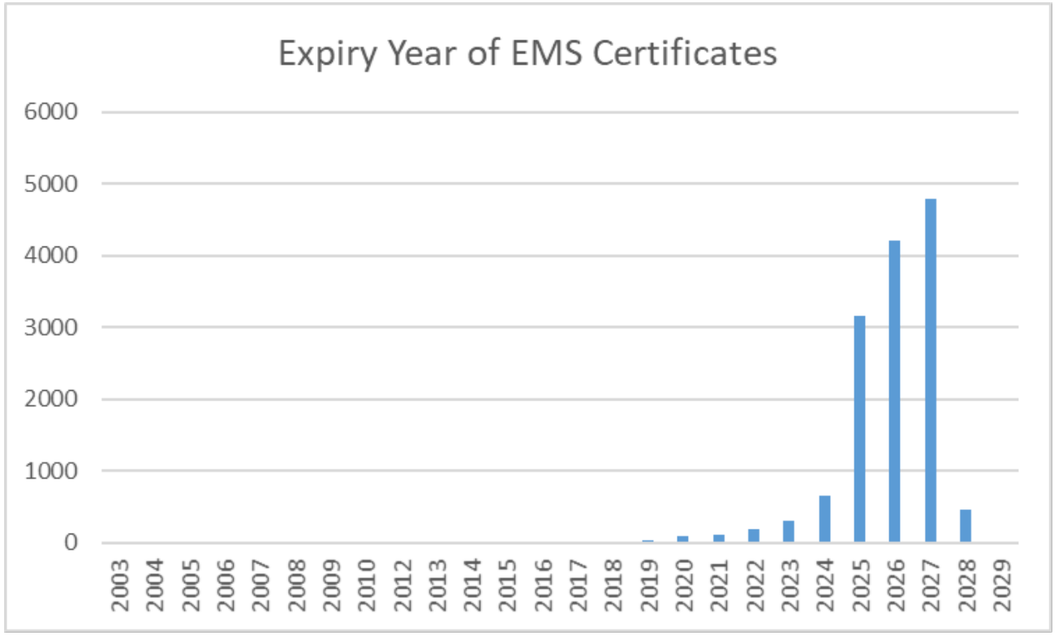


Figure 4.5 illustrates the expiration dates of current EMS certificates on record. As expected, most certificates held by firms in our dataset have not yet expired as of the end of the sample: about 67% of EMS certificates are valid until 2025 or beyond. Very few certificates (only 484) expired before 2022, meaning that more than 97% of firms that ever obtained EMS certification still had it in effect through the end of 2022. This points to a strong persistence for ISO 14001 – once certified, the vast majority of companies continue renewing their EMS certification, paralleling the retention behaviour seen with QMS.

Figure 4.5: Expiration of EMS certification



The dynamic patterns of EMS certification

The patterns of starting and stopping EMS certification differ slightly from QMS but similarly tell a clear story of growth. By 2005, relatively few firms (only 827 in our data) had an active EMS certificate and those firms continued to hold certification through 2022 ('always EMS-certified'). The bulk of ISO 14001 adopters came later: 11,053 firms obtained their first EMS certificate between 2005 and 2022. Of those, 245 firms had let their certification lapse by 2022 ('stoppers'). In addition, 42 firms that were EMS-certified prior to 2005 had discontinued their certification by 2022.

Figure 4.6 charts annual EMS adoption versus cessation. In 2005, around 150 firms became newly EMS-certified. The number of new EMS adopters grew steadily year by year, with a plateau in the early 2010s, then accelerated around 2017. By 2021, more than 1,000 firms per year were gaining EMS certification for the first time. Importantly, there were no recorded EMS cessations (stoppers) in the dataset until 2017, indicating that firms rarely dropped the standard in its early years of uptake. From 2017 onward, a few companies began to discontinue EMS each year – rising to nearly 200 stoppers in 2021. These trends confirm that EMS adoption intensified over the sample period, with far more firms entering than exiting the certified pool. The overall pattern, similar to QMS, is that most firms continue with the certification once adopted; exits are relatively uncommon and mostly involve firms that had adopted EMS only in recent years.

Figure 4.6: EMS adoption and cessation

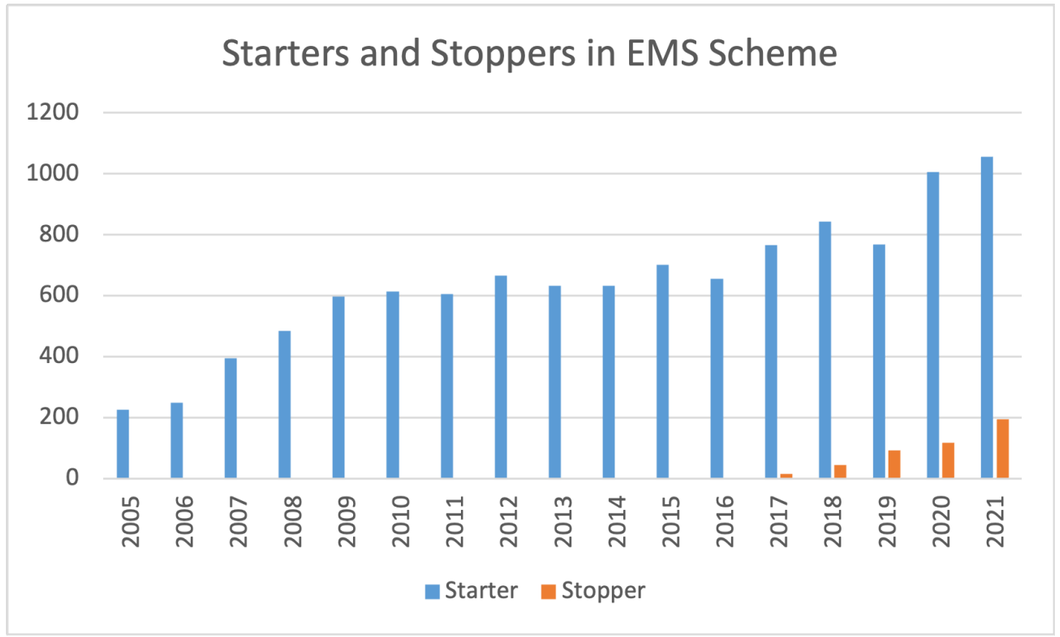
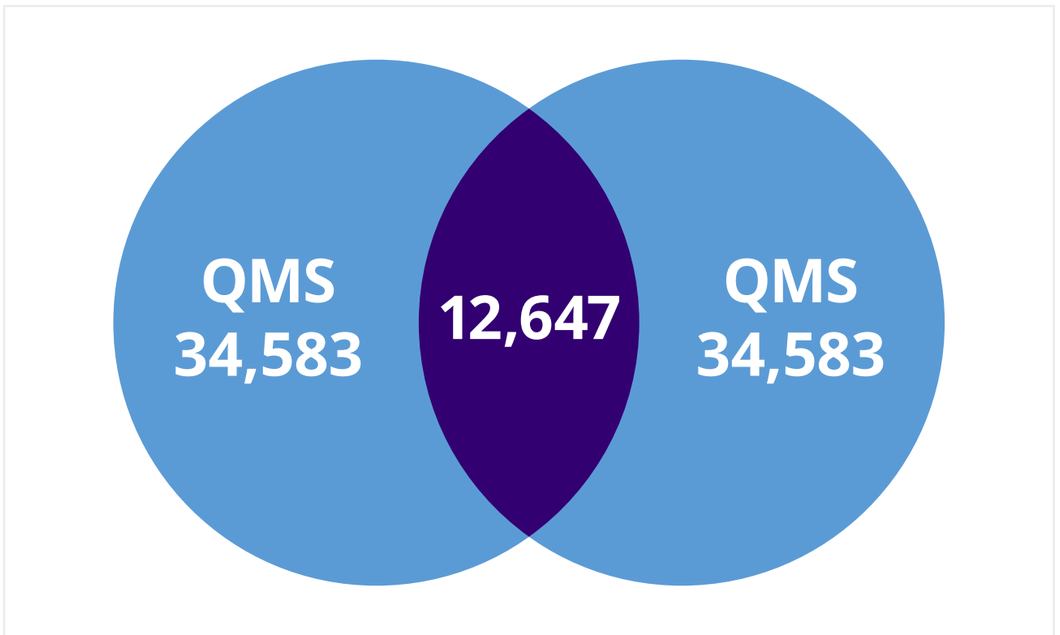
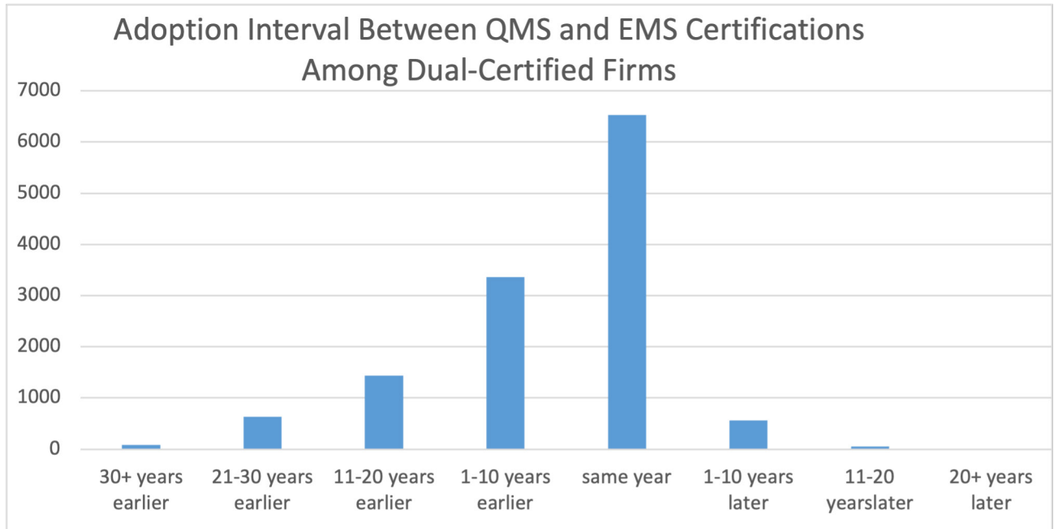


Figure 4.7: Dual certification in QMS and EMS



Around 12,647 firms in our dataset hold both ISO 9001 and ISO 14001 certifications, underscoring the prevalence of dual management system certification among UK businesses. The timing of obtaining the two standards varies across firms. Just over half (approximately 52%) of dual-certified firms decided to implement QMS and EMS in the same year, likely to streamline the effort and achieve both quality and environmental credentials together. Among the remaining dual adopters, the vast majority (about 43% of all dual-certified firms) obtained QMS certification first, typically one to ten years before adding EMS certification. A small subset (roughly 5%) pursued the opposite order, adopting EMS certification before QMS – indicating that, for a few firms, environmental management was the initial priority. Overall, these patterns highlight that dual certification can arise through both simultaneous adoption and sequential adoption. Firms' approaches differ based on their strategic priorities: many treat ISO 9001 as a foundation and then layer on ISO 14001, but others integrate both at once and a minority focus on environmental standards early on. This diversity in adoption sequences suggests that motivations for certification (and the perceived benefits of each standard) can vary across businesses.

Figure 4.8: Adoption interval between QMS and EMS certifications



4.2 Sectoral and regional distribution

Industry sectors

Figures 4.9 and 4.10 (also in Table A.1 in the Appendix) visualise the sectoral breakdown of accredited certifications, showing the share of QMS and EMS certificates held by firms in each broad sector.

Manufacturing dominates for both standards, accounting for just over one-third (33.4%) of all QMS-certified firms and about 28% of EMS-certified firms. The construction sector is the next largest contributor, representing 14% of QMS certifications and more than 20% of EMS certifications. This discrepancy suggests that construction companies, while substantial adopters of ISO 9001, place an even greater emphasis on ISO 14001 – likely due to environmental management being particularly salient in construction projects and contracts.

Beyond manufacturing and construction, several other sectors show notable levels of certification. These include wholesale and retail trade, information and communication services, professional, scientific and technical services as well as administrative and support services. Each of these service-oriented industries contributes more than 5% of all QMS certificates and more than 3% of EMS certificates and, interestingly, their shares are relatively consistent between QMS and EMS. This points to a broadly similar impetus for adopting quality and environmental standards across a wide range of business services – possibly driven by common factors like supply-chain requirements or a general culture of formal management practices.

Figure 4.9: Current QMS certificates by sector

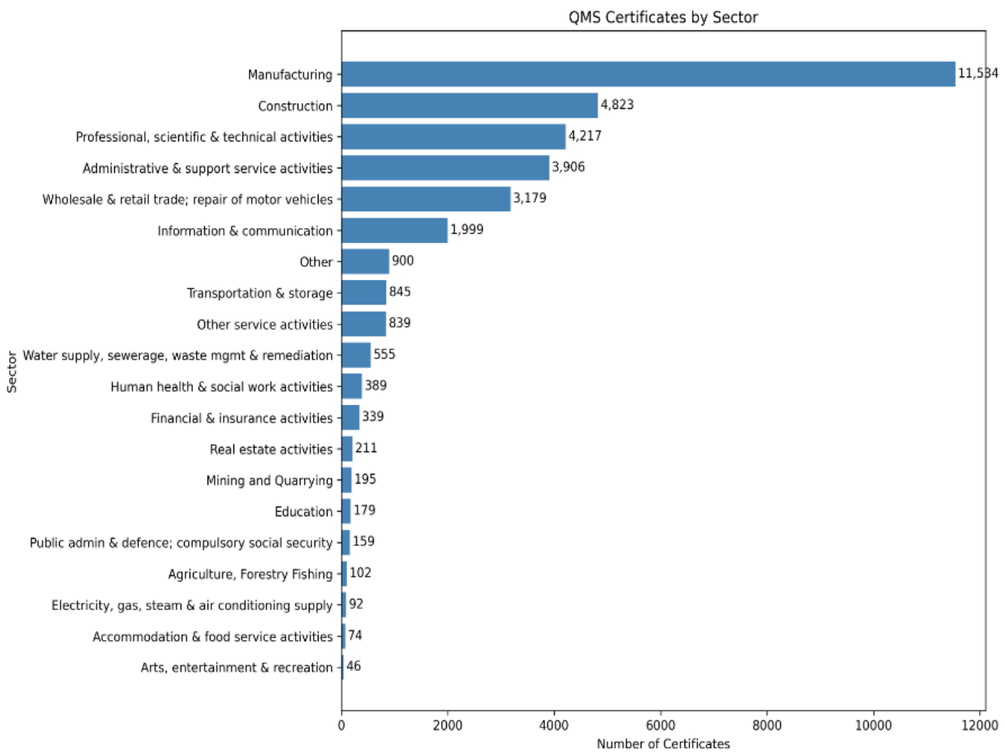
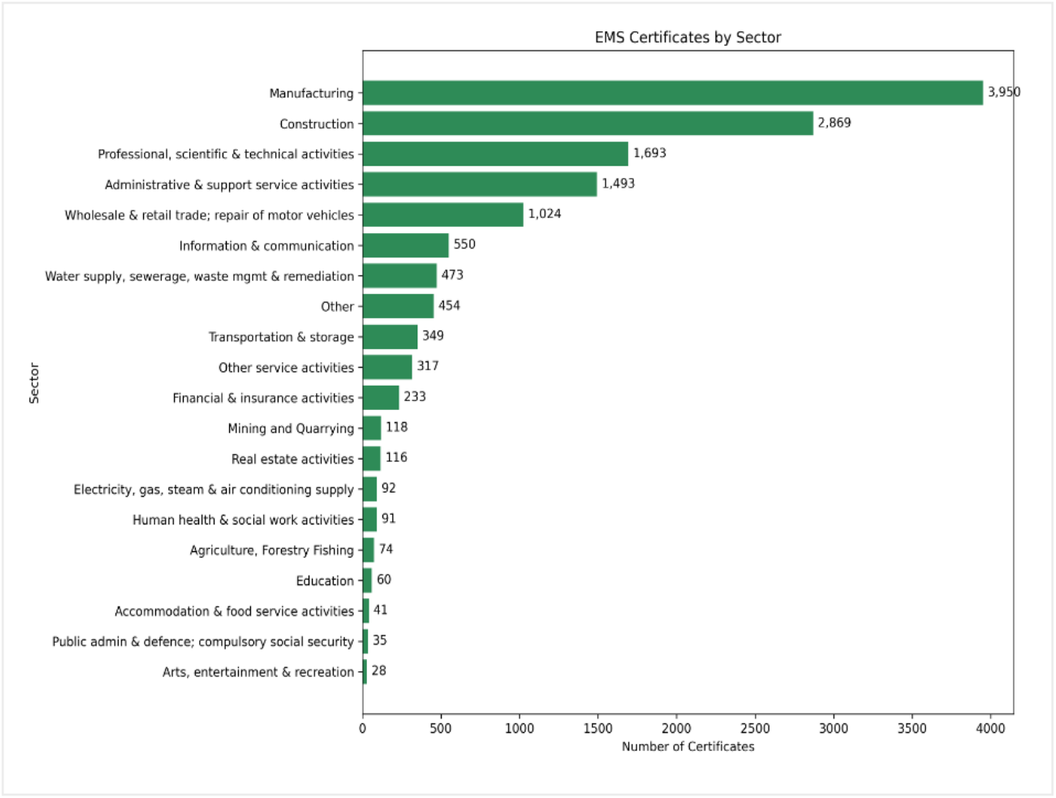


Figure 4.10: Current EMS certificates by sector



Overall, the distribution of accredited certification by industry indicates that neither QMS nor EMS is confined to a single type of business. Although manufacturing and construction together comprise a large portion of certified firms, both standards have been embraced by a diverse array of industries. Companies in sectors ranging from agriculture and mining to finance, real estate, education and healthcare have all pursued ISO 9001 and ISO 14001, underscoring that the appeal of quality and environmental management systems spans the breadth of the UK economy.

Table 4.1: Current QMS and EMS certification by sector

	QMS CERTIFICATES	% SHARE	EMS CERTIFICATES	% SHARE
Agriculture, forestry, fishing	102	0.29	74	0.53
Mining and quarrying	195	0.56	118	0.84
Manufacturing	11,534	33.35	3,950	28.09
Electricity, gas, steam and air conditioning supply	92	0.27	92	0.65
Water supply, sewerage, waste management and remediation activities	555	1.60	473	3.36
Construction	4,823	13.95	2,869	20.41
Wholesale and retail trade; repair of motor vehicles and motorcycles	3,179	9.19	1,024	7.28
Transportation and storage	845	2.44	349	2.48
Accommodation and food service activities	74	0.21	41	0.29
Information and communication	1,999	5.78	550	3.91
Financial and insurance activities	339	0.98	233	1.66
Real estate activities	211	0.61	116	0.83
Professional, scientific and technical activities	4,217	12.19	1,693	12.04
Administrative and support service activities	3,906	11.29	1,493	10.62
Public administration and defence; compulsory social security	159	0.46	35	0.25
Education	179	0.52	60	0.43
Human health and social work activities	389	1.12	91	0.65
Arts, entertainment and recreation	46	0.13	28	0.20
Other service activities	839	2.43	317	2.25
Other	900	2.60	454	3.23
Total	34,583		14,060	

Regional footprints

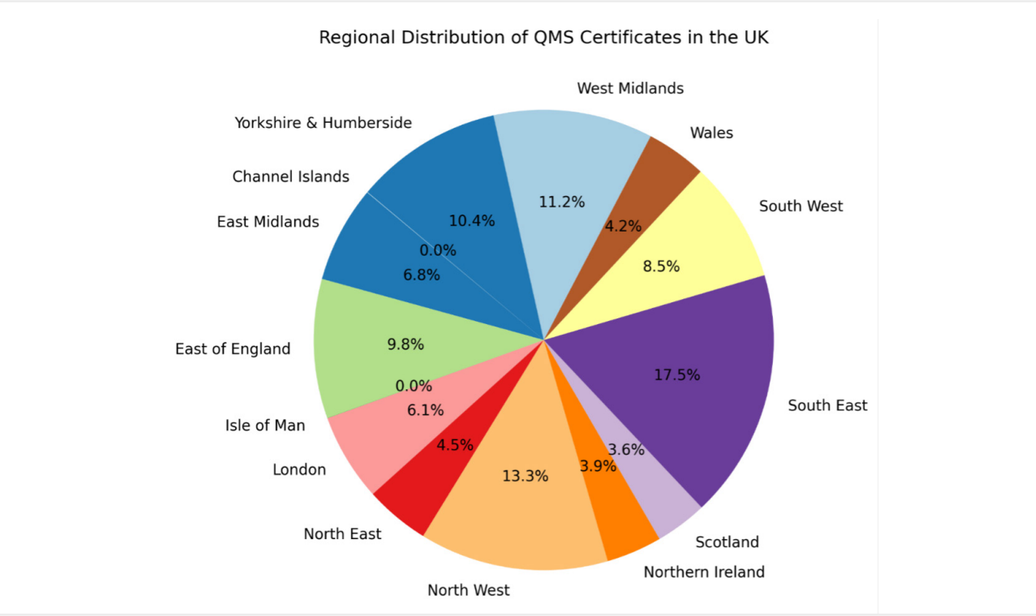
Table 4.2 (also visualised in Figure 4.11) shows that QMS- and EMS-certified firms are broadly distributed across the UK, with certain regions hosting especially large concentrations. The South East and North West of England stand out, together accounting for a significant share of certified businesses under both schemes. This concentration partly reflects the fact that these regions have substantial industrial and commercial activity (and therefore a large base of companies). In other words, areas with more businesses in general tend to have more certifications, but there may also be regional clusters of industries where certification is particularly common.

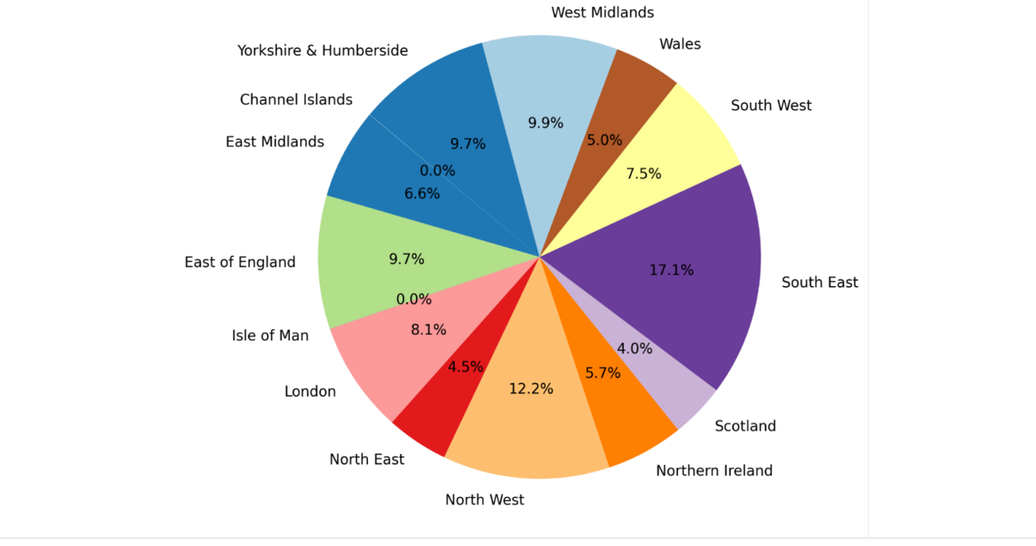
Other regions with prominent shares of certified firms include the West Midlands, Yorkshire and the Humber and the East of England – each of these contributes more than 10% of all QMS certificates and likewise shows strong uptake of EMS. London accounts for about 6% of QMS-certified firms but greater than 8% of EMS-certified firms. This suggests that within London's predominantly service-based economy, environmental management certification has a relatively strong foothold, perhaps due to corporate sustainability initiatives or urban regulatory pressures. Regions outside England are also meaningfully represented: Scotland, Wales and Northern Ireland each host hundreds of certified companies, demonstrating that accredited standards are a UK-wide phenomenon.

Table 4.2: Current QMS and EMS certification by region

	QMS CERTIFICATES	% SHARE	EMS CERTIFICATES	% SHARE
Channel Islands	14	0.05	3	0.02
East Midlands	2,097	6.79	822	6.61
East of England	3,021	9.78	1,210	9.73
Isle of Man	5	0.02	1	0.01
London	1,898	6.15	1,013	8.14
North East	1,405	4.55	562	4.52
North West	4,100	13.28	1,517	12.20
Northern Ireland	1,206	3.90	704	5.66
Scotland	1,125	3.64	494	3.97
South East	5,408	17.51	2,130	17.12
South West	2,630	8.52	929	7.47
Wales	1,310	4.24	617	4.96
West Midlands	3,461	11.21	1,230	9.89
Yorkshire and Humberside	3,205	10.38	1,207	9.70
Total	30,885		12,439	

Figure 4.11 Regional distribution of QMS and EMS certificates





In summary, accredited management certification is geographically widespread across the country. The regional pattern of certifications largely corresponds to local economic size and industrial composition – regions with more and larger firms (and with industry mixes prone to certification) show higher counts of ISO 9001 and ISO 14001 certificates. However, virtually every part of the UK has companies engaged in these standards, indicating a broad diffusion of quality and environmental management practices nationwide.

4.3 Financial and structural characteristics of certified firms

To further characterise the firms in our dataset, we examine key financial metrics for various types of certified businesses. In particular, we compare groups of firms defined by their certification history: firms that were always certified, those that never obtained certification, those that adopted certification mid-period ('starters') and those that discontinued a certification ('stoppers'). We conduct this analysis separately for QMS and EMS, given the differences in sample composition noted above. This yields a set of 'stylised facts' about firm size and assets that help motivate the more formal impact evaluation later in the report.

QMS-certified firms

Table 4.3 summarises turnover, employment and net tangible assets for firms in the QMS sample, broken down by the four types of certification status as described above. We report both the mean and median for each group (as well as standard deviations and the number of observations contributing to each statistic) because the size distribution of firms is highly skewed – a small number of very large companies can raise the average substantially above the median. By including medians, we get a clearer sense of a 'typical' firm in each category.

Looking first at the overall sample, the average firm (across all groups) has about £59.8 million in annual revenue, 149 employees and £11 million in net tangible assets. However, the median firm is much smaller – it has approximately £13 million in turnover, 35 employees and £0.6 million in assets – underscoring the heavy skew in the data. That is, firms opting into QMS certification tend to be larger and more established than the average firm, whereas the very smallest firms are under-represented among QMS adopters. As of 2022, there are 30,680 QMS-certified businesses in the linked dataset. Among these, 8,459 firms reported revenue figures, 27,678 reported employment, and 28,966 reported tangible asset values – collectively accounting for approximately £454 billion in revenue, 2.4 million workers and £359 billion in net assets. This indicates that QMS-certified firms contribute a significant portion of the UK economy's activity.

Turning to the differences across groups, firms that maintained QMS certification continuously throughout 2005–2022 (the 'Always' group) are broadly similar in size to those that eventually gave up their certification ('Stoppers'). Both groups are, by median measures, larger than firms that either only adopted certification mid-period or never certified. For example, the median Always-QMS firm had about £14.1 million in turnover and 54 employees, which is on a par with the median Stopper firm (£14.6 million turnover and 64 employees). By contrast, the median size of Starters and Never-certified firms are considerably lower (eg median turnover around £12 million for starters and under £10 million for never-certified, with correspondingly fewer employees). These patterns suggest that firms opting into QMS certification tend to be larger and more established than the average firm, whereas the very smallest firms are under-represented among QMS adopters. In other words, there may be underlying firm characteristics (such as scale, resources or growth orientation) that make certain businesses more inclined to pursue and maintain accredited quality management standards.

Table 4.3: Business characteristics of all QMS adoption groups

	REVENUE (£ MILLIONS)	EMPLOYMENT	NET TANGIBLE ASSETS (£, MILLIONS)
All			
mean	59,839	149	10,977
median	13,003	35	598
standard deviation	420,282	982	183,610
observations	139,506	267,249	486,095
Always			
mean	52,817	169	13,166
median	14,108	54	1,127
standard deviation	244,086	848	168,152
observations	53,109	83,181	138,787
Starter			
mean	57,691	137	8,909
median	12,128	28	462
standard deviation	475,871	1,059	166,400
observations	77,317	164,749	312,862
Stopper			
mean	109,653	225	26,049
median	14,586	64	776
standard deviation	661,750	708	287,031
observations	5,471	7,307	12,813

EMS-certified firms

A similar picture emerges from the EMS sample (Table 4.4), though the absolute figures differ. In general, EMS-certified firms are larger than those with QMS certification. The mean EMS-holding business generates roughly £106 million in annual revenue, has 338 employees and holds £62.6 million in net tangible assets – substantially higher than the corresponding means for the QMS sample. The median EMS firm is smaller (around £18.2 million revenue, 62 employees, £1.15 million assets), reflecting skewness, but notably it is still larger than the median QMS firm. This indicates that ISO 14001 adopters include a relatively greater share of medium and large companies (eg heavy industrial firms) compared to the ISO 9001 group.

By 2022, approximately 11,635 firms in the dataset held an EMS certificate. Those EMS-certified firms for which data are reported contribute about £700 billion in aggregate revenue, 2.4 million employees and over £1.2 trillion (ie £1,223 billion) in net tangible assets. Thus, although the number of EMS-certified businesses is only about half that of QMS-certified businesses, their combined economic footprint is comparable in terms of employment and even larger in terms of total sales and assets. This is consistent with the observation that EMS adopters skew towards heavy industries and large multi-site firms.

As with QMS, the always-certified EMS firms and stoppers are broadly similar to one another, and both groups are significantly larger (in median terms) than starters or never-certified firms. For instance, the median continuously EMS-certified company has £29.7 million in turnover and 146 employees, while the median EMS stopper has £19.9 million turnover and 108 employees. These figures dwarf those for the median firm that only began EMS certification after 2005 or never pursued it, which again suggests that larger firms are more likely to both adopt and retain certification. Smaller enterprises, on the other hand, are less prevalent among EMS adopters, possibly due to the resource commitments required for ISO 14001 or differences in incentives to pursue environmental credentials. These descriptive patterns reinforce the importance of using careful econometric methods (later in the report) to account for such initial differences – larger, more successful firms may self-select into certification, which we need to control for when estimating the causal impact of certification on performance.

Table 4.4: Business characteristics of all EMS adoption groups

	REVENUE (£ MILLIONS)	EMPLOYMENT	NET TANGIBLE ASSETS (£, MILLIONS)
All			
mean	105,894	338	62,560
median	18,204	62	1,153
standard deviation	782,624	3,078	3,940,279
observations	84,904	126,137	197,892
Always			
mean	201,390	689	124,062
median	29,716	146	6,146
standard deviation	1,239,547	4,271	1,338,997
observations	9,950	11,265	13,546
Starter			
mean	94,580	306	64,371
median	17,256	60	1,082
standard deviation	73,798	2,813	4,385,376
observations	64,933	99,051	158,373
Stopper			
mean	151,175	306	975
median	19,856	108	1,863
standard deviation	894,560	975	368,271
observations	2,243	2,631	3,854

4.4 Certification dynamics and business performance

To obtain preliminary insight into how certification status relates to firm outcomes, we compare business metrics before vs after adoption and during vs after certification for both QMS and EMS.

a) Adoption

- QMS Adopters: As reported in Table 4.5, firms that obtain ISO 9001 typically show higher revenue and net tangible assets after certification, alongside a fall in employment on average. The average revenue rises from c. £54 million to c. £61 million, and net tangible assets from c. £7.4 million to c. £10.3 million. The median moves in the same direction but at lower absolute levels, again reflecting size skew. The joint pattern of higher revenue/ assets and lower headcount is consistent with capital deepening and operational streamlining and implies an increase in productivity - revenue per employee - for the typical adopter.
- EMS Adopters: A similar picture emerges for ISO 14001: mean revenue increases from c. £84 million to c. £103 million and mean net tangible assets from c. £59 million to c. £70 million, while average employment falls (from 374 to 266). Again, the median tells a similar story, suggesting that adoption is associated with greater scale or asset intensity and leaner staffing, possibly suggesting improvements in process control and resource efficiency.

These shifts are compatible with firms adjusting operations post-certification – eg tightening processes, investing in equipment or systems and prioritising higher-margin activity. However, they also underline the need to disentangle certification effects from coincident influences such as changes in cyclical demand or compositional change in the sample when seeking to estimate causal effects.

Table 4.5: Certification timing and business performance: Before vs after certification

QMS Certification	REVENUE (£ MILLIONS)	EMPLOYMENT	NET TANGIBLE ASSETS (£, MILLIONS)
Before certification			
mean	53,865	199	7,432
median	9,504	38	302
standard deviation	445,929	1440	133,666
After certification			
mean	60,769	111	10,294
median	14,145	25	662
standard deviation	498,641	841	192,073

EMS Certification	REVENUE (£ MILLIONS)	EMPLOYMENT	NET TANGIBLE ASSETS (£, MILLIONS)
Before certification			
mean	84,012	374	59,491
median	13,840	66	666
standard deviation	660,887	3,572	4,810,621
After certification			
mean	102,745	266	69,534
median	19,943	56	1,718
standard deviation	782,110	2,245	3,885,134

b) Decertification

- QMS 'Stoppers': Comparing periods during certification with those after cessation (Table 4.6), the mean yields a mixed picture – eg mean revenue falls (c. £111 million to c. £105 million) while employment and net tangible assets rise, driven by a handful of very large firms. The median provides a clearer signal: revenue, employment and net tangible assets all decline after firms discontinue ISO 9001.
- EMS 'Stoppers': For ISO 14001, the median shows a small increase in revenue and employment after decertification, but a marked fall in net tangible assets. This could reflect a shift towards more asset-light operating models, disposal of plant/equipment or sample composition effects. Equally, it may indicate that the most tangible efficiency gains of EMS are realised while certification is active.

The decertification patterns suggest that certification may help sustain higher levels of commercial activity and asset investment, particularly for QMS. For EMS, the reductions in median-level assets post-exit point to the structural role that environmental management systems can play in anchoring resource-efficiency investments.

Table 4.6: Certification timing and business performance: Certification vs decertification

QMS Certification	REVENUE (£ MILLIONS)	EMPLOYMENT	NET TANGIBLE ASSETS (£, MILLIONS)
During certification			
mean	111,236	224	20,678
median	14,980	66	979
standard deviation	708,364	727	190,635
Decertification			
mean	105,081	232	38,022
median	13,511	55	389
standard deviation	503,629	648	429,945

EMS Certification	REVENUE (£ MILLIONS)	EMPLOYMENT	NET TANGIBLE ASSETS (£, MILLIONS)
During certification			
mean	160,153	294	59,034
median	19,803	104	2,303
standard deviation	1,008,171	913	400,376
Decertification			
mean	136,732	327	47,568
median	20,036	111	1,273
standard deviation	673,109	1,073	323,248

These descriptive statistics are informative but not causal. They may be influenced by 1) pre-existing trends and selection (larger, better-managed firms are more likely to certify) and 2) contemporaneous shocks (eg sector cycles, COVID-19). Accordingly, our subsequent empirical strategy employs staggered Difference-in-Differences models which include firm and time fixed effects (additionally, for robustness, matched controls) as well as extensive pre-trend and robustness diagnostics to isolate the incremental impact of certification from these confounders.

4.5 Comparing certified and non-certified firms

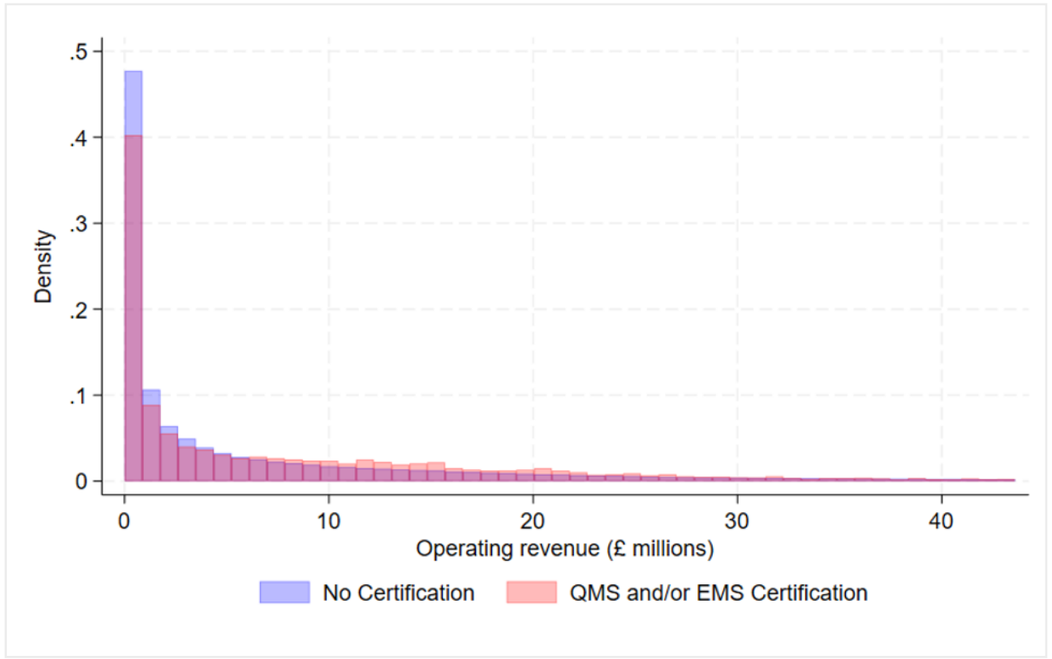
To better understand the differences between certified (either QMS or EMS, or both) and non-certified companies, we examine the distributions of three key performance metrics - operating revenue, employment and labour productivity (revenue per employee) – using overlaid histograms. This is useful for assessing (i) the drivers of differences in the mean between the two groups and (ii) the degree of common support, ie whether certified and non-certified firms occupy comparable ranges of the distributions such that like-for-like comparisons are feasible.

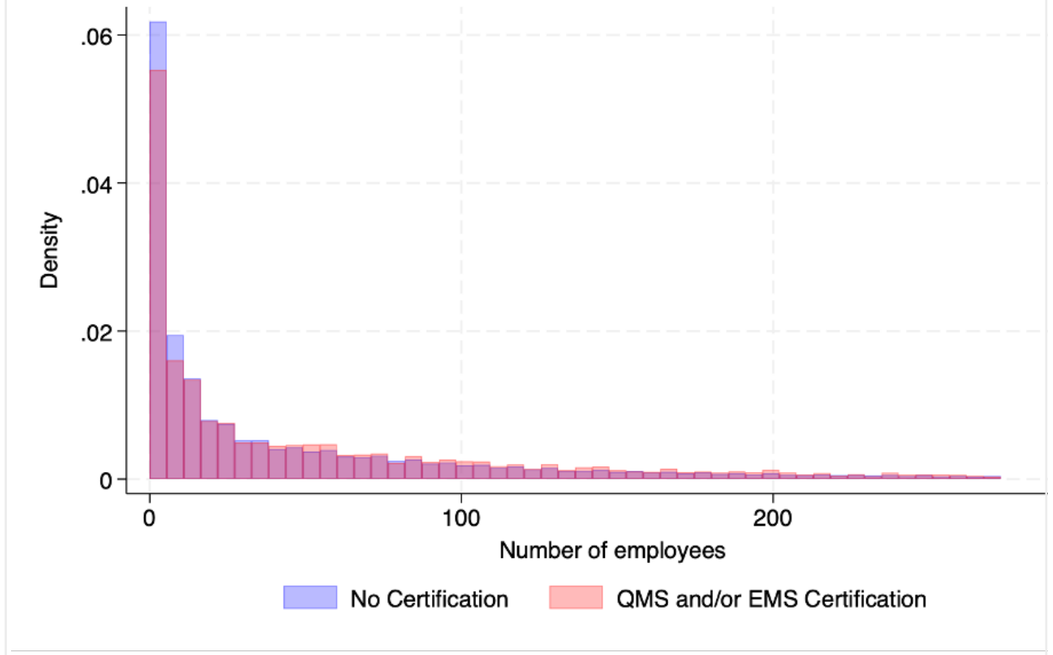
As shown in Figure 4.12, the distribution of operating revenue is highly right-skewed: most firms report low turnover with smaller numbers reporting very high revenues. Certified and non-certified firms overlap across virtually the entire support, indicating adequate common support for subsequent benchmarking. Two differences are visible. First, the left tail is thinner for certified firms, implying that micro-businesses are under-represented among adopters. Secondly, the mid-to-upper tail (roughly £10–£40 million) is marginally thicker for certified firms, signalling that adopters are, on average, larger. These features are consistent with selection into certification by better-resourced firms and explain why simple, unadjusted comparisons tend to show higher revenues for certified firms.

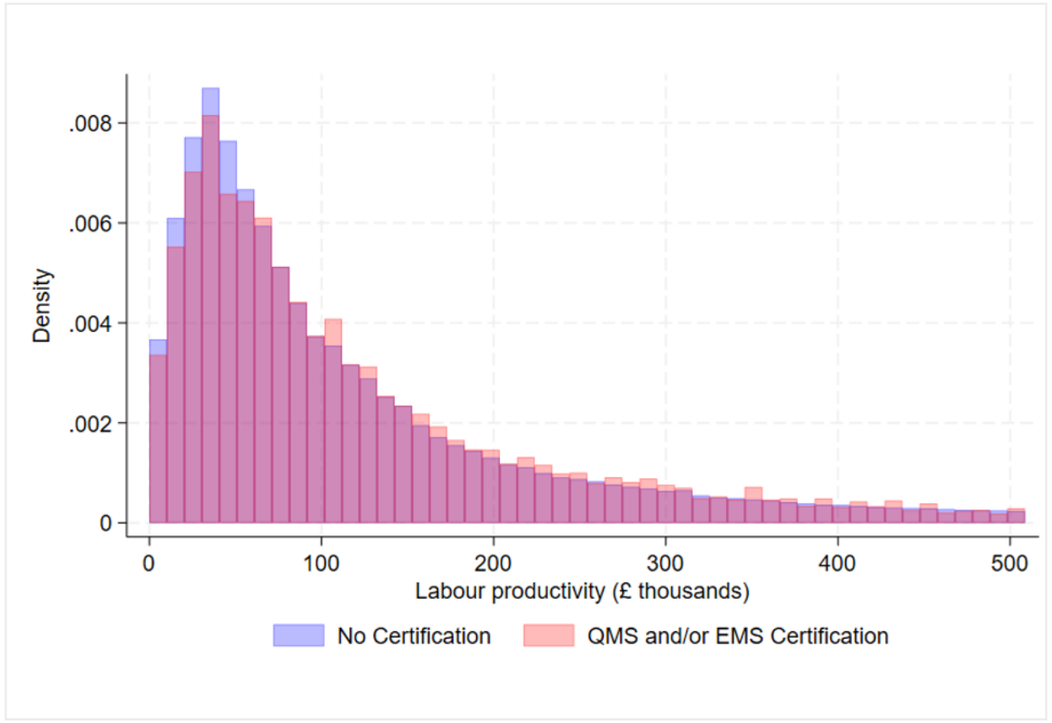
Employment exhibits the same right-skewed pattern: a concentration of small employers with a long tail of larger workforces. The two distributions again overlap closely, but certified firms have less density at the very bottom and somewhat more in the 20–150 employee range. This indicates that certification is relatively uncommon among the smallest employers and more prevalent from mid-size upwards. As with revenue, any raw employment gap largely reflects differences in firm size composition rather than certification per se.

The labour productivity histogram (revenue per employee, £ thousands) shows even closer correspondence between the two groups. Both exhibit a common mode around £50–£100k per worker and broad overlap across the distribution. Certified firms again display slightly less mass at the very low end and a marginally heavier right tail, consistent with the small average productivity premium observed in the raw data. As with revenue, the visual similarity suggests that raw differences are not large.

Figure 4.12: Distributions of key outcome measures: Certified vs non-certified firms



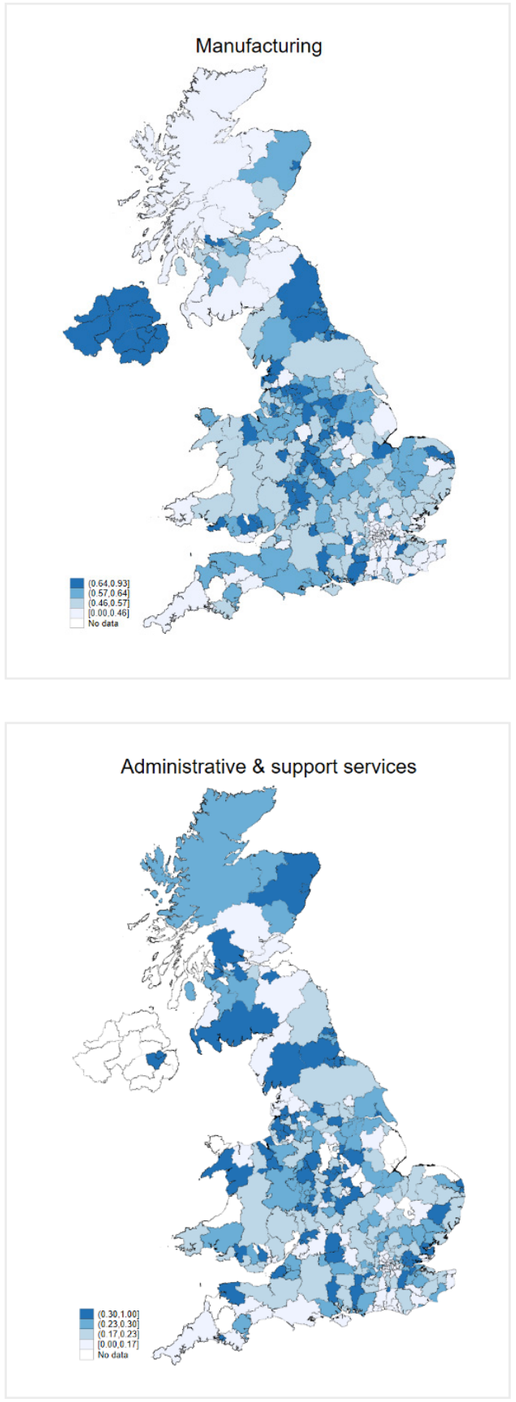


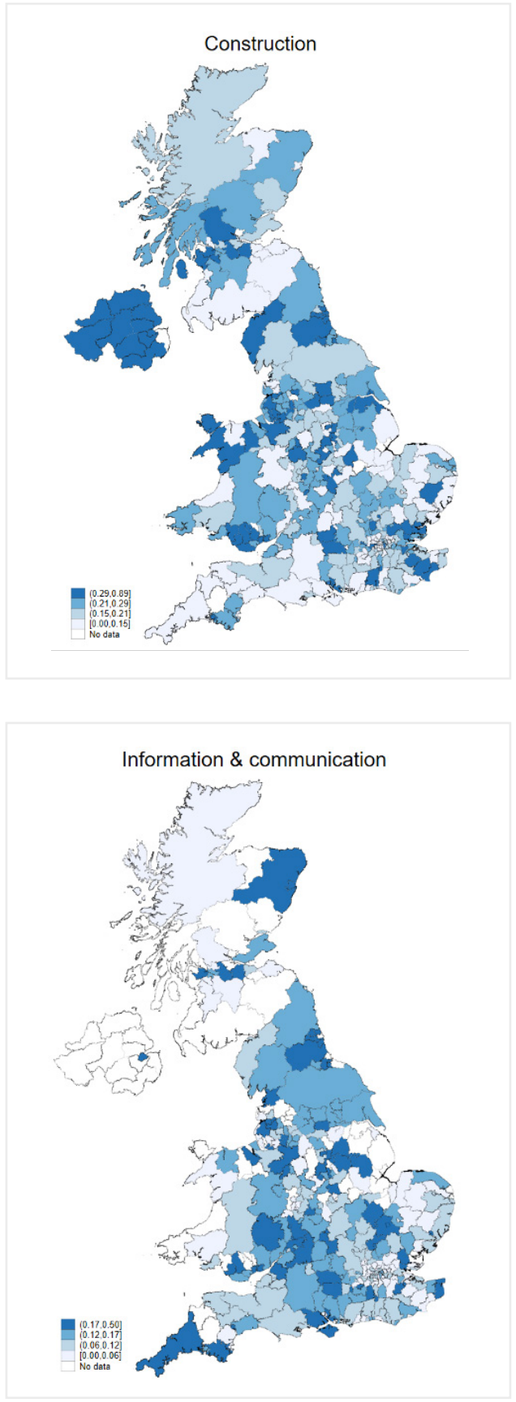


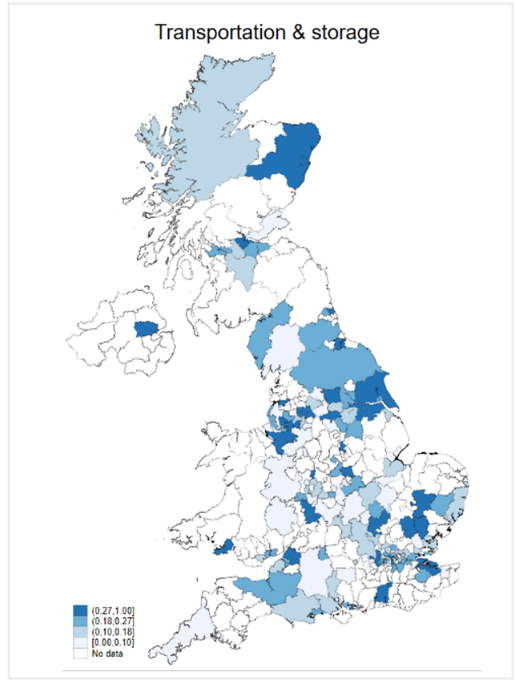
On the whole, these histograms indicate that certified firms tend to be larger and marginally more productive, but there is extensive overlap with non-certified firms across all three outcomes. This pattern supports two conclusions that inform the modelling approach used in the report. First, composition matters: simple mean differences would conflate the effects of certification with differences in characteristics across certified and non-certified firms. Secondly, the substantial common support justifies the use of within-firm (fixed-effects) and matched comparisons to isolate post-certification changes from pre-existing differences.

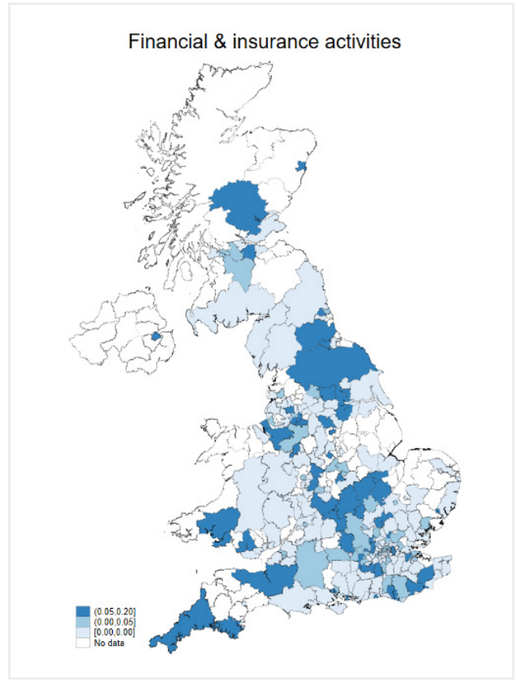
The heat maps in Figure 4.13 display the penetration of management certification by local authority area and sector in the UK. For each local authority (NUTS3 area), the measure is the share of businesses in that sector holding either ISO 9001 (QMS) or ISO 14001 (EMS), or both. Because the numerator is divided by the total number of firms in the local area, the shading reflects intensity of take-up rather than the absolute count of certificates. This avoids conflating larger local business populations with higher adoption and provides a clearer view of where certification is most embedded in the local industrial base (ie highest density).

Figure 4.13: Spatial patterns of management certification penetration: Adoption rates heat map









Notes: Adoption rates are based on certification penetration rather than absolute counts, calculated at the UK local authority level (NUTS 3). Spatial boundaries are based on Office for National Statistics data, licensed under the Open Government Licence v.3.0. Contains OS data © Crown copyright and database right 2016.

Several cross-cutting features stand out. Certification is geographically widespread, with above-median rates in many parts of England, Wales, Scotland and Northern Ireland. Inner-urban authorities often show lower penetration despite hosting many certified firms in absolute terms; very large firm populations in the denominator can depress the rate. A small number of very dark areas typically correspond to small denominators where a few certified firms yield a high share.

By sector, the spatial patterning broadly aligns with supply-chain pressures and sectoral norms:

- Manufacturing: Penetration is broadly high across the industrial belt of northern and central England, much of Wales and Northern Ireland, with further pockets in the South and East. Lower rates tend to appear in service-dominated urban cores and sparsely populated areas.
- Construction: Adoption is widespread but heterogeneous, with strong clusters in the Midlands, South West and parts of Scotland, Wales and Northern Ireland. Lower intensities in some inner-urban districts likely reflect very large numbers of micro contractors in the denominator.
- Administrative and Support Services: Rates are moderate to high across a wide set of authorities, including several in Scotland, northern England and the southern coastal belt, consistent with certification supporting B2B outsourcing and procurement assurance.
- Information and Communication: Penetration is lower overall and concentrated in a small number of university or tech hubs. The sector's high share of micro and project-based firms may limit widespread uptake.
- Transportation and Storage: Higher intensities follow logistics corridors and port/airport geographies – East coast ports, Midlands distribution belts and selected northern authorities – where certification underpins safety, quality and environmental compliance.
- Financial and Insurance Activities: This is one of the lowest-penetration sector, with isolated pockets of higher rates in areas specialising in back-office or insurance operations, reflecting the sector's reliance on regulatory assurance and internal controls rather than ISO management systems.

Overall, penetration rates are highest where sectoral structures and supply-chain requirements favour certification (eg manufacturing, construction) and lowest in sectors dominated by micro firms or alternative assurance regimes (eg information and communication; financial and insurance).

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5

Econometric evaluation of management certification and firm performance

This section evaluates whether accredited management certification is followed by measurable improvements in firm performance and, crucially, whether any observed links can be interpreted causally rather than as artefacts of selection or timing. We structure the analysis along two dimensions that map to distinct identification strategies.

First, to identify short-run effects, we estimate immediate post-adoption changes in revenue and labour productivity for first-time adopters observed in the panel. These within-firm changes before and after certification are benchmarked against contemporaneous outcomes for never-certified firms. Second, to study longer-term effects, we assess firms' resilience during periods of economic stress among those certified prior to major economic shocks, capturing potential benefits that arise once standards are embedded and maintained through successive renewals.

Simple cross-sectional correlations are likely to be confounded: better-performing firms may self-select into certification; performance shifts may themselves trigger certification (reverse causality); or unobserved firm attributes may drive both certification and outcomes.

To address these concerns, we exploit the longitudinal structure of the data and distinguish four firm groups: always-certified, new adopters, stoppers and never-certified firms. The core designs use staggered Difference-in-Differences and matched control groups to compare like-with-like over time, thereby controlling for time-invariant firm quality and common shocks.

5.1 Estimation sample and empirical strategy

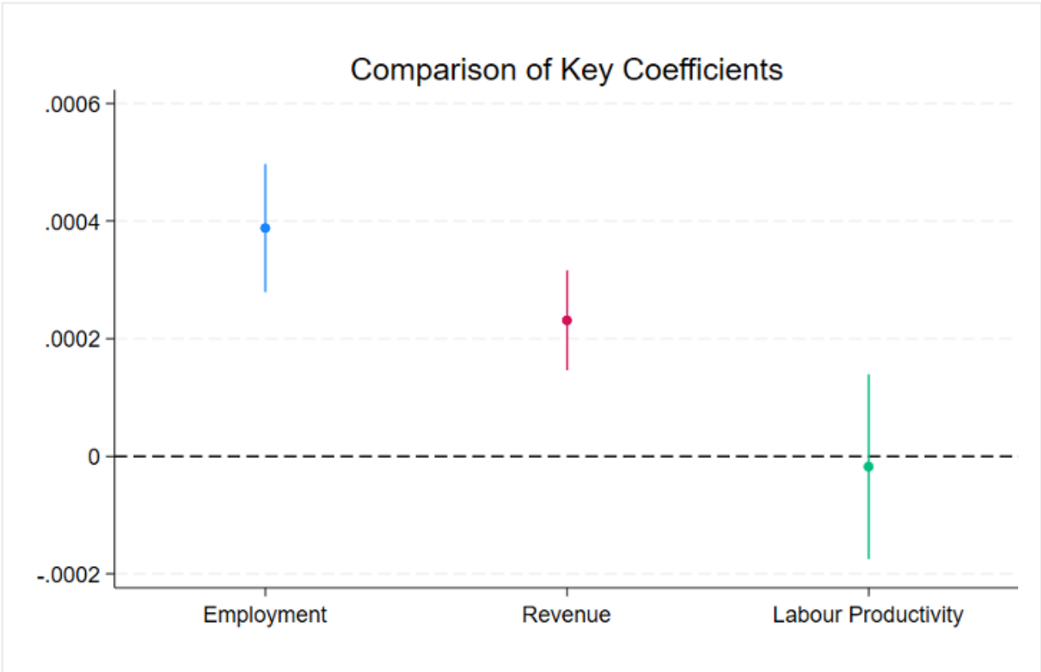
We assemble a panel of UK firms from 2015–2024 that includes both certified and non-certified businesses across the main market-facing sectors. The analysis focuses on broad 1-digit NACE industries: Manufacturing (C), Construction (F), Wholesale and Retail Trade (G; including motor vehicle repair), Administrative and Support Services (N), Professional, Scientific and Technical Services (M) and Information and Communication (J). Firms in other sectors (eg transport, utilities, finance, real estate, health and other services) are pooled into an 'Other' category for completeness. The estimation sample comprises all firms holding an ISO 9001 QMS or ISO 14001 EMS certification during the period, along with a pool of never-certified firms in the same sectoral groupings.

For causal analysis, we ensure comparability between certified and non-certified firms. Certified firms are matched to never-certified counterparts with similar pre-certification characteristics – including size (employment), age, industry, region and legal form – and observed over a similar time span. This matching on observables helps refine the control group, so that remaining differences in outcomes are more likely due to certification rather than initial disparities. We then implement a generalised Difference-in-Differences/ event-study design, exploiting within-firm variation around each firm's certification date. In practice, our regressions include firm fixed effects (to absorb all time-invariant differences between firms) and year fixed effects (to absorb economy-wide shocks each year). The treatment indicator is set to 1 from the first year a firm becomes certified. Standard errors are clustered at the firm level to reflect the non-independence of observations over time. This framework means each certified firm is effectively compared to itself before vs after certification, while also being compared to similar never-certified firms over the same period, strengthening the causal interpretation of the results.

5.2 Determinants of certification uptake

Before estimating the impacts of certification, we first examine which firms choose to become certified, to understand potential selection bias. Focusing on firm characteristics observed prior to any certification event, we compare future adopters against firms that never obtain accredited certification. Several clear patterns emerge from the results presented in Figure 5.1: businesses that subsequently adopt ISO 9001 (QMS) or ISO 14001 (EMS) are systematically larger than their never-certified peers in terms of both employment and revenue prior to certification. In contrast, we do not find strong evidence that future adopters are more efficient or productive ex ante – their pre-certification labour productivity (revenue per employee) is not significantly higher on average than non-adopters. This suggests that while larger firms are more inclined to seek accredited management certification (perhaps reflecting greater organisational capacity or stronger external pressure), they are not necessarily more productive at the point of adoption.

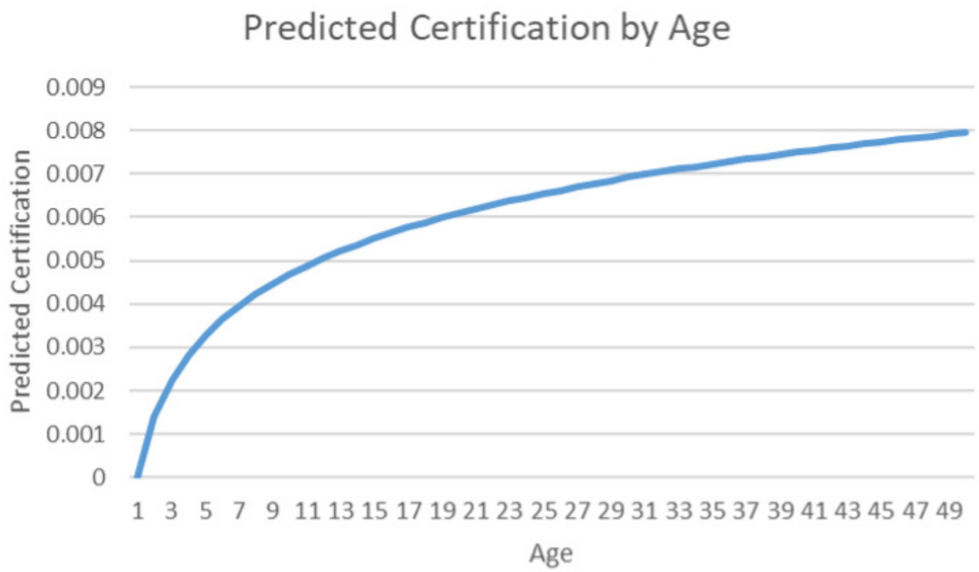
Figure 5.1: Modelling the business decision to obtain certification



1 Legal form refers to partnerships, private limited companies, public limited companies, and so on.

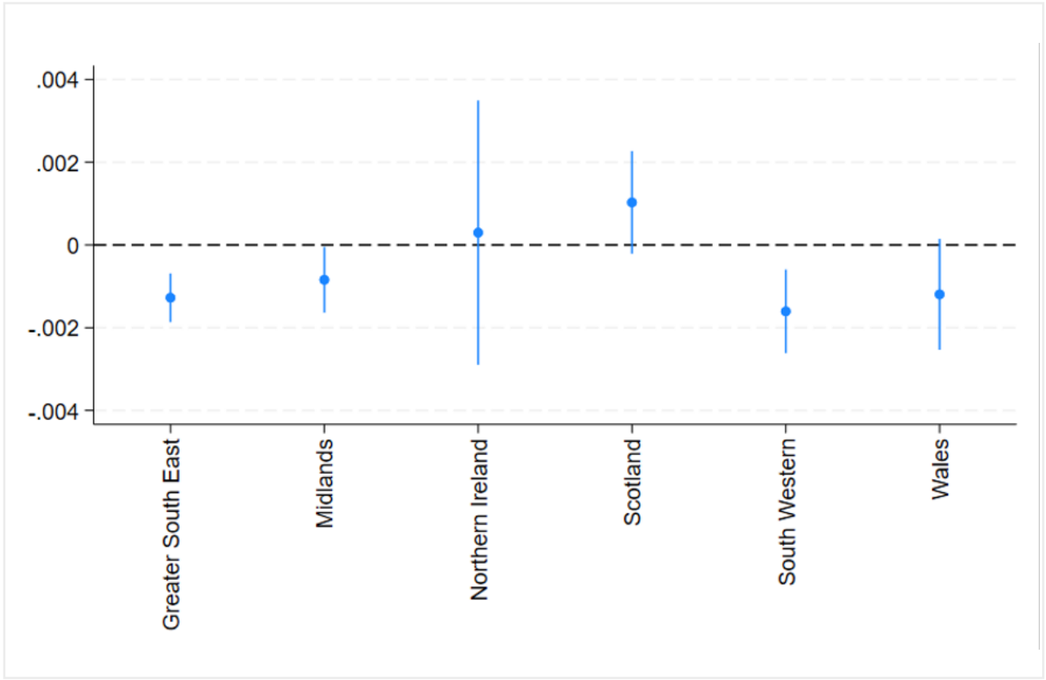
Firm age also plays a role in uptake. As shown in Figure 5.2, the probability of accredited certification tends to rise with age: older companies are more likely to seek certification than very young firms, but with diminishing returns (the age effect tapers off for the oldest firms).

Figure 5.2: Predicted likelihood of certification by firm age



Regional patterns, shown in Figure 5.3, reveal only modest differences. Firms across most parts of the UK display broadly similar propensities to pursue certification when controlling for observable characteristics. Relative to the reference group of firms located in the North, there is a slight under-representation of new certification in some regions such as the South West and Wales, but these differences are rather small in magnitude. In other words, location within the UK does not strongly predict certification uptake once industry and size are accounted for.

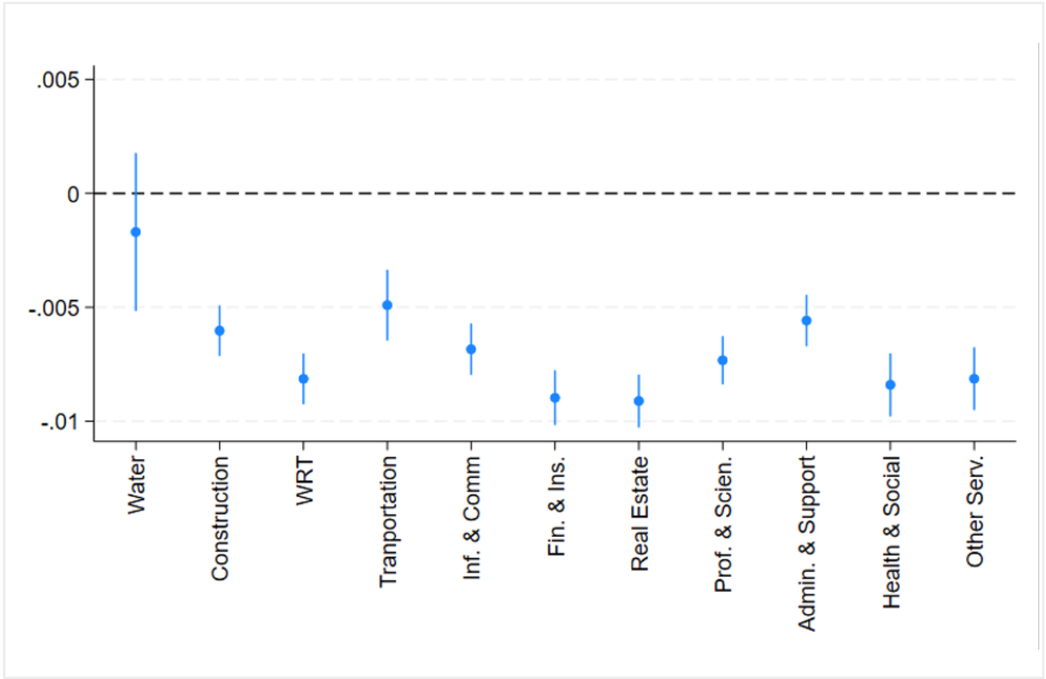
Figure 5.3: Modelling regional differences in certification uptake



Notes: Estimated coefficients from a regression controlling for firm size, age and sector. Differences across UK regions are small and mostly statistically insignificant, suggesting that certification propensity is broadly uniform once structural factors are accounted for.

Sectoral differences, by contrast, are more pronounced, as illustrated in Figure 5.4. Manufacturing firms (our reference category) have a higher propensity to become certified, whereas many service sectors show lower uptake. For example, companies in services – particularly in financial and insurance activities – are significantly less likely to pursue ISO certification than manufacturers, all else equal. This pattern is consistent with ISO 9001 and ISO 14001 having traditionally been perceived as more directly relevant to manufacturing and production-oriented processes than to many service-based activities.

Figure 5.4: Modelling sectoral differences in certification uptake

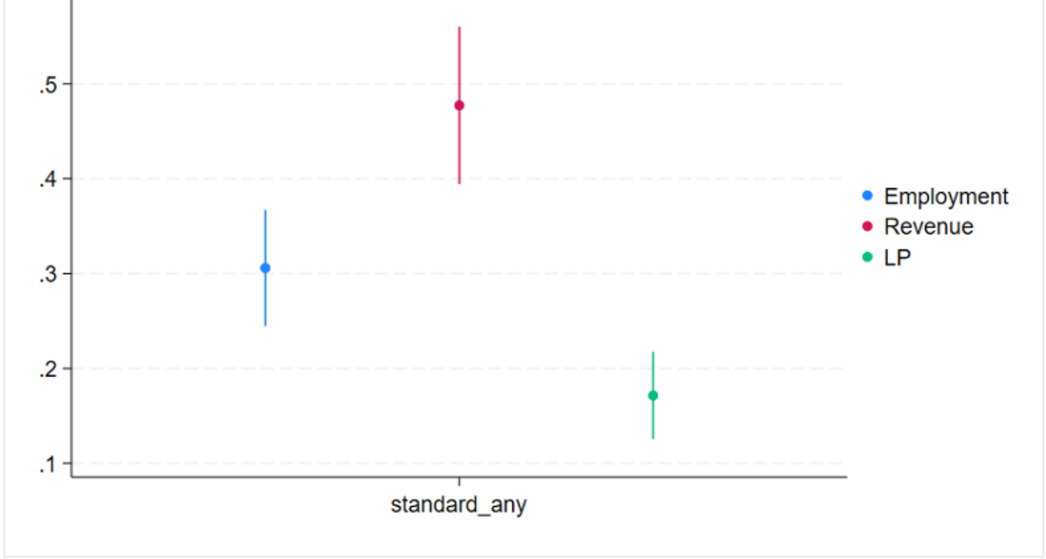


Notes: Estimated coefficients from a regression controlling for firm size, age and regions, showing sectoral disparities.

5.3 Linking accredited certification to business performance

We begin the outcome analysis with a straightforward comparison of performance metrics between certified and non-certified firms, acknowledging that this is descriptive and does not account for selection biases. This provides a sense of the raw performance gaps associated with certification. Indeed, the data confirm that certified firms outperform on several dimensions. Pooling the two certification schemes together, businesses holding an accredited certification have on average about 48% higher annual revenue[2], 31% more employees and 17% higher labour productivity than businesses without certification. In other words, certified firms tend to be larger *and* somewhat more productive. When we disaggregate by certification scheme, the pattern remains[3] : firms with ISO 9001 (QMS) certification show roughly a 49% revenue premium, 33% greater employment and 16% higher productivity compared to non-certified firms, while those with only ISO 14001 (EMS) certification have about a 37% revenue premium, 27% more employees and 9% higher productivity than non-certified firms. The performance gap is slightly smaller for EMS-only companies, which may reflect the different industry profile of environmental standard adopters (often in heavy industry and larger multi-site firms, as noted earlier).

Figure 5.5: Modelling the correlation between certification and performance



2 This is calculated as exp (Standard)-1.

3 Results from these separate analyses are not included here but available upon request.

While these correlations are suggestive of a link between certification and business performance, it is important not to interpret them as causal. As discussed, certified businesses differ from others in important ways. In fact, much of the performance gap can be explained by observable characteristics. When we compare certified and non-certified firms after accounting for basic differences such as firm age and legal form, the advantages shrink considerably. For example, controlling for these factors reduces the certified employment premium to around 3% (and this difference is no longer statistically significant) and brings the revenue and labour productivity gaps down to roughly 12% and 8% respectively (these remaining gaps are statistically significant). In other words, part of the reason certified firms are larger and more productive is that they tend to be older companies and more often structured as public or private corporations rather than small partnerships – characteristics associated with scale and performance regardless of certification status.

If we further include controls for industry and region – recognising that firms in different industries and locations face different environments – the performance differentials narrow even more. After accounting for sector and regional factors, the employment difference is around 5% and remains statistically indistinguishable from zero and the revenue and productivity gaps fall to 0.13% and 0.08% respectively (still positive and statistically significant, but much smaller than the raw gaps). In summary, once we compare like with like (ie controlling for age, sector, etc), certified firms still exhibit a modest performance edge in revenue and productivity, but the gap is only a fraction of the headline differences. This simple adjusted comparison hints that some performance benefit might be associated with certification, but it also illustrates that most of the initial disparity is due to underlying firm characteristics (ie self-selection of firms with better resources) rather than the act of certification itself. These findings motivate a more rigorous approach to pin down causality, which we turn to next.

5.4 Short-run impact on revenue and productivity (first adoption)

The analysis so far indicates that careful methods are required to isolate the effect of becoming certified. We, therefore, implement a Difference-in-Differences (DiD) methodology to quantify the impact of QMS and/or EMS certification on firm performance. Throughout this section, 'certified firms' refers to firms holding QMS, EMS or both. This approach considers what happens to a certified firm's outcomes before and after it becomes certified, relative to a control group of firms that never certify. By tracking firms over time, we difference out any stable firm-specific advantages or disadvantages and by comparing to never-certified firms facing the same external conditions, we control for broader economic shocks (such as the Brexit referendum and the COVID-19 pandemic) that affected all businesses. The identifying assumption is that, absent certification, the trend in outcomes for the soon-to-be certified firms would have been the same as that for comparable non-certified firms – the usual 'parallel trends' condition for DiD. While this assumption cannot be tested directly, we provide evidence supporting it through pre-trend tests described below.

In practice, our preferred estimation uses a two-way fixed effects regression model with an extended estimator that accounts for staggered adoption timing and allows treatment effects to vary (following Wooldridge (2023)). This avoids biases that can arise when firms adopt the 'treatment' (certification) in different years and potentially experience different effects. We examine whether certified and non-certified firms had similar outcome trends before certification to test for parallel trends. If certified firms were already on a markedly different trajectory pre-adoption, it would cast doubt on the causal interpretation. To be confident in our results, we employ several estimation variants and robustness checks. In particular, we examine results from a matched subsample of firms (using the matched controls described in Section 5.1) and use alternative estimators that allow for heterogeneity in effects. All approaches yield a broadly consistent story, as we describe below.

Descriptive statistics

Table 5.1: Summary statistics of certified vs non-certified firms

MEANS	NON-CERTIFIED	QMS AND/OR EMS CERTIFIED	TOTAL
Employees	146.881	151.593	146.943
Revenue	18.831	19.082	18.834
Labour Productivity	216.322	231.521	216.519
ln Employees	3.025	3.242	3.028
ln Revenue	0.648	0.950	0.652
ln Labour Productivity	4.531	4.615	4.532
Industry (1-digit NACE code)			
Administrative & support service activities	0.108	0.109	0.108
Construction	0.124	0.135	0.124
Information & communication	0.112	0.059	0.111
Manufacturing	0.061	0.406	0.065
Other	0.306	0.085	0.303
Professional, scientific & technical activities	0.170	0.108	0.169
Wholesale & retail trade; repair of motor vehicles & motorcycles	0.119	0.098	0.119
Region			
Greater South East	0.531	0.384	0.529
Midlands	0.132	0.181	0.132
North	0.199	0.258	0.200
Northern Ireland	0.007	0.035	0.007
Scotland	0.034	0.058	0.034
South Western	0.065	0.054	0.065
Wales	0.034	0.029	0.033
Year			
2015	0.094	0.081	0.094
2016	0.113	0.096	0.113
2017	0.109	0.100	0.109
2018	0.104	0.107	0.104
2019	0.114	0.115	0.114
2020	0.120	0.121	0.120
2021	0.120	0.126	0.120
2022	0.123	0.130	0.123
2023	0.103	0.124	0.103
Observations	851,860	11,205	863,065

Table 5.1 provides summary statistics for the estimation sample, comparing the key performance and structural variables between certified and non-certified firms. This confirms the patterns seen previously: certified firms are larger on average (specifically in terms of employment and revenue) and have higher average labour productivity than non-certified firms. The table also shows the industry and regional composition of the two groups. Certified businesses are disproportionately concentrated in Manufacturing (accounting for just over 40% of the certified sample, compared to just 6% of the non-certified sample) and are under-represented in sectors such as Information & Communication or Professional Services. Regionally, a smaller share of certified firms are in the Greater South East (which includes London) than one might expect from the overall sample, whereas regions like Northern Ireland account for a larger share of certified firms than of firms generally. This likely reflects the sectoral mix – for example, Northern Ireland, the North and the Midlands have a high concentration of manufacturing and engineering firms that engage with management system standards. Conversely, regions with more service-based economies (like the Greater South East) show lower intensities of certification. In short, these structural differences suggest that the certified cohort looks quite different from the average UK firm, underscoring why the econometric analysis must compare firms on a like-for-like basis.

Regression results

Table 5.2 shows the estimated effects on revenue and labour productivity obtained from generalised Difference-in-Difference estimation aggregated across all post-certification periods[4]. The upper panel of the table shows revenue results and the lower panel shows productivity results, with each column breaking out a particular industry (the first column is the effect across all industries combined). For the full sample of industries, the point estimate on revenue is small and not statistically distinguishable from zero. In other words, on average, we do not find a statistically significant impact of certification on firm revenues following first-time adoption. Looking across individual sectors, the estimated revenue impacts are also generally small and not statistically significant. That is, none of these estimates is precise enough for us to be confident that an effect exists. The one exception is the wholesale and retail trade sector, where the model suggests certification might be associated with a negative impact on revenue. However, we urge caution in interpreting this result. The pre-trends test strongly suggests that certified firms from the wholesale and retail trade sector were already on a markedly different revenue trajectory before they got certified, violating the parallel trends assumption (see the 'Pre-trends' row in Table 5.2). This means the negative revenue result for wholesale and retail trade is likely spurious, reflecting those pre-existing divergent trends rather than an effect of certification per se.

Turning to labour productivity (Table 5.2, lower panel), the results are broadly similar. The aggregate Average Treatment Effect on the Treated (ATET) – the average impact of becoming certified – on labour productivity is close to zero (+0.6%) and statistically imprecise. This indicates that, on average, certification is not associated with immediate productivity changes in the short run, consistent with the interpretation that its impact may operate through longer-term or metrics not measured here. Across industries, most estimated effects hover close to zero, with large confidence intervals. Most notably, firms in the construction industry exhibit a sizeable and statistically significant productivity gain following certification, with estimated increases in labour productivity of around 16%–17%. Moreover, when we use the matched sample for robustness, the construction productivity estimate becomes even larger in magnitude (indicating an even greater productivity boost). This finding aligns well with the role of management system standards in improving process coordination, quality control and project management in site-based industries. The event-study plot for construction firms shows a steadily widening gap in productivity after certification, consistent with an accumulating benefit. However, as with the wholesale and retail trade case discussed above, there is some evidence that construction firms that became certified had slightly different productivity trends before certification than those that remained uncertified. Our pre-trend test for construction finds a modest divergence in productivity trajectories prior to certification (significant at the 10% level). This suggests that firms choosing to certify may already have been on a stronger efficiency path. In practical terms, the results point to certification potentially reinforcing and formalising these underlying improvements, with the observed post-certification productivity gains of around 17% reflecting a combination of pre-existing momentum and additional benefits associated with the adoption of management system standards.

Overall, the core Difference-in-Differences analysis indicates that certification is associated with broadly stable revenue and productivity outcomes across the economy, with no statistically detectable short-run effects on average. Figures 5.6 and 5.7 plot the dynamic event-study results for all industries combined (ie the cumulative effects at different points relative to the point of certification). As illustrated in these figures, prior to certification, the trends for the treated and control groups are largely similar with no notable pre-certification increase or dips for the treated firms relative to control, which supports our identification strategy. After certification, the outcome paths remain very close: there is little discernible difference in revenue or productivity trajectories between certified firms and their non-certified counterparts on average. The confidence intervals around the estimated effects post-certification generally include zero, indicating a lack of statistical significance.

4 We use the extended two-way-fixed-effects estimator proposed by Wooldridge (2023). This is one approach that addresses the 'forbidden comparison' problem that arises in the context of staggered receipt of treatment (i.e. certification) and heterogeneous treatment effects when using standard two-way fixed effects.

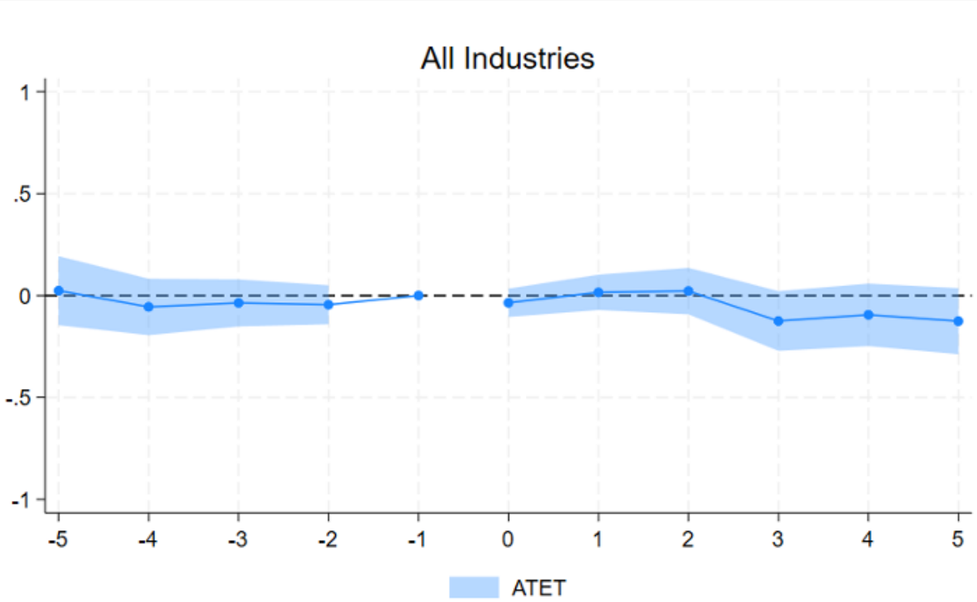
Table 5.2: Estimated effect of certification on revenues and labour productivity

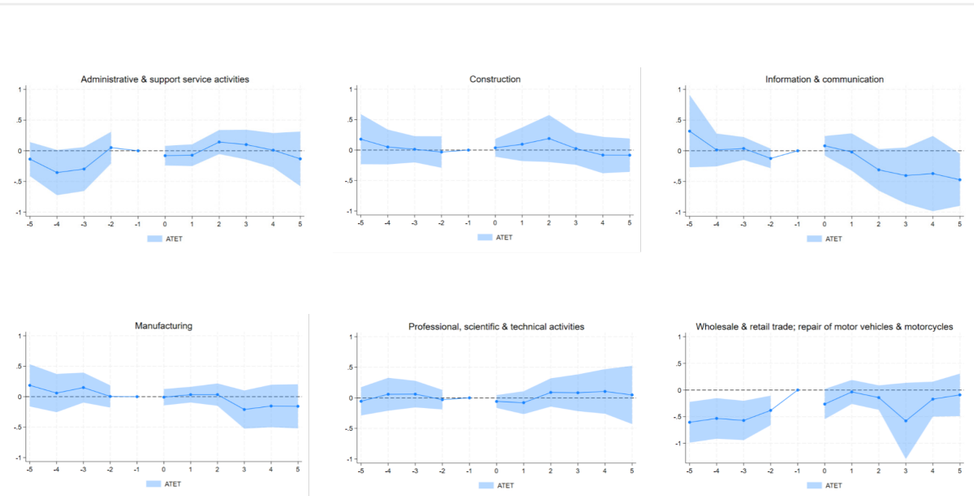
	ALL	ADMINISTRATIVE & SUPPORT SERVICES	CONSTRUCTION	INFORMATION & COMMUNICATION
		REVENUES		
ATET	-0.036	-0.006	0.061	-0.171
	(0.037)	(0.079)	(0.094)	(0.114)
Pre-Trends	5.763	9.390	2.522	12.789*
		LABOUR PRODUCTIVITY		
ATET	0.006	-0.157*	0.158**	-0.003
	(0.036)	(0.090)	(0.071)	(0.079)
Pre-Trends	9.387	19.694***	13.038*	4.363
Observations	853,660	92,527	105,935	95,575

	MANUFACTURING	OTHER	PROFESSIONAL, SCIENTIFIC & TECHNICAL	WHOLESALE & RETAIL TRADE; REPAIR OF MOTOR VEHICLES & MOTORCYCLES
		REVENUES		
ATET	-0.046	0.017	0.012	-0.185*
	(0.066)	(0.091)	(0.109)	(0.101)
Pre-Trends	11.996	12.195*	3.818	16.075**
		LABOUR PRODUCTIVITY		
ATET	-0.007	0.105	-0.070	0.067
	(0.064)	(0.088)	(0.116)	(0.145)
Pre-Trends	6.542	19.330***	8.517	5.075
Observations	52,017	260,948	145,279	101,379

Notes: Standard errors are in parentheses. */**/*** denotes statistical significance at the 10%/5%/1% level. ATET denotes Average Treatment Effect on Treated. 'Pre-trends' refers to a test of the null hypothesis that the aggregated pre-treatment effects equal zero.

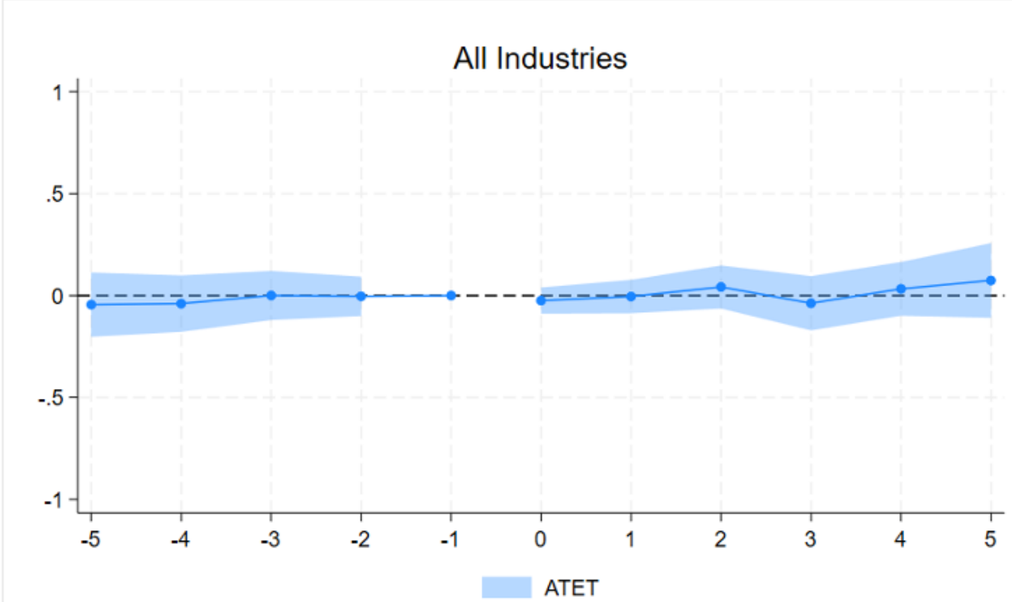
Figure 5.6: Estimated effects of certification on revenues

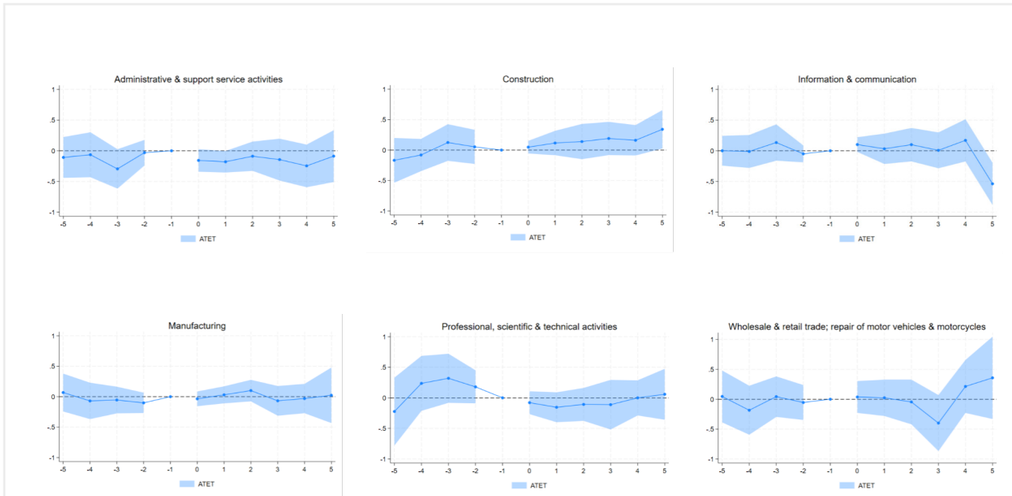




Notes: ATET denotes Average Treatment Effect on Treated. Shaded area shows 95% confidence interval.

Figure 5.7: Estimated effects of certification on labour productivity





Notes: ATET denotes Average Treatment Effect on Treated. Shaded area shows 95% confidence interval.

To ensure these findings are not driven by model specifics, we performed a range of robustness checks. One check uses a matched sample estimator: this is useful since certified and non-certified firms with the same characteristics may be more likely to experience the same trends in revenue. As such, this increases confidence in the causal interpretation of the estimates. Specifically, certified firms are matched with non-certified firms with identical values of employment, age, industry code, region, legal form and year (as well as measures of how long they are observed in the sample). The results from using the matched sample, shown in Table A.3 and Figures A.1 and A.2 in the Appendix, are similar to those seen using the full sample. This boosts our confidence that differences in observable characteristics between certified and non-certified firms are not behind the negligible average effects – even when firms are virtually alike on paper, we still observe no significant divergence in performance post-certification.

In sum, certified firms are, on average, larger and higher performing, but our econometric estimates do not reveal a statistically precise, economy-wide causal uplift in revenue or labour productivity following certification within the short- to medium-term. This pattern is consistent with management system certification being adopted by firms that already exhibit stronger organisational capabilities, suggesting that certification may complement – and help formalise – existing good practices rather than acting as a standalone productivity shock.

The absence of statistically precise short-run effects on revenue or productivity should not be interpreted as evidence that accredited certification lacks impact. The estimates suggest that large, immediate economy-wide gains are not found among recent adopters of mature standards. Several features of the data and institutional context help explain why measurable impacts may be difficult to detect within this framework.

- Cohort and timing: Because reliable financials are concentrated in the last decade using Orbis data, the "treated" group we observe consists mainly of new entrants into established QMS/EMS schemes. Many large early adopters were certified before our panel window and therefore sit outside the identification sample. When a standard is mature and widely diffused as such, the marginal advantage to late adopters could be smaller, so any effect is harder to detect.
- Firm size and coverage: New entries in the last decade are disproportionately smaller firms, and smaller-firm financial accounts are more volatile and less complete. This reduces statistical power and widens confidence intervals, particularly in sectoral or regional splits.
- Treatment intensity and renewal: Much of the observed certification activity in our timeframe reflects renewals of existing certification, which we cannot use for first-difference identification. Focusing on first-time adoptions necessarily shrinks the treated sample, further limiting precision.
- Treatment timing and implementation duration: Certification is rarely a discrete, point-in-time intervention. Firms typically spend 12–24 months preparing, phasing in management practices well before the formal issue date, and financial year-ends often do not align with audit milestones. This timing uncertainty and measurement issue can blur the true onset of certification effects — pulling part of the impact into pre-certification periods and diffusing it across multiple years — thereby attenuating estimated effects in event-study or difference-in-differences analyses and making precise post-certification impacts harder to detect.
- Outcome scope and lag structure: We measure revenue and revenue-per-employee. Many benefits plausibly operate through cost, supply chain linkages, defect rates, win-rates in tenders, compliance risk or resilience, which may not register immediately in these two indicators or may materialise beyond our observation window.

Overall, the heterogeneity we document – by sector, firm age/size and geography – also points to areas where certification may be more consequential, consistent with theory and prior evidence that advantages are strongest earlier in a diffusion cycle or where supply-chain and regulatory pressures are more binding. Interpreted in this way, our results are best viewed as a lower bound on average impacts for late adopters during a period of widespread diffusion.

These findings motivate a broader perspective on the value of accredited certification – one that looks beyond average short-run financial outcomes. In the next section, we therefore turn to an important channel through which certification may deliver value: enhancing firms' resilience and adaptive capacity during periods of economic disruption.

5.5 Long-run benefits for resilience (continued certification)

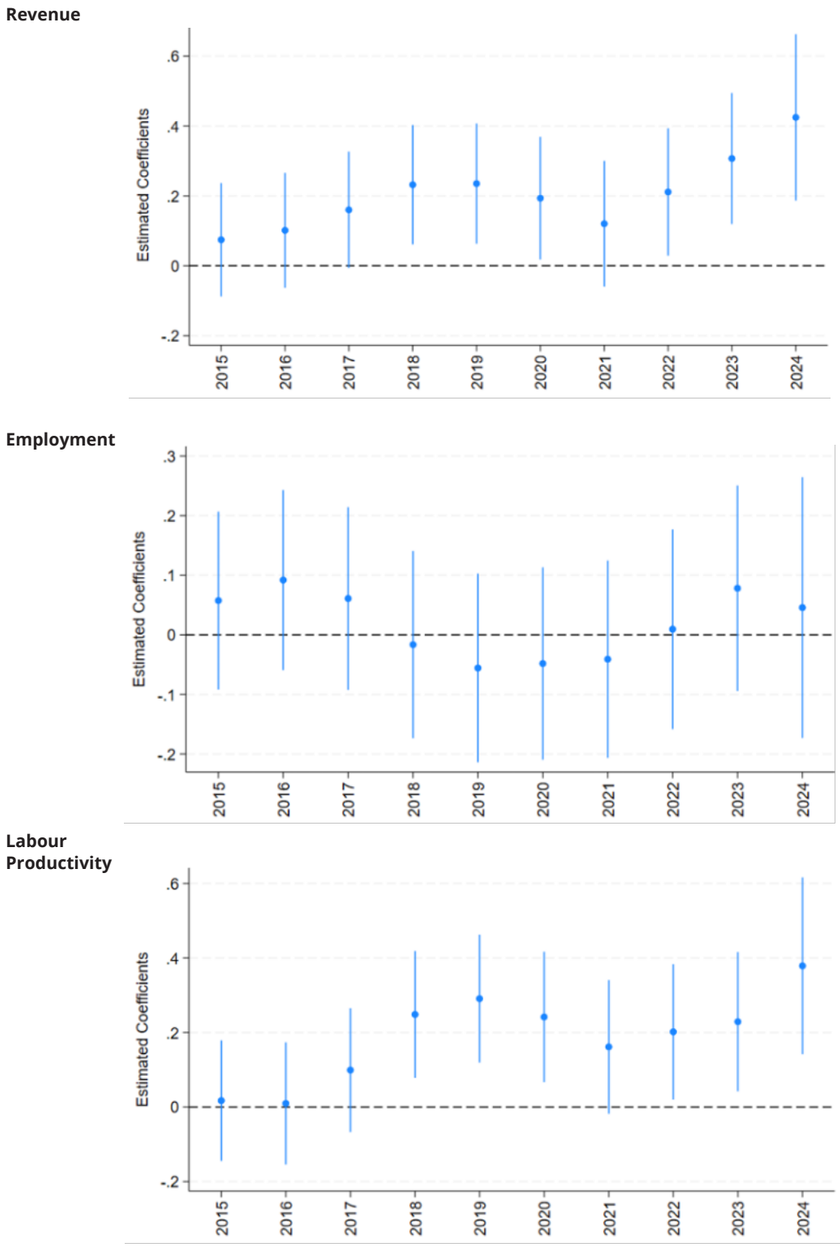
Certified firms during Brexit and the COVID-19 pandemic

The UK economy has been subject to a series of predominantly negative shocks over the last decade, which have contributed to a period of rather anaemic GDP growth. Beyond routine performance metrics, an important question for policy is whether certified firms are more resilient in the face of these economic shocks. The past decade (2016–2024), therefore, offers a useful test bed for this, as businesses in the UK have faced a series of significant disruptions both from home and abroad. These include domestic shocks like the Brexit process (2016 onwards) and fiscal changes, as well as external shocks such as the COVID-19 pandemic (2020–2021, the largest economic contraction in decades) and the global fallout from the Russia–Ukraine conflict. Many of these shocks created heightened uncertainty, demand shortfalls, supply chain disruptions and cost pressures for firms.

We therefore investigate whether firms with accredited certifications were better able to navigate and perform through these crisis periods compared to otherwise similar firms without certification. Our approach is to take firms that were already certified by 2013 (before the onset of these crises) and track their performance through the subsequent turbulence, comparing them to firms that never obtained a certification. By fixing the certification status well in advance of the shocks, we mitigate reverse-causality concerns (i.e. we are not looking at firms that decided to certify during a crisis, but those who had made that choice earlier). We account for firm fixed effects (capturing any advantages that certified firms may have on average) as well as year effects (capturing common shock impacts), and we include interaction terms between the certified-by-2013 indicator and each crisis year (2016 through 2024). This allows us to estimate the year-by-year "performance gap" between the certified and non-certified groups, after controlling for each year's economic conditions and any stable firm characteristics. Intuitively, we ask: did the cohort of certified firms fare relatively better or worse in each of the downturn years compared to how the never-certified firms fared in the same period?

The results, illustrated in Figure 5.8 (for revenue, employment and productivity, respectively), show a clear pattern of advantage for certified firms during several crisis years. Prior to the shocks, in 2015 and 2016, there was no significant difference in revenue, employment or productivity between the two groups – certified and never-certified firms were performing similarly, which provides a baseline validation in this pre-crisis period. However, once the Brexit referendum uncertainty hit (post-2016), a gap opened up, particularly in terms of revenues and productivity. In 2017, the first full year after Article 50 of the Treaty of the European Union was invoked and the legal mechanism to leave the EU began, certified firms on average outperformed their never-certified peers in revenue growth, and this relative advantage persisted in the following years. Through 2018 and 2019 (a period of ongoing Brexit negotiations and uncertainty), certified businesses tended to maintain higher revenues relative to where we would expect them to be if they had no certification. Essentially, having a certified management system in place before the turmoil seems to have helped firms cope better with uncertainty and possibly retain business.

Figure 5.8: Resilience of certified firms through major UK shocks: Baseline model



Notes: Estimated year-by-year performance gap (in revenue, employment and labour productivity, respectively) between firms certified before 2013 and those never certified, controlling for year and firm effects. Certified firms show higher relative performance during Brexit-related uncertainty and the post-pandemic recovery, indicating greater resilience to shocks.

Revenue and productivity trajectories through recovery

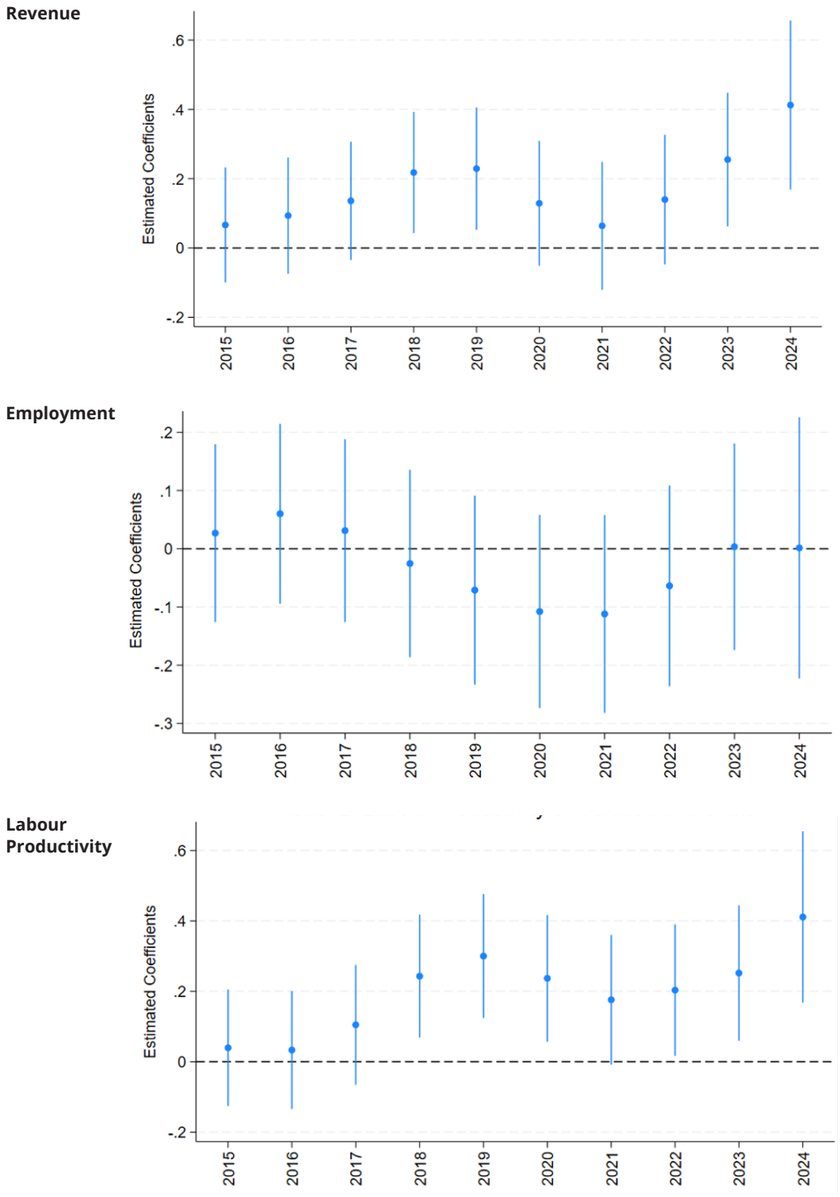
Figure 5.8 further suggests that, during the COVID-19 shock in 2020 and the subsequent lockdown/restriction period in 2021, the performance gap temporarily narrowed. In 2020, and especially by 2021 (the height of the pandemic's disruption), the revenue advantage of the certified cohort dipped and became statistically indistinguishable from zero. This is perhaps not surprising, as the pandemic was an unprecedented shock that hit a wide swath of businesses very hard, likely overwhelming many of the usual differentiators. Even so, the gap did not reverse – certified firms did not perform worse; they responded similarly to other firms during the downturn. By 2022, as the economy reopened and recovered, the certified firms' relative performance advantage re-emerged. In 2022 and 2023, we again observe certified firms significantly outperforming the never-certified group in revenue, despite the spike in energy prices and the emergence of the cost-of-living crisis. This positive gap persists through the end of our data in 2024. In practical terms, across the post-2016 crises (with the exception of the acute phase of the pandemic), businesses that had a QMS/EMS certification prior to the shocks tended to sustain higher revenues than comparable uncertified businesses. A similar story holds for labour productivity: certified firms show a productivity advantage even while the economy was hit by these negative shocks, meaning they managed to either produce more output per worker or maintain productivity better than non-certified firms under the same conditions. On the other hand, employment did not show a notable relative difference – certified firms and others saw similar employment impacts. This suggests that the revenue and productivity advantages were achieved not by disproportionately preserving jobs (since both groups shed or added jobs at similar rates), but perhaps by certified firms adapting operations, managing risks, maintaining resilient supply chains, finding new markets or efficiencies, or otherwise mitigating the hit to output better than their peers.

Robustness checks

To ensure these findings on resilience are robust, we subjected it to more demanding tests. One concern is that different industries or regions were unevenly affected by, say, the pandemic or Brexit. If certified firms are concentrated in sectors that happened to suffer less (or rebound faster), the above result could partly reflect those external factors rather than the certification itself. We therefore estimated an extended model including interactions for region–year, industry–year, legal form–year and age–year, which means effectively we compare certified and non-certified firms within the same region, industry, age bracket and legal form for each year. This saturates the model with controls for any differential shock impacts across those categories and thus takes out differences in the effects that the COVID pandemic had on different industries and regions, for example.

As expected, and illustrated in Figure 5.9, with this very stringent specification, the estimated performance gaps shrink and fewer years show statistically significant differences (since we have removed much of the variation, and the standard errors grow). Nevertheless, it is telling that even in this saturated model, the direction of the effect remains consistently positive in all years – the point estimates continue to suggest a resilience advantage for certified firms, even if some of those estimates are no longer significant at conventional levels. In no year did certified firms underperform the control groups. This gives us greater confidence that the resilience effects of certification is not simply an artifact of industry or regional concentration; there appears to be a real underlying benefit, albeit a moderate one.

Figure 5.9: Resilience of certified firms through major UK shocks: Robustness checks using alternative specification



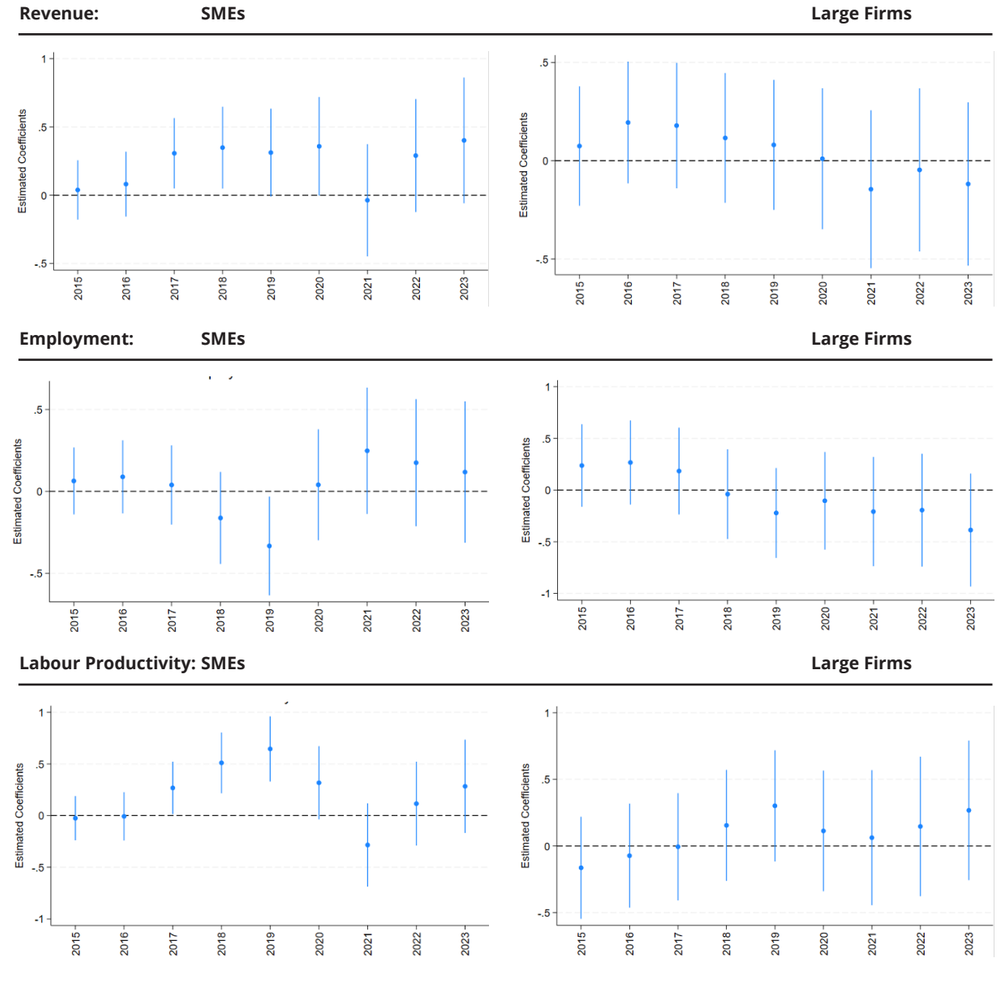
Notes: Estimated year-by-year performance gap (in revenue, employment and labour productivity, respectively) between firms certified before 2013 and those never certified, controlling for year and firm effects. Certified firms show higher relative performance during Brexit-related uncertainty and the post-pandemic recovery, indicating greater resilience to shocks. Extended models with additional controls, including region X year, industry X year, legal-form X year and age X age fixed effects.

Size heterogeneity: The SME resilience premium

To further explore the resilience effect, the sample was split between Small and Medium-sized Enterprises (SMEs, defined as firms with 100 or fewer employees in 2014) and Large Firms (more than 100 employees). This analysis reveals that the aggregate resilience premium documented earlier is driven disproportionately by SMEs.

As shown in Figure 5.10, the resilience premium is notably larger and more persistent for certified SMEs than for larger firms. In revenue terms, for SMEs, the certified–never-certified gap remained positive across much of the period following the Brexit referendum in 2016. Consistent with the aggregate findings, this gap compressed during the acute pandemic years (2020–2021) before re-emerging during the post-pandemic recovery. In contrast, the revenue advantage for larger firms was weaker and less consistent. For labour productivity, the SME premium is clearer and more persistent than for larger firms, where the productivity effect is associated with wider uncertainty. The employment effects are the least stable, confirming that the resilience story is primarily one of output and efficiency maintenance rather than 'employment protection'.

Figure 5.10: Resilience of certified firms through major UK shocks: The size effect



Notes: Small and Medium-sized Enterprises (SMEs) are defined as firms with 100 or fewer employees in 2014. Estimated year-by-year performance gap (in revenue, employment and labour productivity, respectively) between firms certified before 2013 and those never certified, controlling for year and firm effects. Certified firms show higher relative performance during Brexit-related uncertainty and the post-pandemic recovery, indicating greater resilience to shocks.

The finding that SMEs account for a larger share of the resilience advantage suggests that accredited certification operates as a vital organisational capability where baseline managerial and financial buffers are most constrained. For SMEs, an accredited QMS may function as a form of organisational insurance. Codified processes, clearer responsibilities, corrective-action routines and supplier/customer assurance can significantly reduce the costs of disruption when demand or operating conditions shift sharply.

In economic terms, the marginal value of these routines is higher for firms with less managerial slack and thinner cash buffers. While larger firms often possess sophisticated internal controls and risk management functions, the formalised systems provided by quality management systems offer SMEs a foundational structure to sustain throughput, maintain customer confidence and support quicker recovery.

While this heterogeneity analysis reveals a clear pattern, the estimates for any given year should be treated with a degree of caution since splitting the sample reduces statistical power and widens confidence intervals. Nevertheless, the results provide indicative evidence that certification delivers its highest resilience returns where a firm's internal buffers are more limited.

Interpreting the resilience effect by certification type

Finally, we explore whether the resilience advantage differs by type of certification. Does QMS or EMS confer different crisis-management benefits? To investigate this, we split the sample between firms that held only QMS certification (and no EMS) by 2013 and firms that held only EMS certification by 2013. We then compare each group to appropriate never-certified firms using the baseline model (firm and year fixed effects only, for simplicity). The estimation results (visualised in Figures 5.11 and 5.12) indicate that the resilience benefits in these recent crises were largely driven by QMS-certified firms. Firms with QMS certification alone showed a noticeable revenue advantage in the turbulent years – their revenues were higher relative to non-certified peers during Brexit and COVID years – although not every yearly gap was statistically significant, the overall pattern favoured QMS firms. In contrast, firms with EMS alone showed little significant relative advantage in revenues during the same period. More specifically, QMS-certified companies maintained a positive performance differential in most crisis years, whereas EMS-certified companies tracked very closely to non-certified firms with no noticeable gap. This difference could stem from the nature of the standards: quality management practices might help firms become more agile, improve customer retention and process stability under stress, whereas environmental management improvements, while beneficial for other reasons, may not directly cushion a firm against macroeconomic shocks. It could also relate to the sectors involved – QMS is far more prevalent in manufacturing and construction, which faced particular Brexit/COVID challenges, whereas EMS adopters include more large industrial firms that may have had other resilience factors at play. In any case, no evidence emerged of a resilience boost from EMS certification alone. Comparing results in Figures 5.11 and 5.12 further suggests that there was no clear sign of an extra advantage for dual-certified firms beyond the effect of QMS; firms holding both behaved similarly to those with just QMS in the crisis period.

Figure 5.11: Resilience of QMS certified firms through major UK shocks

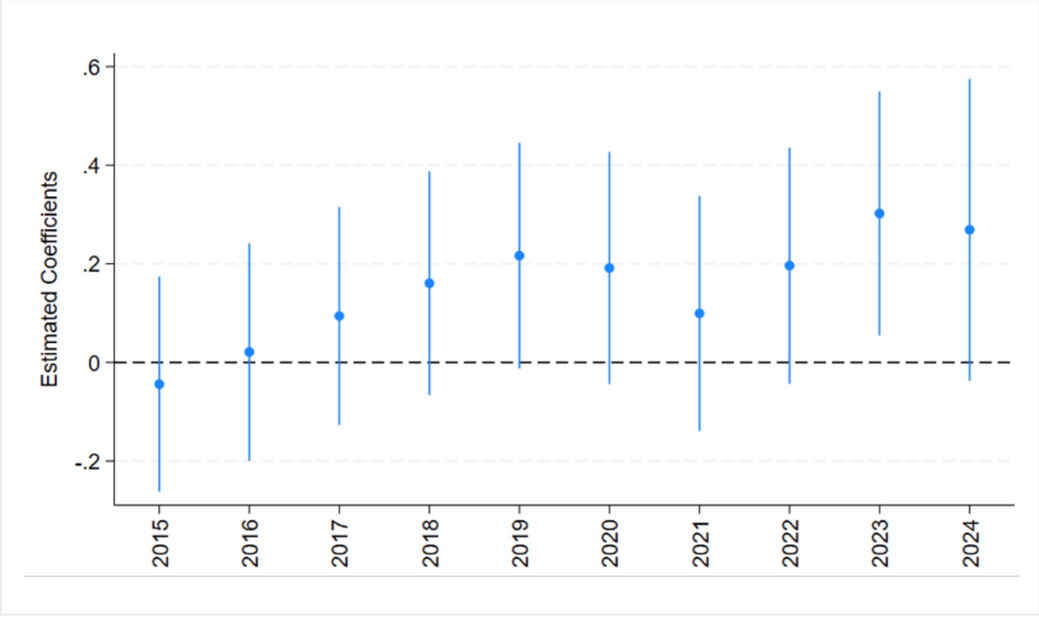
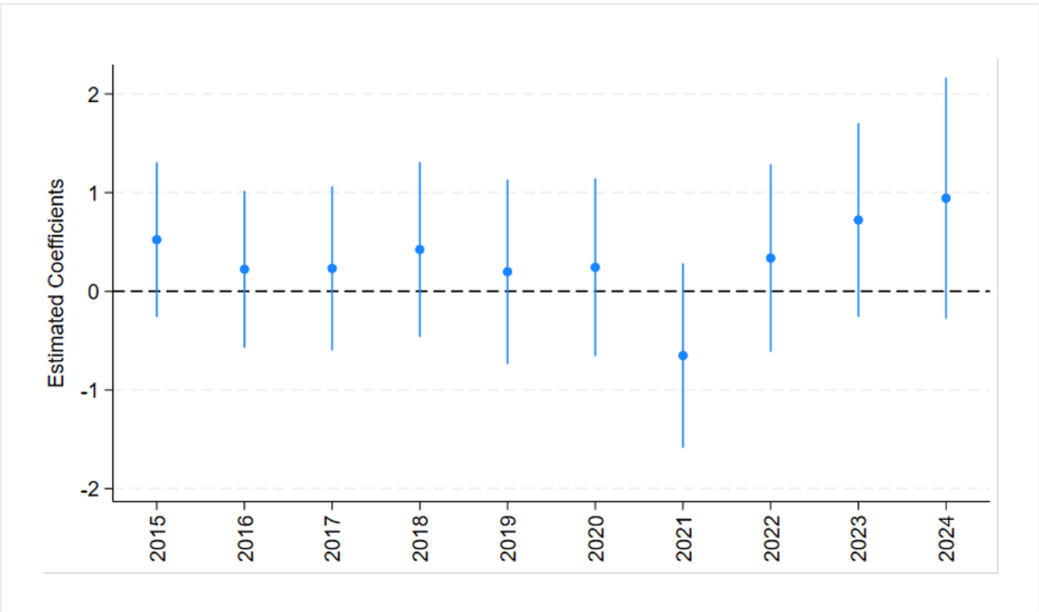


Figure 5.12: Resilience of EMS certified firms through major UK shocks



In summary, although our earlier impact evaluation did not find a universal and immediate performance uplift, in terms of revenue or productivity, from management certification, the evidence from this analysis suggests that certified firms – especially those with quality management certification – have been more resilient through recent economic crises. This aggregate resilience premium is driven disproportionately by SMEs, for whom certification appears to deliver its highest returns. Certified SMEs maintained a clearer and more persistent premium in revenue and labour productivity during major shocks compared to larger firms, suggesting that management systems function as a vital organisational capability where baseline managerial and financial buffers are most constrained. This resilience effect implies that accredited management certification can equip firms with practices that improve adaptability and crisis management. While certification may not always translate into immediate growth, it enhances stability and robustness, which is highly valuable during turbulent times. Such benefits might not be fully captured by short-term averages but become evident when tested by adversity. Over the longer run, a more resilient firm is likely to sustain investment, employment and innovation better, yielding broader economic benefits.

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6

Conclusion and recommendations

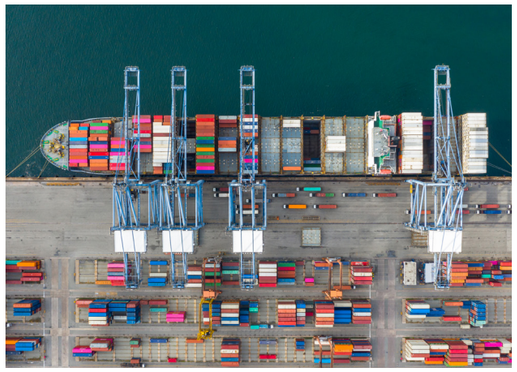
This study draws on a newly constructed linked database of UK firms that integrates UKAS's CertCheck records with detailed company accounts from Moody's Analytics Orbis, enabling a robust evaluation of how accredited management systems certification – ISO 9001 (Quality Management) and ISO 14001 (Environmental Management) – relate to business performance. The resulting firm-level longitudinal panel, encompassing tens of thousands of certified businesses across the UK, constitutes a major development in the evidence base, moving beyond the limitations of earlier small-scale survey studies. As core components of the national Quality Infrastructure (QI), QMS and EMS certifications translate international quality and environmental assurance principles into firms' operational practice. Understanding their diffusion and economic impact is therefore of clear strategic relevance to both business and policy.

In simple cross-sectional terms, certified businesses are larger, older, and more productive on average than those that have never certified, underscoring the common perception that certification goes hand-in-hand with strong performance. However, when we apply econometric methods closer to causal analysis – using staggered Difference-in-Differences models and matching methods – we find that the average post-certification effect on revenue and labour productivity is small and statistically insignificant for a typical recent adopter. In other words, once we control for who chooses to get certified, obtaining a certificate by itself does not usually produce a large, statistically significant, short-run increase in sales or efficiency. The evidence we have found does not rule out that obtaining accredited certification leads to improved business performance, but rather that the estimates are too imprecise for us to be able to conclude this. The most consistent interpretation is one of self-selection: businesses that are better managed and more growth-oriented are more likely to seek accredited certification, which is why certified firms outperform in general, rather than certification instantly making them outperform. This nuance is vital for setting realistic expectations.

Interpreting the evidence on new adopters – constraints and context

It is important to acknowledge the limitations of the data and scope that shape this conclusion. The causal identification for the short-run performance effect hinges on first-time certifications observed within the last decade. Many firms that adopted QMS/EMS earlier (for example, in the early 2000s) lie outside the timeframe of our analytical sample, meaning we could not include the full history of those long-standing certified firms in measuring impact. By focusing on more recent adopters, who tend to be latecomers to these now-mature standards, we may be observing firms for whom the incremental benefit of certification is lower than it was for early adopters (since the standards have diffused widely and become more of a baseline expectation in many industries). Moreover, the new adopters in our dataset are disproportionately small and mid-sized enterprises, whose financial performance is often volatile and less consistently reported. This volatility makes detecting modest improvements more difficult – a slight uptick in productivity due to certification might be masked by year-to-year fluctuations. We also deliberately exclude certification renewals and ongoing certifications from the causal estimates (to avoid conflating maintenance of a standard with the act of adoption), which means this analysis does not capture the long-term benefits accruing to firms that have been certified for long periods. Finally, we note that certification is a process, not a discrete event: firms typically invest significant time in preparing for assessment, implementing new processes and controls well before the certificate is awarded. Some performance gains likely occur during this implementation phase, effectively preceding the official 'start' of certification in our data. All these factors imply that while we rule out large, uniform short-term gains from certification by new adopters at the economy-wide level, the true impact of certification may be positive and spread out over time – benefits that are real but not easily captured by our short-run metrics of sales and productivity.

The construction sector offers indicative, though not definitive, evidence of performance gains from certification. Firms adopting ISO 9001 (QMS) recorded higher labour productivity in subsequent years – roughly 17% relative to comparable firms – but also displayed mild upward trends beforehand, suggesting that part of the improvement may reflect pre-existing trends. Nevertheless, the pattern aligns with expectations for a project-based industry where process control, quality assurance and reliable delivery are critical to competitiveness. Certification in this context appears to consolidate and formalise good practices already underway, supporting operational efficiency.



Notable resilience benefits among established adopters during crises

Crucially, firms that already had an accredited certification in place before the recent negative economic shocks demonstrated stronger resilience through those crises than firms without certification. In our crisis-period analysis, certified companies maintained higher revenue levels, and, in some cases, higher productivity compared to never-certified companies during the Brexit turbulence (post-2016), the COVID-19 pandemic (2020–2021) and the spike in energy prices (2022-2023). In particular, certified firms recovered faster following the pandemic, even though the economy entered a cost-of-living crisis. This resilience effect was especially associated with quality management (ISO 9001) certification, consistent with QMS's focus on robust internal processes, risk management and customer satisfaction – all critical factors in navigating disruptions. EMS (ISO 14001) certification likely yields other benefits (regulatory compliance, sustainability credibility) that are valuable but did not show a strong immediate effect on financial performance during these shocks. Importantly, splitting the sample by business size reveals that SMEs account for a larger share of this resilience advantage in revenue and labour productivity. This implies that, for SMEs, an accredited management certification functions as organisational insurance: codified processes and corrective-action routines reduce disruption costs for firms that typically have less managerial slack and thinner cash buffers. Overall, this resilience finding indicates that accredited management systems contribute to a firm's ability to withstand and bounce back from external shocks, providing a form of insurance or "ballast" during uncertain times. This is a key economic value of certification that goes beyond typical year-to-year performance metrics.

Recommendations and strategic implications

Based on the evidence, several pragmatic recommendations emerge for businesses, policymakers and the wider quality infrastructure community:

First, certification should be viewed as a long-term capability and resilience tool, not a quick fix for growth. Accredited QMS/EMS certification should be positioned as part of a firm's broader toolkit for building capacity, consistency and trust, rather than as a stand-alone lever guaranteed to boost short-run productivity. The near-term commercial benefits of certification tend to be context-dependent: they are most apparent in sectors or supply chains where meeting these standards is essential to compete (eg construction contractors needing ISO 9001 to qualify for projects, or suppliers using certification to signal quality to win contracts). In those cases, certification can directly support revenue by opening market opportunities and ensuring reliable performance. More generally, ISO 9001 in particular appears to enhance operational resilience, which can safeguard performance during disruptions – an indirect but important benefit. In contrast, ISO 14001's advantages may be more about meeting regulatory or client expectations and improving efficiency in resource use, which contribute to sustainability and reputation over time rather than immediately raising revenue per employee. For government and industry bodies, this means messaging around certification should set realistic expectations: it is an investment in operational excellence and risk management that pays off over the long haul, rather than a guarantee of instant growth.

Second, what matters most is the quality of adoption and maintenance – embedding processes and continuous improvement – rather than certificate counts. Expanding the population of certified firms is less beneficial than ensuring that certifications are meaningfully implemented and maintained. The research reinforces that 'not all certificates are equal' in their impact. In this context, accredited certification can add value by supporting depth and consistency of implementation: accredited certification bodies are themselves assessed against international requirements, and their regular, robust audits are designed to surface non-conformities and pinpoint practical improvements. This reduces the scope for 'forum shopping' (Lerner and Tirole, 2006) for lighter-touch assessments and helps ensure that auditing functions as a genuine mechanism for operational learning rather than a symbolic 'tick-box' exercise. Firms that embed standards in this way – supported by rigorous external validation and continual review – are more likely to realise durable performance and resilience gains over time. Support should accordingly focus on enabling high-quality adoption through practical guidance, templates and peer-learning networks that demystify implementation and spread workable practices. When firms integrate QMS/EMS principles into everyday operations – through process documentation, employee training and feedback loops for improvement – and sustain them through renewal, they build routines that can deliver incremental gains and, over time, strengthen resilience and adaptability. A key takeaway is that policy initiatives or industry programmes should value depth of implementation: encouraging firms to 'do it well' rather than just 'do it'.

Third, the resilience benefits of certification should be recognised and leveraged. One clear message for both firms and policymakers is that accredited management certifications have a role in strengthening organisational resilience. The evidence that certified firms weathered recent economic storms better suggests that certification can be seen as a form of organisational preparedness. When a firm is ISO-certified, it has met a rigorous standard of management discipline – procedures for monitoring performance, mechanisms for corrective action and a culture of quality and risk awareness. These features can help a business remain steady and responsive during a crisis. However, it is also evident that certification alone is not a shield – it should be complemented by other good business practices and contingency planning. Stakeholders should therefore promote certification as one component of a resilience strategy. Integrating certification with broader risk management and business continuity planning will maximise its resilience payoff.

Finally, support should be targeted to high-impact areas and to continue building the evidence base. To maximise the economic value of accredited certification, any promotional or support efforts should be targeted and evidence-led. Our findings suggest looking at sectors or regions where uptake is still low but potential gains are high – for instance, industries with clear supply-chain requirements for certification or emerging sectors where demonstrating quality and sustainability could unlock growth. Avoid one-size-fits-all mandates; instead, focus on removing barriers for firms that genuinely stand to benefit (eg helping SMEs in manufacturing or construction that face customer demands for ISO certification but lack resources to implement it well). In parallel, it is important to keep strengthening the empirical evidence on certification's impacts. This study has advanced the frontier by creating a large longitudinal dataset and yielding insights on revenue and productivity, but there are other channels and standards to explore. Future research should examine newer or less pervasive standards (where early adopters might see clearer gains before the standard becomes ubiquitous), and widen the lens beyond financials – for example, tracking whether certification improves export success, contract win rates, cost savings, quality defect rates, access to finance or long-term survival and growth. Enhancing data linkages (especially to capture smaller firms and older certification cohorts) will allow more precise estimation of long-run effects and heterogeneity ('what works for whom'). Continuous evidence-building will enable UKAS and policymakers to articulate the benefits of accredited certification with greater confidence and nuance over time, ensuring that support and resources are directed where they can have the most impact.

In conclusion, accredited quality and environmental management certifications mark out firms that are better performers and help to institutionalise good management practices, particularly manifesting as greater resilience during tough times. This resilience effect is most profound for the SME segment, where certification provides critical capabilities that offset limited internal buffers. However, the average causal impact on short-term growth metrics is limited for firms adopting these mature standards today. The evidence counsels a balanced view: promote and facilitate certification as part of long-term competitiveness and risk management, without viewing it as a quick productivity fix. Policies should support high-quality adoption in the right contexts, be measured in promises of immediate gains, and remain committed to gathering further evidence on the commercial, operational and risk-reduction pathways through which accredited certification delivers value. By doing so, the UK's quality infrastructure can be leveraged to its fullest – bolstering firms' capabilities and resilience in a sustainable, evidence-backed manner.

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Appendix

Table A.1 QMS and EMS status by sector
QMS status

	ALWAYS	NEVER	STARTER	STOPPER	TOTAL
Agriculture, Forestry Fishing	16	10	75	4	102
Mining and Quarrying	42	14	136	6	195
Manufacturing	4,183	604	6,585	305	11,534
Electricity, gas, steam and air conditioning supply	13	17	59	7	92
Water supply, sewerage, waste management and remediation activities	76	55	422	13	555
Construction	733	551	3515	108	4,823
Wholesale and retail trade; repair of motor vehicles and motorcycles	858	215	2,064	81	3,179
Transportation and storage	187	75	574	23	845
Accommodation and food service activities	17	7	47	3	74
Information and communication	243	293	1448	59	1,999
Financial and insurance activities	54	41	241	12	339
Real estate activities	43	16	147	16	211
Professional, scientific and technical activities	664	469	3052	114	4,217
Administrative and support service activities	695	372	2812	103	3,906
Public administration and defence; compulsory social security	23	12	124	2	159
Education	28	18	132	7	179
Human health and social work activities	42	34	310	12	389
Arts, entertainment and recreation	4	5	35	3	46
Other service activities	194	79	559	24	839
Other	247	56	574	58	900
Total	8,362	2,943	22,911	960	34,583

Table A.1 QMS and EMS status by sector
EMS status

	ALWAYS	NEVER	STARTER	STOPPER	TOTAL
Agriculture, Forestry Fishing	7	9	58	0	74
Mining and Quarrying	15	15	88	3	118
Manufacturing	411	528	2,989	97	3,950
Electricity, gas, steam and air conditioning supply	13	15	64	3	92
Water supply, sewerage, waste management and remediation activities	37	52	382	10	473
Construction	92	422	2,353	47	2,869
Wholesale and retail trade; repair of motor vehicles and motorcycles	40	162	819	21	1,024
Transportation and storage	16	56	277	1	349
Accommodation and food service activities	3	6	31	2	41
Information and communication	16	134	400	11	550
Financial and insurance activities	11	45	176	3	233
Real estate activities	6	14	96	2	116
Professional, scientific and technical activities	77	300	1,310	37	1,693
Administrative and support service activities	35	222	1,233	24	1,493
Public administration and defence; compulsory social security	0	3	32	1	35
Education	1	8	51	1	60
Human health and social work activities	2	28	61	2	91
Arts, entertainment and recreation	0	6	22	0	28
Other service activities	13	56	248	6	317
Other	32	57	363	16	454
Total	827	2,138	11,053	287	14,060

Table A.2 QMS and EMS status by region
QMS status

	ALWAYS	NEVER	STARTER	STOPPER	TOTAL
Channel Islands	4	2	8	1	14
East Midlands	497	165	1,415	46	2,097
East of England	766	247	1,972	98	3,021
Isle of Man	0	0	5	0	5
London	225	276	1,387	63	1,898
North East	334	163	896	33	1,405
North West	1,078	328	2,655	97	4,100
Northern Ireland	292	88	823	19	1,206
Scotland	206	91	816	34	1,125
South East	1,203	521	3614	165	5,408
South West	665	218	1716	79	2,630
Wales	302	90	904	22	1,310
West Midlands	1,052	234	2,128	117	3,461
Yorkshire and Humberside	856	273	2,039	83	3,205
Total	7,480	2,696	20,378	857	30,885

Table A.2 QMS and EMS status by region
EMS status

	ALWAYS	NEVER	STARTER	STOPPER	TOTAL
Channel Islands	0	1	2	0	3
East Midlands	62	137	623	16	822
East of England	51	187	969	34	1,210
Isle of Man	0	0	1	0	1
London	28	191	792	21	1,013
North East	32	98	428	12	562
North West	103	212	1,198	26	1,517
Northern Ireland	58	71	574	13	704
Scotland	38	56	399	8	494
South East	101	341	1,680	53	2,130
South West	56	136	734	15	929
Wales	44	82	489	4	617
West Midlands	98	193	933	36	1,230
Yorkshire and Humberside	67	229	906	20	1,207
Total	738	1,934	9,728	258	12,439

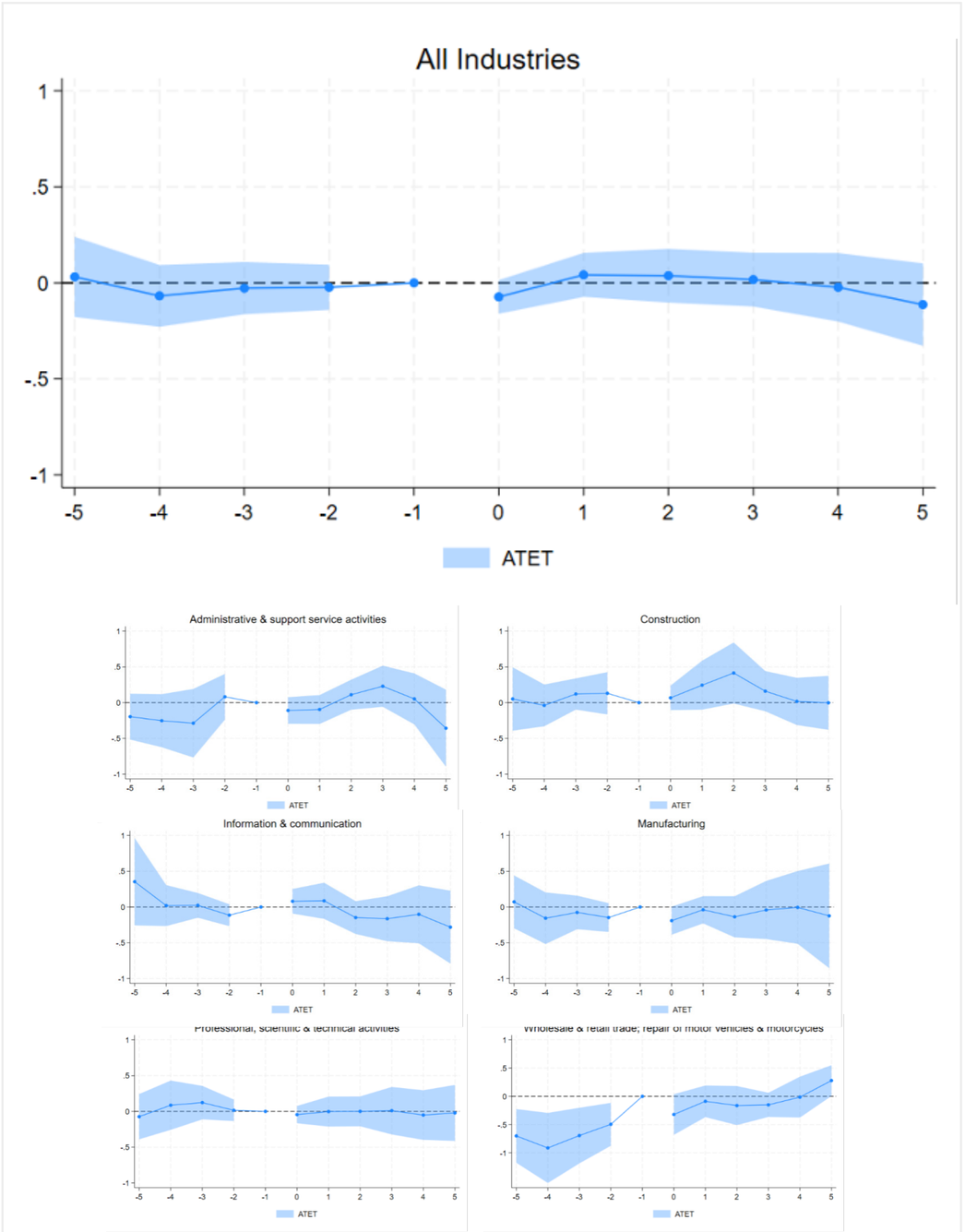
Table A.3 Estimated effect of certification on revenues and labour productivity using matched sample

	ALL	ADMINISTRATIVE & SUPPORT SERVICES	CONSTRUCTION	INFORMATION & COMMUNICATION
		REVENUES		
ATET	-0.018	-0.031	0.158	-0.056
	(0.047)	(0.087)	(0.112)	(0.094)
Pre-Trends	3.394	8.503	3.476	15.823**
		LABOUR PRODUCTIVITY		
ATET	0.009	-0.123	0.254***	-0.005
	(0.052)	(0.112)	(0.088)	(0.083)
Pre-Trends	6.466	20.653***	12.991*	5.640
Observations	853,660	92,527	105,935	95,575

	MANUFACTURING	OTHER	PROFESSIONAL, SCIENTIFIC & TECHNICAL	WHOLESALE & RETAIL TRADE; REPAIR OF MOTOR VEHICLES & MOTORCYCLES
		REVENUES		
ATET	-0.085	-0.041	-0.034	-0.121
	(0.120)	(0.132)	(0.101)	(0.116)
Pre-Trends	59.986***	25.537***	4.299	13.094*
		LABOUR PRODUCTIVITY		
ATET	-0.177	0.142	-0.032	0.101
	(0.122)	(0.127)	(0.139)	(0.228)
Pre-Trends	10.219	17.509**	12.642*	14.895**
Observations	52,017	260,948	145,279	101,379

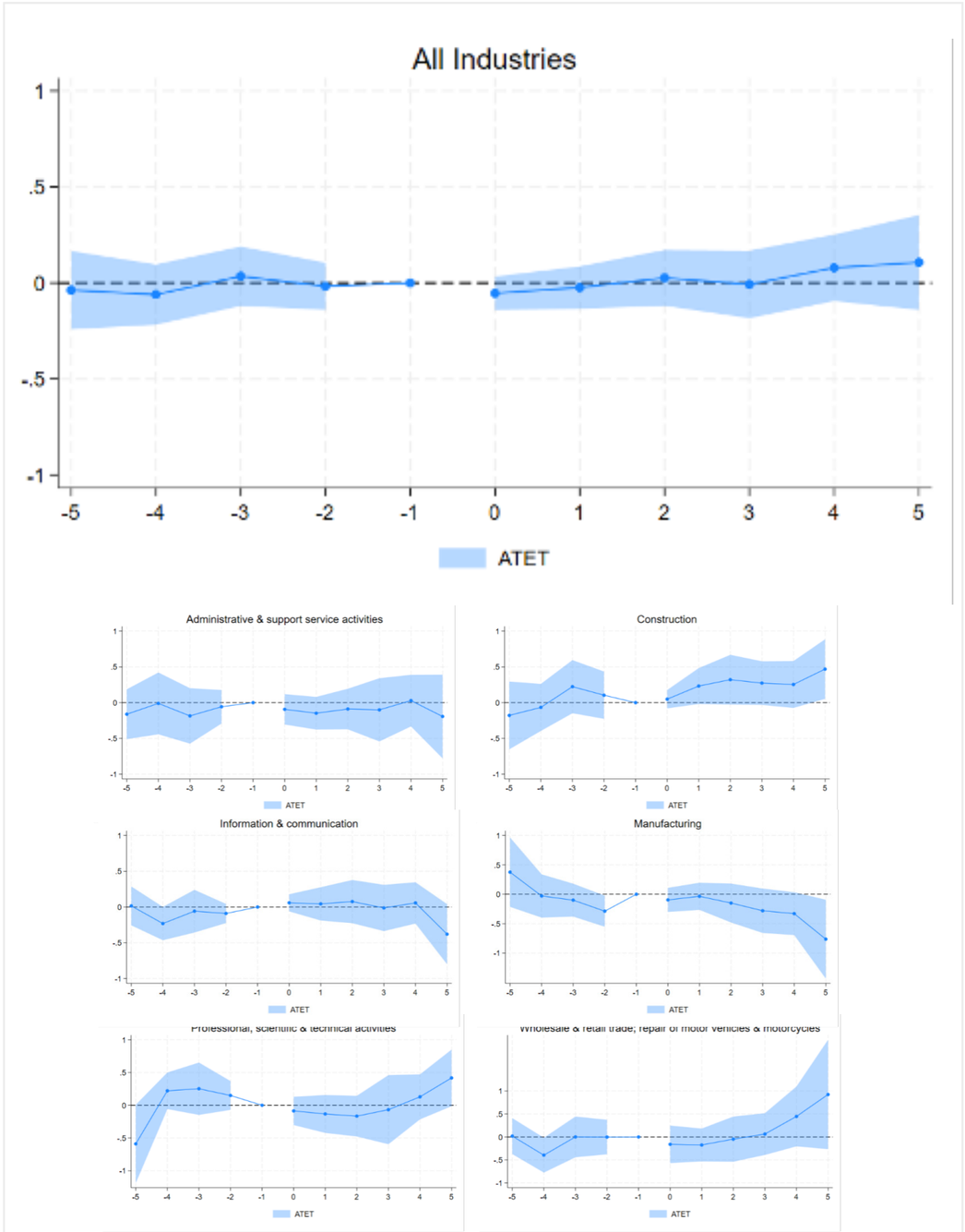
Notes: Standard errors are in parentheses. */**/*** denotes statistical significance at the 10%/5%/1% level. ATET denotes Average Treatment Effect on Treated. 'Pre-trends' refers to a test of the null hypothesis that the aggregated pre-treatment effects equal zero.

Figure A.1: Estimated effects on revenue using matched sample



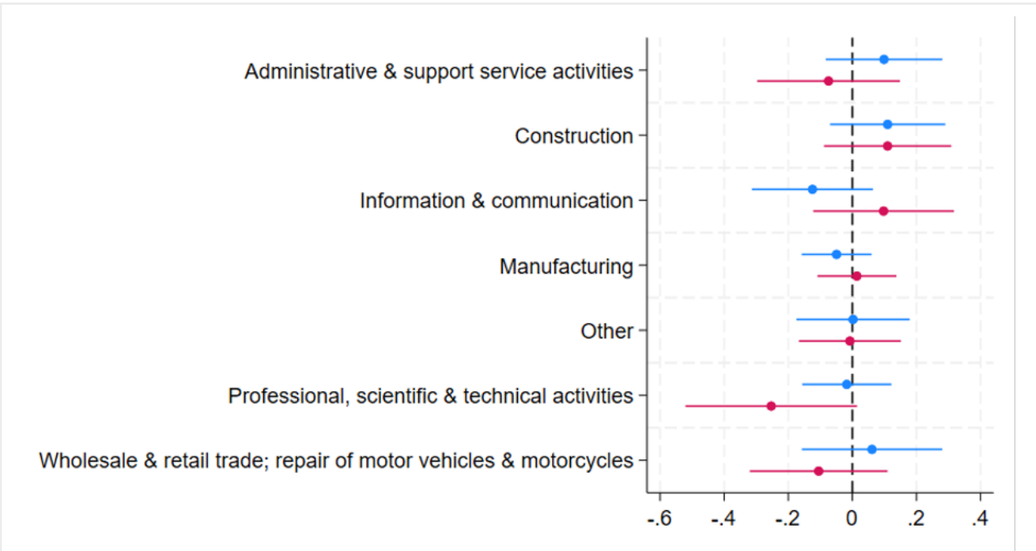
Notes: ATET denotes Average Treatment Effect on Treated. Shaded area shows 95% confidence interval.

Figure A.2: Estimated effects on labour productivity using matched sample



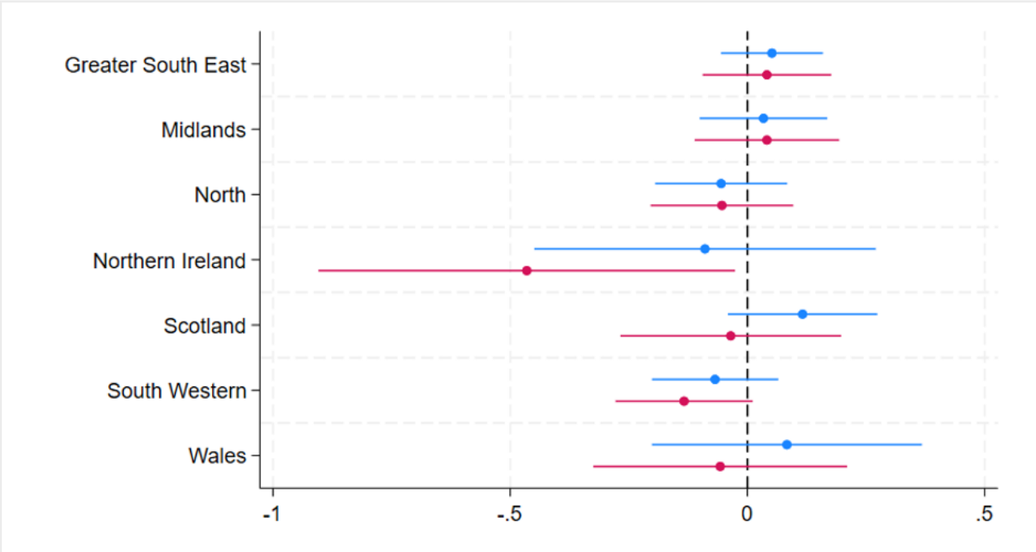
Notes: ATET denotes Average Treatment Effect on Treated. Shaded area shows 95% confidence interval.

Figure A.3: Estimated effects of certification on revenue and labour productivity by industry



Notes: Horizontal lines show 95% confidence intervals.

Figure A.4: Estimated effects of certification on revenue and labour productivity by region



Notes: Horizontal lines show 95% confidence intervals.

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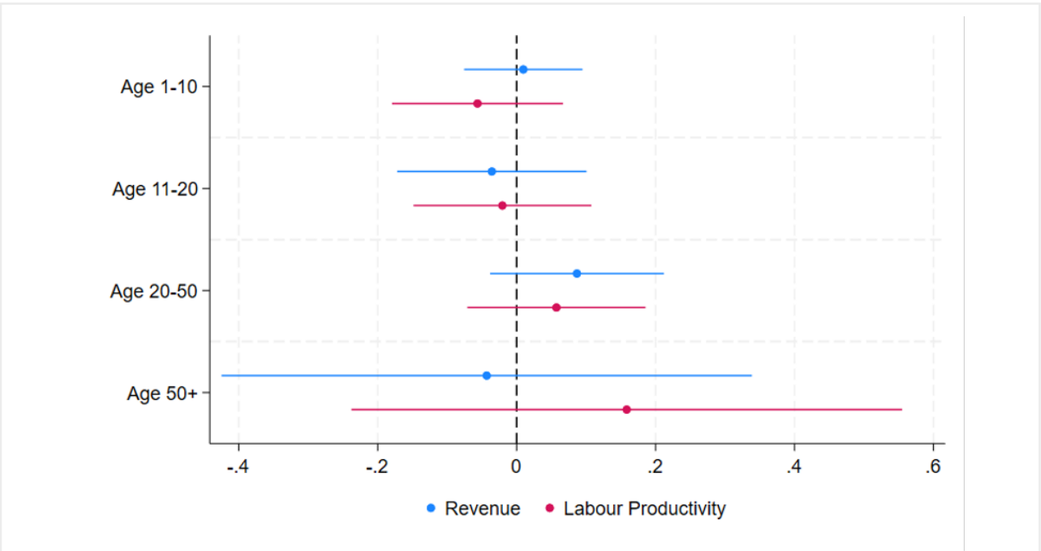
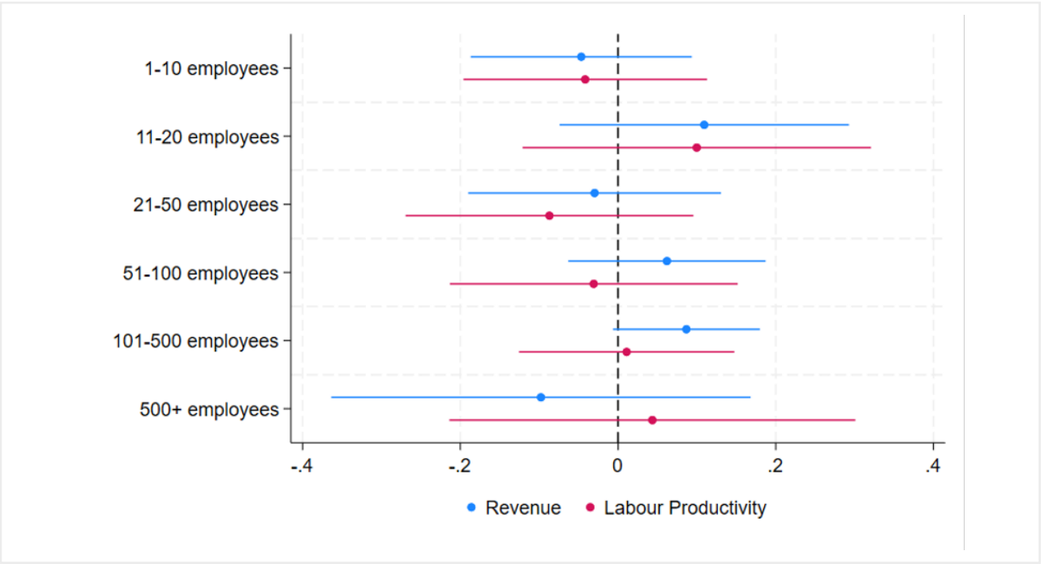
Figure A.5: Estimated effects of certification on revenue and labour productivity by age



Notes: Horizontal lines show 95% confidence intervals.

Figure A.6: Estimated effects of certification on revenue and labour productivity by employment size



Notes: Horizontal lines show 95% confidence intervals.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